



# Application Guide for Lodging

Using the  
LEED Green Building Rating System™



Prepared for  
**U S Air Force Center for  
Environmental Excellence**



In cooperation with the  
**U S Green Building Council**



Prepared by  
**Paladino and Company, Inc.**

## **LEED™ Application Guide for Lodging**

The Application Guide for Lodging has been developed in cooperation with the U.S. Air Force and the U.S. Green Building Council. The document is subject to revision and updating without notice. Revisions may include changes to both the layout and content of the document.

The LEED™ Application Guide for Lodging is the first edition of this document that supports the LEED Green Building Rating System™. The U.S. Green Building Council makes its best effort at promulgating a standard that improves environmental and economic performance of commercial buildings using established or advanced industry principles, practices, materials, and standards. The LEED™ Application Guide for Lodging is intended to be used by low-rise, lodging building project stakeholders and project teams as a guide for green and sustainable design in conjunction with the LEED Green Building Rating System™.

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## Interpretation Pages by LEED Category

Sustainable Sites	SSp10 to SSc80
Water Efficiency	WEc10 to WEc31
Energy & Atmosphere	EAp10 to EAc60
Materials & Resources	MRp10 to MRc70
Indoor Environmental Quality	EQ p10 to EQc82
Innovation & Design Process	IDc11 to IDc20

## Appendix

List of Referenced Documents	A-1 to A-4
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**Introduction**

The purpose of this application guide is to provide direction in applying the LEED Green Building Rating System (LEED) to commercial and non-commercial facilities whose primary function is lodging. Lodging facilities are defined as attached living units that provide shelter and basic services such as electricity, water, and sewage to building occupants.

Applicable building types for this guide include dormitories and barracks, apartment buildings and condominiums, hotels and motels, nursing homes, hostels and other facilities where the primary use is to provide permanent or temporary lodging for people. This guide is not applicable to single-family residences or medical facilities. The guide was developed in cooperation with the US Air Force and the US Green Building Council.

**US Air Force Sustainable Design & Construction**

The United States Air Force (USAF) is committed to sustainable design and construction practices to comply with Executive Order 12873 and Executive Order 12902. These orders direct federal agencies to consider the following factors when designing and constructing new facilities: use of recycled and salvaged building products, life cycle analysis, use of environmentally preferable products, waste prevention and the ultimate disposal of building materials, energy efficiency, water conservation, and renewable energy technologies.

The USAF also recognizes the economic and environmental benefits of sustainable design and construction practices. Special emphasis is placed on life cycle analysis of designed structures. Life cycle analysis (LCA), also referred to as life cycle assessment, is an informed decision-making process that can be applied to building components, design strategies, and other measures associated with analyzing building alternatives. The LCA process is beneficial because initial capital costs are considered in addition to ownership and maintenance costs over a specified building lifetime, typically 50 years or more.

To capitalize on parallel efforts and knowledge from the civilian construction industry, the USAF decided to adopt a standardized framework for encouraging sustainable building design. Advantages of using an established system include the benefit of field-tested methodologies and access to coordinated reference materials that already exist. This desire to adopt an existing approach led to the selection of the LEED Green Building Rating System as the basis for evaluating performance in new dormitory facilities.

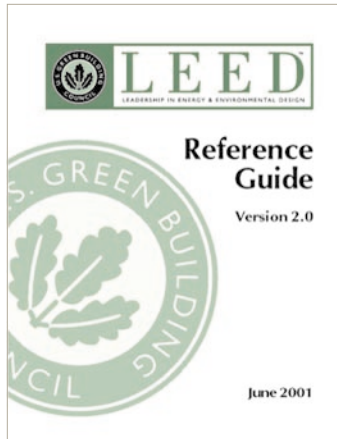
LEED was created for commercial buildings. However, many LEED credits can be applied to lodging facilities such as dormitories, hotels, motels, nursing homes, and other housing facilities.

- Applicable Building Types
- Dormitories & Barracks
  - Apartment Buildings
  - Condominiums
  - Hotels & Motels
  - Nursing Homes
  - Hostels

See the Air Force Center for Environmental Excellence at [www.afcee.brooks.af.mil](http://www.afcee.brooks.af.mil) for more information on the USAF's commitment to sustainability.

USAF design documents are generally prescriptive whereas LEED guidelines are typically performance-based. However, both resources can be simultaneously applied to the design process.

## Introduction



LEED is comprised of six general categories

- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality
- Innovation & Design Process

LEED Certified	26-32 pts
LEED Silver	33-38 pts
LEED Gold	39-51 pts
LEED Platinum	52-69 pts

### LEED Green Building Rating System™

The Leadership in Energy and Environmental Design (LEED), is a program of the USGBC that establishes performance goals in five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. In addition, a sixth category, Innovation & Design Process addresses those environmental issues not included in the environmental categories such as acoustics, community enhancement, education, and expertise in sustainable design. Many issues specific to lodging facilities that are not addressed by the existing credits may be included in the Innovation & Design Process category.

The six LEED categories are divided into 41 prerequisites and credits for a total of 69 points. Prerequisites are required to achieve LEED Certification and receive no points. Credits include a variable number of points, some of which are cumulative based on performance levels and others that address distinct measures that are related by an overarching sustainable concept. Qualifying LEED projects are awarded a specific LEED certification level by the USGBC depending on the total points achieved by the project. The certification levels available for LEED projects include certified, silver, gold, and platinum.

The LEED Green Building Rating System is supported by the LEED Reference Guide, a document that provides additional information and guidance for each LEED Prerequisite and Credit. Consult the LEED Rating System, the LEED Reference Guide and the LEED web site ([www.leedbuilding.org](http://www.leedbuilding.org)) for more information on the LEED program, the LEED application process, and the USGBC.

### Applying LEED to USAF Lodging Projects

LEED was designed for new and renovated commercial buildings, general office buildings, and multi-family residences of four stories or greater. Challenges arise when attempting to apply LEED to lodging facilities because these buildings are often less than four stories and are classified as low-rise residential buildings. In addition, lodging facilities are designed as residences for occupants (either on a permanent or temporary basis) and are occupied at all hours of the day. In contrast, commercial buildings are designed for occupancy during working hours only. As a result, sustainable design issues differ for lodging facilities, especially in the Energy Efficiency and Indoor Environmental Quality categories. Many of these issues have been resolved by analyzing the intent of each LEED Prerequisite or Credit designed for commercial facilities and applying this intent to the lodging facility.

In many cases, no supplement to LEED is needed for its application to lodging facilities. For instance, many prerequisites and credits in the Sustainable Sites, Materials & Resources, and Water Efficiency categories can be applied to lodging facilities with no supplemental interpretation. For some of the LEED Prerequisites and Credits, lodging facilities have an advantage over commercial buildings due to their residential nature. For instance, a variety of energy-efficient appliances and water-efficient fixtures are available for residential applications that are not available to commercial buildings.

It is important to note that the USAF documents and LEED documents differ in their approach to incorporating sustainable measures into buildings. LEED is a performance-based system and excels at providing benchmarks for sustainability. Conversely, the USAF documents provide prescriptive measures for achieving sustainable goals but do not outline the goals themselves.

For instance, the LEED rating system provides performance goals for water savings whereas the USAF documents give examples of water efficiency measures such as low-flow fixtures and appliances. While the methods for achieving sustainability are markedly different, all of the documents are helpful references in the design process.

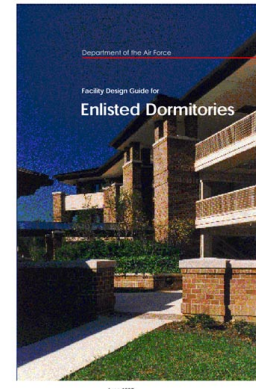
It is important to remember that USAF lodging facilities are designed as individual modules that are duplicated many times to create a multi-unit building. Therefore, while environmental and economic impacts associated with one module may appear to be negligible, these impacts are multiplied numerous times to create an entire lodging facility and may result in substantial impacts in aggregate.

This application guide does not supersede the standards set forth in the LEED Green Building Rating System. Instead, it is an interpretation of the LEED criteria for lodging facilities. The LEED Green Building Rating System and the LEED Reference Guide are the governing documents for all LEED certification applications.

### **US Air Force Resources**

Two USAF documents that are essential to developing sustainable USAF lodging facilities include the Department of the Air Force Facility Design Guide for Enlisted Dormitories and the USAF Environmentally Responsible Facilities Guide. Both of these documents provide prescriptive methods for the development of sustainable USAF lodging facilities. These documents and other USAF documents (listed in the Appendix) should be used in conjunction with the LEED Green Building Rating System, the LEED Reference Guide and the LEED Welcome Packet when designing and constructing USAF lodging facilities.

Lodging facilities can take advantage of residential features such as efficient appliances and fixtures to capture LEED credits.







### How to Use the Application Guide

This Application Guide is designed to complement the LEED Green Building Rating System and the LEED Reference Guide. The Application Guide should be used as a working document that is referenced and updated frequently throughout the design process. In this manner, the Application Guide serves as a checklist of suggested steps and can be used to track the progress of the design team in the completion of those steps. Because changes in the building design affect the anticipated LEED score, these changes should be tracked as they occur. The elements of this Application Guide include a LEED Scorecard, the Prerequisite and Credit Descriptions and an Appendix.

### The Certification Process

In concert with the Application Guide, the LEED Welcome Packet provides two helpful aids when applying for certification by the U.S. Green Building Council: the LEED Calculator and the LEED Template. The LEED Calculator is a Microsoft Excel spreadsheet programmed to calculate compliance with the requirements for particular LEED credits. The LEED Template is a Microsoft Word document that can be used to prepare the application for LEED certification. Once all the steps to achieve a particular prerequisite or credit are complete, the project manager then transfers information from the Application Guide checklists to the LEED Template. The Template is an automated form that records the required narrative, tracks the points being attempted, and lists the submittals provided to document each prerequisite and credit.

The LEED Scorecard (as shown on pages 9 and 10) lists each credit included in the LEED Green Building Rating System. Project managers should use the scorecard to track progress on the prerequisites and credits being pursued for their project. In the initial stages of a project the scorecard can be used to estimate which credits might be achievable. Throughout project development the same scorecard can summarize the progress of the more detailed steps listed on the individual page for each LEED prerequisite and credit. Project managers should assess each prerequisite and credit for the level of effort estimated to achieve them. Adjacent to each prerequisite and credit is a set of three boxes labeled easy, moderate, and difficult. This serves to differentiate "low-hanging fruit" from more difficult green design choices.

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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For prerequisites, enter a zero in the appropriate box, as these are required and have no points associated with them. For credits, enter the anticipated points in the appropriate box. For those credits that are not being pursued, cross out the boxes or leave them blank. Total the number of points for each category and sum all of the points to estimate the anticipated LEED score. A place to copy the estimated points, and their level of difficulty, is included on the second page of the interpretation pages for each prerequisite and credit.

The descriptions for each prerequisite and credit are organized in the Application Guide by LEED Category and are numbered by prerequisite or credit number. Sample pages are shown in **Figures 1** and **2** to illustrate their features.

The Appendix lists all resources, in print and available electronically, that are applicable to LEED Lodging projects and USAF dormitory projects.

## Overview

### Credit Narratives

The prerequisite and credit narratives apply the LEED Green Building Rating System to lodging facilities and USAF dormitories. The first page of each prerequisite and credit narrative includes the official intent and requirements information from the LEED Green Building Rating System. This serves to establish the provisions for successfully earning the prerequisite or credit. The first page also includes a discussion of how the prerequisite or credit applies to lodging facilities and specifically to USAF dormitories. These features are illustrated in a sample first page in Figure 1.

Figure 1 Credit Narrative Page

The figure shows a sample page for Prerequisite 1: Erosion and Sedimentation Control. The page layout includes the following elements:

- Navigation tabs:** A row of tabs labeled SS, WE, EA, MR, EQ, ID, with 'SS' highlighted.
- Title and Points:** 'Prerequisite 1' and 'Lodging'.
- Intent and Requirements:** A green box containing the official intent and requirements from the LEED Green Building Rating System.
- Special Considerations:** Two sections titled 'As applied to LEED Lodging' and 'As applied to U S Air Force' providing specific details for each facility type.
- Page Numbers:** 'SSp1' at the bottom right and 'Prepared by Paladino and Company, Inc., Copyright 2001' at the bottom center.

Callouts from the left side of the image point to these elements:

- Navigation tabs as used in the LEED Reference Guide
- Prerequisite or credit Title and possible Points
- Official Intent and Requirements from the LEED Green Building Rating System™
- Special considerations for the prerequisite or credit as applied to lodging facilities
- Special considerations for the prerequisite or credit as applied to lodging facilities of the U S Air Force
- Page numbers correspond to prerequisite and credit numbers

**Credit Checklists**

The second page provides a checklist for completing the prerequisite or credit and is illustrated in Figure 2. The checklist is intended as a step-by-step list for project managers to track progress. The three boxes (easy, moderate, and difficult) from the LEED scorecard are included at the top of the page for project managers to estimate the degree of difficulty to achieve each prerequisite and credit. Those elements of the checklist required as submittals for LEED certification are in bold and are noted with the word "Submittal."

The second page also includes a list of USAF reference documents. These documents should be reviewed by the project manager and the project team to ensure compliance with USAF regulations and design procedures.

Figure 2 Credit Checklist Page

The screenshot shows a page from the 'LEED Application Guide for Lodging' titled 'Prerequisite 1 Lodging'. It features a progress indicator with boxes for 'SS', 'WE', 'EA', 'MR', 'EQ', and 'ID', with 'MR' highlighted. Below this is a difficulty scale with 'Easy', 'Mod', and 'Diff' boxes, and a 'Points 0' indicator. The main heading is 'Erosion and Sedimentation Control'. The checklist includes four steps, each with a checkbox and a description. Two 'Official LEED Submittal' items are highlighted in green. A 'References' section lists 'Facility Design Guide for Enlisted Dormitories' and 'USAF Landscape Design Guide'. Callout boxes on the right provide context: 'Tracking boxes to estimate the degree of difficulty to achieve each prerequisite or credit' points to the progress indicator; 'Suggested steps to achieve the prerequisite or credit are marked with check boxes' points to the step list; 'Official LEED Submittals required for certification are printed in bold' points to the green highlights; and 'Reference items are listed for guidance (see the Appendix for details)' points to the references section.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Total Project Score</b>	<b>Possible Points 69</b>
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easy mod diff LEED Certified: 26 - 32 points, LEED Silver: 33 - 38 points,  
LEED Gold: 39 - 51 points, LEED Platinum: 52 - 69 points

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Sustainable Sites</b>	<b>Possible Points 14</b>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1 Erosion and Sedimentation Control	<b>0</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1 Site Selection	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2 Urban Redevelopment	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3 Brownfield Redevelopment	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.1 Alternative Transportation, Locate Near Public Transportation	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.3 Alternative Transportation, Alternative Fuel Refueling Stations	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.4 Alternative Transportation, Minimum or No New Parking	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5.1 Reduced Site Disturbance, Protect or Restore Open Space	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5.2 Reduced Site Disturbance, Reduce Footprint & Increase Open Space	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6.1 Stormwater Management, No Net Increase or 25% Decrease	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6.2 Stormwater Management, Treatment Systems	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7.1 Landscape & Exterior Design to Reduce Heat Islands, Site Surfaces	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7.2 Landscape & Exterior Design to Reduce Heat Islands, Roof Surfaces	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 8 Light Pollution Reduction	<b>1</b>

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Water Efficiency</b>	<b>Possible Points 5</b>
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easy mod diff

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1 Water Efficient Landscaping, 50% Reduction to Potable Free System	<b>2</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2 Innovative Wastewater Technologies	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3 Water Use Reduction, 20-30%	<b>2</b>

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Energy &amp; Atmosphere</b>	<b>Possible Points 17</b>
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easy mod diff

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1 Fundamental Building Systems Commissioning	<b>0</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 2 Minimum Energy Performance	<b>0</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 3 CFC Reduction in HVAC&R Equipment	<b>0</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1 Optimize Energy Performance, 20-60% New 10-50% Existing	<b>10</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2 Renewable Energy, 5-20%	<b>3</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3 Additional Commissioning	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4 Ozone Depletion	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5 Measurement and Verification	<b>1</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6 Green Power	<b>1</b>

□	□	□	<b>Materials &amp; Resources</b>	<b>Possible Points 13</b>
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easy mod diff

□	□	□	Prereq 1 Storage & Collection of Recyclables	0
□	□	□	Credit 1 Building Reuse, Maintain 75-100% of Existing Shell & 0-50% of Non-Shell	3
□	□	□	Credit 2 Construction Waste Management, Salvage or Recycle 50-75%	2
□	□	□	Credit 3 Resource Reuse, Specify 5-10%	2
□	□	□	Credit 4 Recycled Content, Specify 25-50%	2
□	□	□	Credit 5.1 Local/Regional Materials, 20% Manufactured Locally	1
□	□	□	Credit 5.2 Local/Regional Materials, of 20% Above 50% Harvested Locally	1
□	□	□	Credit 6 Rapidly Renewable Materials	1
□	□	□	Credit 7 Certified Wood	1

□	□	□	<b>Indoor Environmental Quality</b>	<b>Possible Points 15</b>
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easy mod diff

□	□	□	Prereq 1 Minimum IAQ Performance	0
□	□	□	Prereq 2 Environmental Tobacco Smoke (ETS) Control	0
□	□	□	Credit 1 Carbon Dioxide (CO <sub>2</sub> ) Monitoring	1
□	□	□	Credit 2 Increase Ventilation Effectiveness	1
□	□	□	Credit 3.1 Construction IAQ Management Plan, Prior	1
□	□	□	Credit 3.2 Construction IAQ Management Plan, During	1
□	□	□	Credit 4.1 Low-Emitting Materials, Adhesives	1
□	□	□	Credit 4.2 Low-Emitting Materials, Paints	1
□	□	□	Credit 4.3 Low-Emitting Materials, Carpet	1
□	□	□	Credit 4.4 Low-Emitting Materials, Composite Wood	1
□	□	□	Credit 5 Indoor Chemical and Pollutant Source Control	1
□	□	□	Credit 6.1 Controllability of Systems, Operable Window	1
□	□	□	Credit 6.2 Controllability of Systems, Individual Controls	1
□	□	□	Credit 7.1 Thermal Comfort, Comply with ASHRAE 55-1992	1
□	□	□	Credit 7.2 Thermal Comfort, Permanent Monitoring System	1
□	□	□	Credit 8.1 Daylight and Views, Diffuse Sunlight to 90%	1
□	□	□	Credit 8.2 Daylight and Views, Direct Line of Site to 90%	1

□	□	□	<b>Innovation &amp; Design Process</b>	<b>Possible Points 5</b>
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easy mod diff

□	□	□	Credit 1.1 Innovation in Design	1
□	□	□	Credit 1.2 Innovation in Design	1
□	□	□	Credit 1.3 Innovation in Design	1
□	□	□	Credit 1.4 Innovation in Design	1
□	□	□	Credit 2 LEED™ Accredited Professional	1



## Lodging

### Prerequisite 1 **Erosion and Sedimentation Control**

Intent Control erosion to reduce negative impacts on water and air quality.

Requirements Design to a site sediment and erosion control plan that conforms to the best management practices in the EPA's Stormwater Management for Construction Activities, EPA Document No. EPA-832-R-92-005, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.

As applied to LEED Lodging LEED Lodging facilities require the same erosion and sedimentation control as LEED commercial buildings. Prospective building sites should be analyzed for erosion potential and subsequent impacts on regional water bodies. Those sites that are prone to erosion processes should be avoided. Erosion control measures affect landscape design, building orientation, parking programs, grading activities, and storm drainage.

Follow the EPA Reference Standard and develop an Erosion Control Plan for the project to reduce negative impacts on water and air. If another standard dictates erosion control measures, compare this standard to the EPA Reference Standard and apply the standard that is most stringent.

As applied to U S Air Force USAF projects are required to follow an erosion and sedimentation control standard as described in the USAF Landscape Design Guide. Chapter 18: Erosion Control, Section 18.3 Erosion Control Planning Process describes a method for creating an Erosion Control Plan.

The EPA Standard requires the completion of 6 Steps: 1) Site evaluation, 2) assessment, 3) control selection, 4) certification, 5) construction, and 6) stabilization and termination. The USAF standard requires equivalent steps: an existing conditions survey (satisfies Step 1), an erosion potential analysis (satisfies Step 2), a detailed plan describing measures, the construction sequence and a management approach (satisfies Step 3, 4, 5 and 6). The technical format of the plan as required by the USAF more stringent than those of the EPA approach. Thus, following the USAF standard will meet the requirement for LEED.

Currently there are no sample plans available from the USAF, so consider using sample checklists from the EPA's web site. Include language in construction documents that require erosion and sedimentation control measures for the project. Also, monitor the project site during construction to ensure that the erosion and sedimentation requirements are being followed.

## Lodging

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Points 0

### Erosion and Sedimentation Control

#### Suggested steps:

- Step 1**  
Review the USAF erosion and sedimentation control guidelines. Determine if any local/regional requirements are applicable or appropriate for the project.
- Step 2**  
Follow the USAF erosion and sedimentation control guidelines and include these guidelines in construction documents during the Contract Document Development phase.
- Step 3**  
Monitor erosion and sedimentation control activities during construction to ensure that the erosion and sedimentation guidelines are being followed.



#### Official LEED Submittal:

Declare whether the project follows local erosion and sedimentation control standards or the referenced EPA standards and provide a brief listing of the measures implemented. If local standards and codes are followed, describe how they meet or exceed the EPA best management practices.



#### Official LEED Submittal:

Provide the erosion control plan (or drawings and specifications) with the sediment and erosion control measures highlighted.

- Step 4**  
For the LEED application, state that the project follows USAF erosion and sedimentation control guidelines. These guidelines meet the requirements of the EPA standards. Include construction documents describing the erosion and sedimentation control measures employed on the project.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on site planning.

##### USAF Landscape Design Guide

Refer to the erosion control measures in Chapter 18.



SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

### Credit 1 **Site Selection**

Intent Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

Requirements Do not develop buildings on portions of sites that meet any one of the following criteria:

- Prime agricultural land as defined by the American Farmland Trust
- Land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by FEMA
- Land which provides habitat for any species on the Federal or State threatened or endangered list
- Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent
- Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public land owner (Park Authority projects are exempt)

As applied to LEED Lodging LEED Lodging Facilities are required to avoid the same inappropriate sites as LEED commercial buildings. To capture this point, address the criteria as described in the credit during the site selection process and avoid locating a project on any of the identified land types.

As applied to U S Air Force Site selection is typically performed during the comprehensive planning process. Site selection on USAF installations is a challenging process due to the many installation types as well as the wide variety of locations available on a particular installation. Furthermore, the existing base location may disqualify the building from achieving this Credit. The controlling document for a specific USAF installation is the General Plan. Some USAF installations are likely to include prohibited land types as designated in the LEED Credit requirements.

SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					


## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Site Selection

#### Suggested steps:

- Step 1**  
Amend the USAF evaluation rating criteria to include LEED site restrictions during the Project Definition phase.
- Step 2**  
Evaluate the selected site location to ensure that it is not a prohibited land type as described by the LEED criteria.
-  **Official LEED Submittal:**  
Declare that the project site does not meet any of the prohibited criteria.
- Step 3**  
Provide a letter of certification stating that the project site is not located on any of the restricted land types. Include any applicable site analysis documents for the project.

#### References

##### **Facility Design Guide for Enlisted Dormitories**

Refer to the site selection process in Chapter 2.

##### **Comprehensive Plan**

This is the controlling document for site selection.

##### **Land Use Planning Bulletin: Base Comprehensive Plan**

Refer to Chapter 3 on site planning requirements and Chart A-1 on environmental planning factors including hydrology, ecology, and disturbed lands. Appendix B has an example Land Use Plan.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

### Credit 2 **Urban Redevelopment**

Intent Channel development to urban areas with existing infrastructure, protecting greenfields, preserving habitat and natural resources.

Requirements Increase localized density to conform to existing or desired density goals by utilizing sites that are located within an existing minimum development density of 60,000 square feet per acre (2 story downtown development).

As applied to LEED Lodging Lodging facilities may have difficulty achieving the minimum development densities as required by the credit depending upon the particular project location. An urban location is usually required to achieve densities of 60,000 square feet per acre.

As applied to U S Air Force USAF installations are often located in rural areas with low development densities. In addition, USAF installations tend to comprise large tracts of land with security buffers, further reducing development densities. As a result, this Credit may be difficult to achieve. Development densities can be increased on USAF installations by grouping buildings into campus clusters to create synergies and connections between different facilities. Most dormitories on USAF installations are three stories tall. This height was chosen to promote dense living situations without impacting quality of life for occupants. However, greater heights may be possible without compromising occupant comfort.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Urban Redevelopment

#### Suggested steps:

- Step 1**  
Review the comprehensive plan specific to the installation. Determine if the comprehensive plan is amenable to a dense development strategies.
- Step 2**  
Amend the Site Selection Process as outlined in the Facility Design Guide for Enlisted Dormitories to include development density criteria during the Project Definition phase.
- Step 3**  
Select a project site that maximizes development density and uses existing infrastructure.



#### Official LEED Submittal:

Provide an area plan with the project location highlighted and the calculated development density for both the project and the surrounding area.

- Step 4**  
For the LEED application, provide a site plan describing the project site and surrounding sites. Use the LEED Calculator to determine the appropriate density radius to consider and to complete density calculations.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to the site selection process in Chapter 2.

##### Land Use Planning Bulletin: Base Comprehensive Plan

Refer to Charts B-5 and B-6 on community functional relationships and Chart B-11 on open space function relationships.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

### Credit 3 **Brownfield Redevelopment**

Intent Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirements Develop on a site classified as a brownfield and provide remediation as required by EPA's Brownfield Redevelopment Program requirements.

As applied to LEED Lodging Brownfield redevelopment issues are similar for LEED lodging facilities and LEED commercial buildings. Both are dependent on the project site under consideration. Because lodging facilities are residential buildings, there may be increased concern by potential occupants regarding contamination on the site and possible risks associated with residing on these properties. Therefore, it is important to identify risks and determine if these risks are acceptable to site occupants and future property owners.

As applied to U S Air Force Brownfield redevelopment on USAF installations is dependent on the existence of abandoned industrial sites. Some USAF properties are considered to be Brownfields due to activities associated with hazardous chemicals such as jet fuels and solvents. If these sites are available and appropriate for development, it is necessary to complete some level of remedial action to qualify for this credit. In other words, this credit does not apply to sites where no remediation activities have been performed. Remediation activities may include cleanup or removal of contaminated soil and groundwater, site monitoring, and contaminant plume modeling.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Brownfield Redevelopment

#### Suggested steps:

- Step 1**  
Identify if Brownfield sites exist on the installation and if these sites are appropriate for redevelopment.
- Step 2**  
Amend the Site Selection Process to include criteria for Brownfield redevelopment in the Project Definition phase.
- Step 3**  
Assess the risks to building occupants for the future project and determine if these risks are acceptable to future building occupants.
- Step 4**  
Perform remediation activities on the site if necessary and document cleanup results.



#### Official LEED Submittal:

Provide a letter from the local regulatory agency or regional EPA office confirming that the site is classified as an EPA Brownfield site.



#### Official LEED Submittal:

Provide documentation demonstrating that remediation efforts have been performed on the site to clean up or stabilize contaminants.

- Step 5**  
For the LEED application, obtain a certification letter from the government agency with environmental jurisdiction over the installation stating that the project site is classified as a Brownfield site. Summarize the remediation efforts applied to the site and provide supporting documents describing remediation activities.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to the site selection process in Chapter 2.

##### The Environmental Restoration Program

Refer to Chapter 2 on cleanup program resources and elements.

## Lodging

### Credit 4.1 **Alternative Transportation, Public Transportation Access**

Intent Reduce pollution and land development impacts from automobile use.

Requirements Locate building within 1/2 mile of a commuter rail, light rail or subway station or 1/4 mile of 2 or more bus lines.

**As applied to LEED Lodging** Public transportation issues are similar for LEED lodging facilities and LEED commercial buildings. Access to public transportation is dependent on the location of the project in question. If the project is located in a rural area, it may be difficult or impossible to earn this Credit due to a lack of mass transit infrastructure or potential ridership. However, if the project is located in an area serviced by a private shuttle service, this may meet the intent of the Credit. For instance, a campus or hotel/motel may have a shuttle bus that transports people between facilities on campus or to a regional transit node, airport, or train station.

**As applied to U S Air Force** USAF installations are often located in areas not serviced by public transportation. However, some USAF personnel, especially those living on installations in foreign countries, have no personal vehicles and require a mass transit system. As a result, many Air Force installations offer facility transportation programs to accommodate installation residents. For example, if the installation is serviced by a shuttle bus that connects dormitory occupants with amenities throughout the installation as well as to the neighboring communities, this could meet the intent of the Credit. Conversely, a shuttle bus system may not be cost effective for an installation if there are not enough users for the system.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Alternative Transportation, Public Transportation Access

#### Suggested steps:

- Step 1**  
Determine the location of mass transportation services in relation to the project site.
- Step 2**  
Amend the Site Selection Process to include public transportation access in the site ranking process in the Project Definition phase.



#### Official LEED Submittal:

Provide an area drawing highlighting the building location, the fixed rail stations and bus lines, and indicate the distances between them. Include a scale bar for distance measurement.

- Step 3**  
For the LEED application, provide a drawing to indicate the distance to public transportation stops.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to sections in Chapter 3 addressing the location of bus and public transportation stops.

##### Base Comprehensive Transportation Planning Bulletin

Refer to the section in Chapter 2 on travel facilities.



SS	WE	EA	MR	EQ	ID
<b>Credit 4.2</b>					

## Lodging

### Credit 4.2 **Alternative Transportation, Bicycle Friendly**

Intent Reduce pollution and land development impacts from automobile use.

Requirements Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants

As applied to LEED Lodging Bicycle-friendly transportation amenities can easily be provided for lodging facilities. Bicycle security can be provided by purchasing and installing bicycle racks or lockers for use by all building occupants. Because lodging facilities are residences, changing rooms and showers are inherent in the building design. Separate facilities may be necessary for non-resident building occupants such as employees at hotels and nursing homes. In addition to bicycle security and changing facilities, bicycling activities are encouraged by safe and well-marked bicycle lanes.

As applied to U.S. Air Force USAF facilities are typically conducive to bicycling activities. It may be possible to include bicycling as a transportation option on the USAF installation for commuting to the workplace or to installation amenities.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Alternative Transportation, Bicycle Friendly

#### Suggested steps:

- Step 1**  
Poll future building occupants to estimate the appropriate number of bicycling facilities.
- Step 2**  
Adopt bicycle accommodation criteria during the Project Definition phase.
- Step 3**  
Incorporate bicycling facilities into the project design. Include bicycling equipment and design information in construction documents during the Contract Document Development phase.



#### Official LEED Submittal:

Provide site drawings and specifications highlighting bicycle securing apparatus and changing/shower facilities. Include calculations demonstrating that these facilities accommodate 5% or more of building occupants.

- Step 4**  
For the LEED application, include construction documents describing the accommodation of bicycling occupants. The documents should address bicycle securing apparatus, changing rooms, and showers. Follow the calculation methodology as described in the LEED Reference Guide.

#### References

##### USAF Landscape Design Guide

Refer to Chapter 10 on walkways and bikeways.

##### Facility Design Guide for Enlisted Dormitories

Refer to Chapter 3 on site circulation design.

##### Base Comprehensive Transportation Planning Bulletin

Refer to the section in Chapter 2 on travel facilities.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.3</b>					

## Lodging

### Credit 4.3 **Alternative Transportation, Alternative Fuel Refueling Stations**

Intent Reduce pollution and land development impacts from automobile use.

Requirements Install alternative-fuel refueling station(s) for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

As applied to LEED Lodging Alternative fuel refueling stations for commercial buildings are intended for commuting to and from the workplace. If such facilities are shared among residents, it is important to address access issues. It may also be desirable to provide facilities for non-resident building occupants such as employees at hotels and nursing homes.

As applied to U S Air Force Currently, many USAF installations operate conventional gas stations. These stations could also offer alternative fuels such as electricity and natural gas. The need for alternative fuel refueling stations is dependent on the installation population and estimated on-site and off-site vehicle trips. Alternative-fueled vehicles may be particularly applicable to short on-site trips where long distances travel is not required. It may be possible to use these stations for both personal use and official USAF business trips.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.3</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Alternative Transportation, Alternative Fuel Refueling Stations

#### Suggested steps:

- Step 1**  
Poll installation residents and employees to estimate the demand for alternative fuels.
- Step 2**  
Research alternative fuel vehicles and alternative fuel refueling stations and select the appropriate type and number of stations during project design phases.
- Step 3**  
Monitor installation of refueling stations during construction and perform commissioning to ensure that the stations will operate properly.



#### Official LEED Submittal:

Provide site drawings and specifications highlighting alternative-fuel refueling stations. Include information on venting if applicable.



#### Official LEED Submittal:

Provide calculations demonstrating that these facilities accommodate 3% or more of the total vehicle parking capacity.

- Step 4**  
For the LEED application, include construction documents describing the location and number of alternative-fuel refueling stations. Include a narrative describing the refueling stations and vehicles that will be serviced. Follow the calculation methodology as described in the LEED Reference Guide.

#### References

#### Base Comprehensive Transportation Planning Bulletin

Refer to the section in Chapter 2 on travel facilities.

## Lodging

### Credit 4.4 **Alternative Transportation, Parking Reductions**

Intent Reduce pollution and land development impacts from automobile use.

Requirements Size parking capacity to meet only minimum local zoning requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants.

As applied to LEED Lodging If zoning requirements exist for parking capacity, the minimum requirements should not be exceeded for the project. In areas where zoning requirements do not exist, such as military installations and campuses, the local zoning requirements of the adjacent municipality or county, for a similar use, should be adopted. Carpool and vanpool programs should be adopted for the lodging facility to service commuting between the residence and other amenities. In some cases, lodging facilities are located in close vicinity to the workplace and carpools and vanpools are not necessary. Such a strategy would likely comply with the intent of the credit.

As applied to U S Air Force Many USAF personnel, especially those in foreign countries, have no personal vehicles. As a result, parking requirements for USAF dormitories are typically lower when compared with commercial buildings. To further reduce parking requirements, dormitory occupants should be encouraged to share vehicles and utilize alternative transportation forms whenever possible. Reduced parking areas decrease the footprint of the building project and reduces stormwater runoff volumes and the urban heat island effect. These environmental improvements in turn reduce the cost of capital improvements, lowering the overall project budget.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.4</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Alternative Transportation, Parking Reductions

#### Suggested steps:

- Step 1**  
Identify the local or base zoning requirements for parking.
- Step 2**  
Poll building occupants to determine the number of parking spaces required.
- Step 3**  
Determine if opportunities for sharing parking facilities exist with adjacent buildings or if a carpool or van pool program would be useful.
- Step 4**  
Design the project with the minimal number of parking spaces required. Minimum parking requirements may be promulgated by the installation or by local/regional authorities.



#### Official LEED Submittal:

Provide a design narrative, parking plan, and company literature demonstrating that carpool and van pool programs serve 5% of the building occupants.



#### Official LEED Submittal:

For new projects, provide a copy of the local zoning requirements highlighting the criteria for minimum parking capacity. Provide a parking plan highlighting the total parking capacity.



#### Official LEED Submittal:

For rehabilitation projects, provide a pre-rehabilitation parking plan and a post-rehabilitation parking plan demonstrating that no new parking capacity was added.

- Step 5**  
For the LEED application, draft a narrative describing the carpool and van pool programs serving the project. Include any support documentation describing these programs and photographs of signage and applicable vehicles. Identify the parking program on construction documents and note the total number of parking spaces. Include local zoning requirements and demonstrate how the designed parking program does not exceed the minimum parking capacity required. Include construction documents that indicate the existing site's parking program and the project parking program. Include the total number of parking spaces for each program.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 addressing parking design.

**USAF Landscape Design Guide**

Refer to parking design guidelines in Chapter 14.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.4</b>					

## Lodging

Continue to the next page.



SS	WE	EA	MR	EQ	ID
<b>Credit 5.1</b>					

## Lodging

### Credit 5.1 **Reduced Site Disturbance, Protect and Restore Open Space**

Intent Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation.

As applied to LEED Lodging Site disturbance limits should be applied to lodging facilities similar to commercial buildings. These limits should be stated in construction documents and enforced during construction activities.

As applied to U S Air Force Site planning has a significant effect on open space areas incorporated into the project site. Project sites on USAF installations should be organized with buildings grouped in small community areas to preserve large expanses of open areas. Open areas can be used for activities such as recreation and stormwater management as well as providing a connection between the base facilities and the natural surroundings. Minimized site disturbance reduces landscaping needs and site repair activities after construction activities are completed.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.1</b>					



## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Reduced Site Disturbance, Protect and Restore Open Space

#### Suggested steps:

- Step 1**  
Include construction disturbance limits in construction documents during the Contract Document Development phase. Modify Division 0, Section 01505 Environmental Procedures as appropriate.
- Step 2**  
Monitor construction activities to ensure that construction disturbance limits are not exceeded.
-  **Official LEED Submittal:**  
On greenfield sites, provide site drawings and specifications highlighting limits of construction disturbance.
-  **Official LEED Submittal:**  
On previously developed sites, provide a narrative describing restoration and revegetation of degraded habitat areas. Include highlighted site drawings with area calculations demonstrating that 50% of degraded habitat areas have been restored.
- Step 3**  
For the LEED application, include construction documents that identify the construction areas and areas that have been protected. Describe any restoration activities that have been applied to degraded site areas and include construction documents showing the extent of restoration. Follow the calculation methodology in the LEED Reference Guide to determine the total amount of restored site area.

#### References

**Land Use Planning Bulletin: Base Comprehensive Plan**  
Refer to Chart B-11 for open space functional relationships.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.2</b>					

## Lodging

### Credit 5.2 **Reduced Site Disturbance, Maximize Open Space**

Intent Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements Reduce the development footprint (including building, access roads and parking) to exceed the local zoning's open space requirement for the site by 25%.

As applied to LEED Lodging Reduction of the building footprint is similar for lodging facilities and commercial buildings. Lodging units can be stacked to increase verticality of the building and reduce the building footprint. However, occupant comfort and accessibility issues should be considered for multiple floor buildings. On sites where the project area is not clearly defined, such as military bases and campuses, an area equal to the building footprint must be designated as open space through legally binding community covenants and restrictions. See the Reference Guide for more information.

As applied to U S Air Force Most USAF dormitories are three stories in height to maximize efficient use of available real estate. It may be possible to design dormitories with additional stories to further reduce the development footprint. Other methods to reduce the project footprint include minimizing parking requirements, sharing facilities between buildings such as recreation areas and dining halls, and by locating parking spaces underground. Generally, USAF installations have a great deal of space available for development, which does not encourage footprint reduction. Therefore, a conscious design decision is necessary to meet the intent of this credit.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.2</b>					

## Lodging


Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>


Points 1


### Reduced Site Disturbance, Maximize Open Space

#### Suggested steps:

- Step 1**  
Adopt project design criteria to minimize the building footprint during the Project Definition phase. Identify applicable local zoning requirements.
- Step 2**  
Research measures to stack the building program and share facilities with adjacent buildings to reduce the overall building footprint.
- Step 3**  
Implement viable footprint minimization measures in the project design. Employ these measures throughout the design phases to avoid expansion of the building footprint.

 **Official LEED Submittal:**  
Provide a copy of the local zoning requirements highlighting the criteria for open space.

 **Official LEED Submittal:**  
Provide highlighted site drawings with area calculations demonstrating that the building footprint exceeds local zoning space requirement for the site by 25%.

 **Official LEED Submittal:**  
For areas with no local zoning requirements (e.g., university campuses, military bases), designate open space area adjacent to the building that is equal to the building footprint. Provide a letter from the property owner stating that the open space will be conserved for the life of the building.

- Step 4**  
For the LEED application, include local zoning requirements and highlight the open space criteria. Include construction documents describing the building footprint and follow the calculation methodology in the LEED Reference Guide. If open space requirements do not exist, provide a certification letter from the installation commander describing the open space set aside in perpetuity.

#### References

##### **Comprehensive Plan**

Refer to the land use and open space designations and requirements

##### **Facility Design Guide for Enlisted Dormitories**

Refer to the module footprint comparisons in Chapter 2 and Chapter 4 on functional area and space criteria.

SS	WE	EA	MR	EQ	ID
<b>Credit 6.1</b>					

## Lodging

### Credit 6.1 **Stormwater Management, Flow Reduction**

Intent Limit disruption of natural water flows by eliminating storm water runoff, increasing on-site infiltration and reducing contaminants.

Requirements Implement a stormwater management plan that results in no net increase in the rate and quantity of stormwater runoff from existing to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff.

As applied to LEED Lodging Stormwater management for lodging facilities is similar to commercial buildings. Reuse of stormwater for residential applications such as clothes washing and landscape irrigation may be desirable. Stormwater reuse opportunities depend on precipitation volumes, building form, site constraints, and local codes and regulations.

As applied to U S Air Force On typical USAF installations, the area for dormitory projects is not clearly defined. One method for estimating the project area is to assume that all areas disturbed by construction activities constitute the project area. All surfaces within this area should be assessed for imperviousness and measures should be adopted to reduce stormwater generation. Stormwater flow reduction measures include stormwater reuse on site, infiltration of stormwater volumes, specification of pervious paving materials for hard surfaces, and construction of garden roofs.

SS	WE	EA	MR	EQ	ID
<b>Credit 6.1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Stormwater Management, Flow Reduction

#### Suggested steps:

- Step 1**  
Amend the Site Selection Process as described in the Facility Design Guide for Enlisted Dormitories to include stormwater management issues.
- Step 2**  
Establish a goal for stormwater flow reduction such as 50% or 100% reduction during the Project Definition phase.
- Step 3**  
Define the total project area by establishing project boundaries during the Project Definition phase. This may be a difficult process on installations where project boundaries are not well-defined.
- Step 4**  
Use the Landscape Design Guide to determine appropriate surface types for the project site to meet the established stormwater flow reduction goal.



#### Official LEED Submittal:

For sites with less than 50% net imperviousness, provide pre-construction and post-construction site drawings. Include area calculations demonstrating no increase in net imperviousness of the site.



#### Official LEED Submittal:

For sites with greater than 50% net imperviousness, provide a copy of the stormwater management plan. Include calculations describing how the measures of the plan decrease net imperviousness of the site by 25% over existing conditions.

- Step 5**  
For the LEED application, include construction documents describing all site surfaces. Use the LEED Calculator to estimate the total imperviousness of the existing site and the designed site.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to Chapter 6 on site development.

##### USAF Landscape Design Guide

Refer to Chapter 1 on site planning.

SS	WE	EA	MR	EQ	ID
<b>Credit 6.2</b>					

## Lodging

### Credit 6.2 **Stormwater Management, Flow Treatment**

Intent Limit disruption of natural water flows by eliminating storm water runoff, increasing on-site infiltration and reducing contaminants.

Requirements Implement a stormwater management plan that results in:  
- Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters (EPA 840-B-92-002 1/93).

As applied to LEED Lodging Applicability of stormwater flow treatment measures is dependent on the project site. For some projects, stormwater treatment is not possible due to site constraints or is not cost effective due to existing storm sewer infrastructure. A wide variety of mechanical and natural treatment systems to remove suspended solids, phosphorous, and other runoff contaminants are available.

As applied to U S Air Force Projects on USAF installations are generally less dense and thus, stormwater management measures are not hindered by space constraints. Conventional stormwater infrastructure is costly, especially on low-density properties that are far from a treatment facility or outflow. Thus, it may be cost effective to encourage treatment and infiltration of precipitation volumes via bioswales, retention and detention ponds, and constructed wetlands. These measures can also serve as site amenities such as decorative ponds and natural areas.

SS	WE	EA	MR	EQ	ID
<b>Credit 6.2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Stormwater Management, Flow Treatment

#### Suggested steps:

- Step 1**  
Identify and review applicable stormwater regulations, both regional and Federal.
- Step 2**  
Research stormwater infiltration and treatment strategies, including mechanical and natural systems. Rank these strategies in terms of initial costs, maintenance and repair costs, and potential benefits and problems.
- Step 3**  
Select the appropriate stormwater management strategy or strategies during project design phases. Design the project stormwater strategy following the requirements in the Facility Design Guide for Enlisted Dormitories.
- Step 4**  
Monitor construction activities to ensure proper installation of stormwater management measures.



#### Official LEED Submittal:

Provide drawings and specifications describing EPA Best Management Practices implemented for removal of TSS and TP.

- Step 5**  
For the LEED application, include construction documents and applicable cut sheets describing the stormwater treatment system employed for the project. Demonstrate that the stormwater treatment meets the credit requirements.

#### References

##### Facility Design Guide for Enlisted Dormitories

Chapter 3 requires drop-inlet structures with retention or detention capacity. These structures should also be designed to filter stormwater flows before discharging to local waterbodies.

##### USAF Landscape Design Guide

Refer to the stormwater management considerations in Chapter 18.

##### Environmentally Responsible Facilities Guide

Refer to Chapter 4 on water conservation and quality issues.



## Lodging

### Credit 7.1 **Landscape & Exterior Design to Reduce Heat Islands, Non-Roof Surfaces**

**Intent** Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

**Requirements** Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space underground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area.

**As applied to LEED Lodging** Heat island effects are similar for lodging facilities and commercial buildings. The heat island effect is typically considered in urban locations where constructed surfaces have a measurable effect on the microclimate. However, this credit can also be earned for projects in rural areas. Non-roof surfaces to consider include parking lots, sidewalks, roads and other impervious surfaces. It might also be desirable to tuck parking underneath the building to reduce site impervious surfaces.

**As applied to U S Air Force** The first step to reduce heat islands is to reduce impervious surfaces on the project. Once the impervious surface areas have been reduced, specify light-colored or open-grid surfaces. Locating parking underneath the building to reduce site impervious surfaces conflicts with force protection criteria. When considering alternative surface materials, it is important to consider problems associated with reflectance that could be a safety concern for drivers. The lifetime of these materials should also be assessed and compared with conventional materials. An simple method to achieve this credit is to specify light-colored concrete instead of conventional blacktop asphalt for parking lots and roadways. Concrete typically has a higher first cost but requires less maintenance and has a longer lifetime than blacktop asphalt surfaces.

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Points 1		

### Landscape & Exterior Design to Reduce Heat Islands, Non-Roof Surfaces

#### Suggested steps:

- Step 1**  
Adopt criteria to reduce the heat island effect in the Project Definition phase.
- Step 2**  
Assess the non-roof site surfaces for the project site and minimize these areas during project design phases. Consider tucking the parking program under the building and sharing impervious surfaces with neighboring buildings.
- Step 3**  
Research potential site surface materials in terms of emissivity, reflectance, first costs, maintenance, and estimated lifetimes.
- Step 4**  
Specify light colored materials or open-grid paving materials for impervious surfaces in construction documents during the Contract Document Development phase.



#### Official LEED Submittal:

Provide drawings highlighting all non-roof impervious surfaces and portions of these surfaces that will be shaded within five years. Include calculations demonstrating that a minimum of 30% of non-roof impervious surfaces areas will be shaded within five years.



#### Official LEED Submittal:

Provide specifications and cut sheets for high-albedo materials applied to non-roof impervious surfaces highlighting the reflectance of the installed materials.



#### Official LEED Submittal:

Provide drawings and calculations demonstrating that these materials are furnished and installed on 30% of non-roof impervious surfaces.



#### Official LEED Submittal:

Provide a parking plan demonstrating that a minimum of 50% of site parking spaces are located underground.



#### Official LEED Submittal:

Provide drawings and cut sheets for the open-grid pavement system with a minimum perviousness of 50%. Include calculations demonstrating that this pavement system covers a minimum of 50% of the total parking area.



#### Step 5

For the LEED application, include construction documents and cut sheets for site surfaces. Use the calculation methodology as described in the LEED Reference Guide to determine the amount of site coverage.

References

**Facility Design Guide for Enlisted Dormitories**

Refer to the section in Chapter 3 on site specifications for shade tree planting in parking areas and the section in Chapter 3 on sloped roofs.

**USAF Landscape Design Guide**

Refer to the section in Chapter 14 on shading of hardscape surfaces.

SS	WE	EA	MR	EQ	ID
<b>Credit 7.1</b>					

## Lodging

Continue to the next page.

## Lodging

### Credit 7.2 **Landscape & Exterior Design to Reduce Heat Islands, Roof Surfaces**

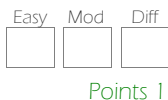
**Intent** Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

**Requirements** Use ENERGY STAR Roof-compliant, high-reflectance AND high emissivity roofing (initial reflectance of at least 0.65 and three-year-aged reflectance of at least 0.5 when tested in accordance with ASTM E903 and emissivity of at least 0.9 when tested in accordance with ASTM 408) for a minimum of 75% of the roof surface; OR install a “green” (vegetated) roof for at least 50% of the roof area.

**As applied to LEED Lodging** Heat island effects are similar for lodging facilities and commercial buildings. The heat island effect is typically considered in urban locations where constructed surfaces have a measurable effect on the microclimate. However, this credit can also be earned for projects in rural areas. Roof surfaces vary by project but there are options available for most types of roofs. Ballast roofs can be specified with a light colored ballast that conforms with credit requirements and metal or tiled roofs can be painted. Garden roofs automatically qualify for the credit.

**As applied to U S Air Force** Roof surfaces on the project should be specified to include materials that have high emissivity and high reflectance properties. Performance characteristics of these materials such as lifetime and energy benefits should be assessed before requiring them in construction documents. The slope of the roof will have a significant effect on the type of roofing material that can be specified. However, both low-slope and high-slope roofs can be specified with high emissivity, high-reflectance properties.

## Lodging



### Landscape & Exterior Design to Reduce Heat Islands, Roof Surfaces

#### Suggested steps:

- Step 1**  
Assess the project roof area and determine where high reflectance, high emissivity roofing materials can be applied.
- Step 2**  
Research potential roofing materials in terms of emissivity, reflectance, first costs, maintenance costs, and estimated lifetimes. Compare potential roofing systems to EPA Energy Star criteria.
- Step 3**  
Specify appropriate roofing materials in construction documents during the Contract Document Development phase.
- Step 4**  
Verify installation of the specified roofing materials during construction.



#### Official LEED Submittal:

Provide specifications and cut sheets highlighting roofing materials that are Energy Star labeled, with a minimum initial reflectance of 0.65, and a minimum three-year-aged reflectance of 0.5, and a minimum emissivity of 0.9. Include area calculations demonstrating that the roofing material covers a minimum of 75% of the total roof area.



#### Official LEED Submittal:

Provide specifications and cut sheets highlighting a green vegetated roof system. Include area calculations demonstrating that the roof system covers a minimum of 50% of the total roof area.

- Step 5**  
For the LEED application, include construction documents and cut sheets showing the type of roofing surfaces specified for the project. Include information on the reflectance and emissivity of the roofing surfaces. Use the calculation methodology in the LEED Reference Guide for calculations.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on architectural systems.

SS	WE	EA	MR	EQ	ID
<b>Credit 8</b>					

## Lodging

### Credit 8 **Light Pollution Reduction**

Intent	Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.
Requirements	Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site.
As applied to LEED Lodging	Light pollution reduction measures are similar for lodging facilities and commercial buildings. Lodging facilities often have outdoor signage to direct occupants and visitors. This signage should be downlit instead of uplit to reduce light pollution. These facilities also use outdoor lighting for parking lots, sidewalks, and building entrances. All outdoor lighting uses should all be assessed for light pollution effects and minimized when possible.
As applied to U S Air Force	Site lighting on USAF dormitories is necessary for safety, security, as well as for navigation. However, site lighting consumes energy every night, resulting in substantial energy costs over time. It also affects views to the night sky. Simple procedures such as specifying outdoor lighting with cut-off luminaires can greatly reduce light trespass. It is often helpful to adopt a site lighting plan to assist in proper outdoor lighting.

SS	WE	EA	MR	EQ	ID
<b>Credit 8</b>					




## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Light Pollution Reduction

#### Suggested steps:

- Step 1**  
Review the site lighting guidelines in the Facility Design Guide for Enlisted Dormitories. Assess site lighting needs for the project in terms of safety, security, and function.
- Step 2**  
Design outdoor lighting to comply with the LEED requirements. Use the design strategies as described in Chapter 16 of the USAF Landscape Design Guide. Include equipment and design information in construction documents during the Contract Document Development phase.
-  **Official LEED Submittal:**  
Provide a brief exterior lighting design narrative and exterior lighting design plan demonstrating the lighting objectives and measures that prevent any direct-beam illumination from leaving the building site.
-  **Official LEED Submittal:**  
Provide an exterior lighting design plan that illustrates the location of all lighting fixtures and the features they are to light.
-  **Official LEED Submittal:**  
Demonstrate that the design will use diffuse or muted light, will meet the IESNA illuminance values measured at eye height, and not create glare or direct lighting onto neighboring property, streets or the night sky.
- Step 3**  
For the LEED application, include construction documents and a narrative describing the exterior lighting strategy. Address the IESNA requirements and include a lighting contour map showing the footcandle contours on the site.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 addressing site amenities.

##### USAF Landscape Design Guide

Refer to outdoor lighting discussion in Chapter 16.



SS	<b>WE</b>	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

### Credit 1 **Water Efficient Landscaping, 50% Reduction to Potable Free System**

Intent Limit or eliminate the use of potable water for landscape irrigation.

- Requirements
- Use high efficiency irrigation technology, OR, use captured rain or recycled site water, to reduce potable water consumption for irrigation by 50% over conventional means.
  - Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems.

As applied to LEED Lodging Landscaping issues are similar for lodging facilities and commercial buildings. There may be increased opportunities for graywater application to landscapes for lodging facilities due to greater water use per capita in residential units. Landscape strategies vary depending on climate and site conditions. When designing the landscape, it is essential to employ a landscape architect who is familiar with local plants and can design the landscape for low maintenance and water consumption.

As applied to U S Air Force USAF dormitories have great potential for water efficient landscaping through stormwater or graywater reuse and xeriscape landscape design. The Site Planning section of the Facility Design Guide for Enlisted Dormitories addresses landscape design. According to this document, the intent of landscape design intent for USAF dormitories is to minimize water usage, conserve resources, and provide low-maintenance over the lifetime of the landscape. This design intent conforms with the goals of the Credit.

SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging



Points 2

### Water Efficient Landscaping, 50% Reduction to Potable Free System

#### Suggested steps:

- Step 1**  
Select a landscape architect that is familiar with the local climate and appropriate plant types. The landscape architect is the key design team member for designing a water efficient landscape for the project.
- Step 2**  
Design the landscape to require the least amount of irrigation volumes possible. Use the xeriscape principles as described in Chapter 13 of the USAF Landscape Design Guide whenever possible. Hosebibs can be used for temporary or occasional irrigation needs.
- Step 3**  
If the landscape requires irrigation, specify a water efficient irrigation system. See the Landscape Design Guide, Chapter 12: Irrigation for guidance on water-efficient irrigation systems.
- Step 4**  
Identify possible graywater and stormwater reuse strategies for the irrigation system. Determine if graywater and stormwater volumes can be used to partially or fully meet irrigation requirements.



#### Official LEED Submittal:

Provide cut sheets for high efficiency irrigation equipment. Include calculations demonstrating that potable water consumption for irrigation is reduced by 50%.



#### Official LEED Submittal:

Provide drawings and a narrative describing the captured rain system or recycled site water system with the capacity of the system highlighted. Include calculations demonstrating potable water consumption for irrigation is reduced by 50%.



#### Official LEED Submittal:

Provide drawings and a narrative describing the captured rain system or recycled site water system with the capacity of the system highlighted. Include calculations demonstrating that potable water used for irrigation is reduced by 100%.



#### Official LEED Submittal:

Provide a design narrative of the landscape design and describe why a permanent landscape irrigation system is not required.



**Step 5**

For the LEED application, include construction documents that describe the irrigation system and captured water system, if applicable. Use the LEED Calculator to perform calculations of irrigation water efficiency.

SS	<b>WE</b>	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

Continue to the next page.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

### Credit 2 **Innovative Wastewater Technologies**

**Intent** Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

**Requirements** Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR treat 100% of wastewater on site to tertiary standards.

**As applied to LEED Lodging** Wastewater volumes per capita are typically greater for lodging facilities than for commercial buildings due to greater occupancy hours and more wastewater-generating activities. Water-efficient fixtures such as waterless urinals and low-flow water closets can be installed to reduce wastewater generation. While these fixtures sometimes increase first costs, they quickly result in substantial cost savings due to reduction of water use.

Projects with large site areas are good candidates for on-site wastewater treatment systems because they typically have more square footage available to locate wastewater treatment infrastructure. However, on-site wastewater treatment is typically costly and is usually justified where existing wastewater treatment facilities are not available. When considering wastewater reduction and treatment, this Credit should be closely coordinated with WE Credit 3: Water Use Reduction.

**As applied to U S Air Force** USAF dormitories can reduce sewage volumes by specifying low-flow water closets or dry fixtures such as composting toilets. These fixtures not only reduce wastewater volumes but also reduce potable water volumes used. Infrequent use may require the heating of the compost to maintain the organic process. This minimal amount of electricity, and that required to run the ventilation fan, may be provided by solar PV array, depending on project site. These fixtures should be researched for performance and applicability to the project. Reuse strategies to utilize graywater volumes for sewage conveyance can also be considered to replace potable water for toilets and urinals. Waste water from water closets and kitchen sinks cannot be reused due to health risks associated with these wastewater volumes.

Conversely, measures can be applied to treat wastewater volumes on site. Natural methods for treating wastewater include wetlands and 'living machine' systems. Packaged mechanical wastewater treatment systems can also be installed. Both types of systems require capital expenditure as well as varying degrees of maintenance. However, they may be cost effective depending upon sewage treatment options for a particular project.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Innovative Wastewater Technologies

#### Suggested steps:

- Step 1**  
Establish wastewater reduction goals for the project in the Project Definition phase. These goals should reflect reduction in potable water volumes used for conveyance of sewage volumes from toilets and urinals.
- Step 2**  
Identify existing sewage infrastructure on the installation that could potentially service the project.
- Step 3**  
Assess sewage treatment options for the project to determine if on-site treatment is desirable. On-site treatment options might include mechanical or natural systems.
- Step 4**  
Research low-flow fixtures and dry fixtures that reduce or eliminate wastewater generation. Consider first costs, maintenance costs, sewage disposal savings, and fixture lifetimes.
- Step 5**  
Identify local codes and regulations that may prohibit or restrict the use of dry fixtures and stormwater/graywater volumes.
- Step 6**  
Specify fixtures in construction documents that reduce or eliminate wastewater volumes during the Contract Document Development phase.



#### Official LEED Submittal:

Provide a narrative of measures implemented to reduce potable water sewage conveyance. Include calculations demonstrating that potable water sewage conveyance volumes are reduced by 50% over baseline conditions.



#### Official LEED Submittal:

Provide drawings, specifications, and a narrative demonstrating that 100% of building wastewater volumes is directed to an on-site wastewater treatment system that provides treatment to tertiary levels. Include a letter from the local health department documenting compliance with local codes.

- Step 7**  
For the LEED application, include construction documents and cut sheets describing the sewage system. Use the LEED Calculator to estimate the amount of sewage reduction achieved.

References

**Environmentally Responsible Facilities Guide**

Refer to the section in Chapter 7 on the application of composting toilets and waterless urinals.

**Air Force Water Management Program**

This Program provides water efficiency measures that can significantly reduce wastewater volumes.

**Investment Opportunities for Energy and Water Conservation**

Refer to the section on cost-effective water efficiency measures.

**Facility Design Guide for Enlisted Dormitories**

Refer to the section in Chapter 3 on plumbing.

SS	<b>WE</b>	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

Continue to the next page.



SS	<b>WE</b>	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

### Credit 3 **Water Use Reduction, 20-30% Reduction**

Intent Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements

- Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.
- Exceed the potable water use reduction by an additional 10% (30% total efficiency increase).

As applied to  
LEED Lodging

Water use per capita is typically greater for lodging facilities than for commercial buildings due to greater occupancy hours and more water using activities. However, a wide variety of water-efficient fixtures and appliances are available for residential applications, including water closets, showers, lavatories, kitchen sinks, water heaters, dishwashers, and washing machines. Some of these fixtures and appliances are not appropriate for commercial buildings and thus, lodging facilities have a special opportunity to conserve potable water.

Potable water volumes can also be substituted with rainwater or graywater for non-potable applications such as clothes washing and cleaning. Treated water can also be used for boiler and HVAC system make-up water. When considering water use reduction, this Credit should be closely coordinated with WE Credit 2: Innovative Wastewater Strategies.

As applied to  
US Air Force

USAF dormitories have many opportunities to conserve potable water. Water savings can add up quickly, especially when applied to multiple living units. Therefore, devices that have a small impact on overall water savings should be considered because these small savings are realized in aggregate throughout the building.

Examples of water-efficient measures that can achieve the 20% savings include flow restrictors for faucets and showerheads, low-flow water closets, and residential appliances such as water heaters, dishwashers, and clothes washers. In particular, consider the use of front-loading washing machines, waterless urinals and hand-operated shower heads. When considering low-flow plumbing fixtures and appliances, it is important to consider the effectiveness of these fixtures in terms of water flow, water pressure, and other parameters.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 2

### Water Use Reduction, 20-30% Reduction

#### Suggested steps:

- Step 1**  
Establish water use reduction goals during the Project Definition phase. Water uses to consider include water closets, showers, lavatories, kitchen sinks, washing machines, dishwashers, HVAC system processes, sidewalk and driving cleaning, and other major water users. Do not consider irrigation systems as these are addressed in Water Efficiency Credit 1.
- Step 2**  
Review the Environmentally Responsible Facilities Guide for fixture and appliance requirements for USAF dormitories. The waterless urinals and composting toilets addressed in the Guide can achieve significant potable water savings.
- Step 3**  
Research fixture and appliance choices for first costs, potable water savings, maintenance costs, and equipment lifetimes. Coordinate with WE Credit 2 strategies.



#### Official LEED Submittal:

Provide cut sheets for all water consuming fixtures necessary for the occupancy use of the building, with water conservation specifications highlighted. Demonstrate that plumbing fixtures meet or exceed fixture performance requirements of the Energy Policy Act of 1992.



#### Official LEED Submittal:

Provide a water budget calculation demonstrating that occupancy based potable water consumption is reduced by 20% over baseline conditions.



#### Official LEED Submittal:

Provide a water budget calculation demonstrating that occupancy based potable water consumption is reduced by 30% over baseline conditions.

- Step 4**  
For the LEED application, include construction documents and cut sheets describing the potable water system. Use the LEED Calculator to estimate the potable water reduction achieved.

#### References

#### Environmentally Responsible Facilities Guide

Refer to Chapter 7 on recommended plumbing fixtures.

#### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on plumbing.

## Lodging

### Prerequisite 1 **Fundamental Building Systems Commissioning**

Intent Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Requirements Implement all of the following fundamental best practice commissioning procedures.

- Engage a commissioning authority.
- Collect and review design intent and basis of design documentation.
- Include commissioning requirements in the construction documents.
- Develop and utilize a commissioning plan.
- Verify installation, functional performance, training and documentation.
- Complete a commissioning report.

As applied to LEED Lodging Commissioning activities for lodging facilities are greatly simplified as compared to commercial buildings. Equipment to commission typically includes HVAC systems, sprinkler systems, and lighting. A commissioning agent must be assigned to the project. However, this authority can be a member of the design team as long as he/she is qualified to perform commissioning duties.

As applied to U S Air Force The Environmentally Responsible Facilities Guide states that HVAC Commissioning is required for all Air Force construction projects. The Guide has a Project Commissioning Tool in Appendix E. Following this guide satisfies the LEED prerequisite with two exceptions: the addition of a designated commissioning authority and the creation of a commissioning plan are required to meet LEED. The LEED guidelines for commissioning have a broader scope than is required for lodging facilities, but the steps are the same as those listed in the LEED Reference Guide.

SS	WE	EA	MR	EQ	ID
<b>Prerequisite 1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 0

### Fundamental Building Systems Commissioning

#### Suggested steps:

- Step 1**  
Add the designation of a commissioning agent to the project scope of work.
- Step 2**  
Hire a commissioning agent and task the agent with the creation of the commissioning plan. The commissioning agent should be an individual well-versed in the commissioning process.
- Step 3**  
Draft a commissioning report after commissioning activities are completed. The report must address the six fundamental commissioning procedures as listed in the credit requirements.



#### Official LEED Submittal:

Provide a copy of the commissioning plan highlighting the six fundamental commissioning procedures as listed in the credit requirements.



#### Official LEED Submittal:

Provide a signed letter of certification by the commissioning authority confirming that the commissioning plan has been successfully executed and the design intent of the building has been achieved.

- Step 4**  
For the LEED application, include a copy of the commissioning report and a certified letter from the commissioning agent.

#### References

#### Environmentally Responsible Facilities Guide

Refer to the Project Commissioning Tool in Appendix E.

## Lodging

### Prerequisite 2 **Minimum Energy Performance**

Intent Establish the minimum level of energy efficiency for the base building and systems.

Requirements Design to meet building energy efficiency and performance as required by ASHRAE/IESNA 90.1-1999 or the local energy code, whichever is the more stringent.

As applied to LEED Lodging The LEED standard for energy performance ASHRAE (90.1-1999) applies to all lodging facilities of four stories or greater. When lodging facilities are low rise, there are two possibilities for the LEED reference standard for energy performance. For lodging facilities of three stories or lower such as motels, hotels, barracks and dormitories, use the existing LEED reference standard, ASHRAE 90.1-1999.

For lodging facilities of three stories or lower such as new residential dwellings including single-family, multi-family structures (3 stories or fewer above grade), modular and mobile homes; apply ASHRAE 90.2-1993. In ASRAE 90.2 either the prescriptive path or the annual energy cost method can be used to demonstrate compliance. If additional energy efficiency credits are being pursued, use the annual energy cost method for this prerequisite and the energy performance credits. The standard is organized by Building Envelope, HVAC Systems and Equipment, and Service Water Heating. Each section provides minimum design criteria that can be followed directly or used to calculate an energy cost budget.

As applied to U S Air Force The ASHRAE Standard 90.1-1999, Energy Standard for Buildings Except Low-Rise Residential Buildings is applicable to the Enlisted Dormitory building type, as defined in the Facility Design Guide for Enlisted Dormitories.

This applicability is primarily a result of the modular design that combines 2 bedrooms with efficiency kitchens. These units function like small apartment units, which are covered by the Standard.

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 0

### Minimum Energy Performance

#### Suggested steps:

- Step 1**  
Establish energy performance goals in the Project Definition phase. These goals should use the appropriate ASHRAE Standard (90.2-1993 OR 90.1-1999) as the referenced standard and compare the designed building to a baseline building to quantify energy savings.
- Step 2**  
Identify energy saving measures that can be used during the design phases. These measures should include heating, ventilating, and cooling equipment as well as lighting and appliances.
- Step 3**  
Model the energy performance of the building following the ASHRAE guidelines. Include all energy saving measures in the modeling exercise and quantify the savings when compared with a baseline building. See the LEED Reference Guide for the modeling rules.



#### Official LEED Submittal:

State whether the energy design process followed ASHRAE or local energy codes. If local energy codes were applied, demonstrate that the local code is equivalent to or more stringent than the applicable ASHRAE document.



#### Step 4

For Lodging, state whether the project followed ASHRAE 90.2-1993 OR ASHRAE 90.1-1999, describing whether the project falls into a residential or commercial class. Include documents summarizing the energy modeling activities. Use the LEED Calculator and the referenced standard to quantify these savings as compared to a baseline building.



#### Official LEED Submittal:

Provide a summary table of design features that minimally comply with applicable mandatory and prescriptive requirements in ASHRAE, or local energy codes (whichever is stricter) OR a copy of the Energy Cost Budget Compliance Report.



#### Step 5

For Lodging, state that the project followed ASHRAE 90.2-1993 instead of ASHRAE 90.1-1999.

References

#### Facility Design Guide for Enlisted Dormitories

Refer to Chapter 8 on energy design issues.

## Lodging

### Prerequisite 3 **CFC Reduction in HVAC&R Equipment**

Intent Reduce ozone depletion.

Requirements Zero use of CFC-based refrigerants in new building HVAC&R base building systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion.

As applied to LEED Lodging CFC reduction for HVAC and refrigeration equipment is similar for lodging facilities and commercial buildings. By law, new HVAC and refrigeration equipment cannot contain CFCs. Buildings that are being remodeled may have existing HVAC or refrigeration equipment with CFCs. In these cases, all CFC equipment must be replaced with non-CFC equipment. It is useful to inventory all HVAC and refrigeration equipment and note the type of refrigerant used.

As applied to U S Air Force The Building Systems section of the Facility Design Guide for Enlisted Dormitories provides guidance on HVAC system design but does not address CFC refrigerants. USAF dormitories designed with natural ventilation do not require refrigerants and thus, CFC use in air conditioning is eliminated. For those dormitories with mechanical ventilation, it is necessary to verify that the HVAC system specified does not contain CFC refrigerants. Currently, the primary refrigerant is HCFC-22, a non-CFC refrigerant, however this is being phased out starting in 2003. HFC-134a is the best alternative and CE shops need to be prepared appropriately to maintain these systems.

SS	WE	EA	MR	EQ	ID
<b>Prerequisite 3</b>					



## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 0

### CFC Reduction in HVAC&R Equipment

#### Suggested steps:

- Step 1**  
For new projects, establish criteria to use no CFC products in building equipment during the Project Definition phase. For remodeling projects, inventory all HVAC and refrigeration equipment and identify any building equipment that uses CFCs.
- Step 2**  
Specify HVAC systems and refrigeration equipment that uses no CFC refrigerants in construction documents during the Contract Document Development phase.
-  **Official LEED Submittal:**  
For new buildings, provide equipment schedules and cut sheets highlighting refrigerant information for all HVAC&R components.
-  **Official LEED Submittal:**  
For existing buildings, provide a listing of all existing HVAC&R components and state whether each component uses CFCs. For those components that use CFCs, provide a copy of the phase out plan describing how these components will be converted or removed and replaced with CFC-free components before construction is complete.
- Step 3**  
For the LEED application, include construction documents that describe the HVAC and refrigeration equipment. If existing equipment is replaced, include a narrative describing the replacement procedure.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section on HVAC design.



SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

### Credit 1 **Optimize Energy Performance, 20-60% New 10-50% Existing**

**Intent** Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

**Requirements** Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1-1999, as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11 (percentages for existing buildings):

- Reduce design energy cost by 20% (10%) for 2 points
- Reduce design energy cost by 30% (20%) for 4 points
- Reduce design energy cost by 40% (30%) for 6 points
- Reduce design energy cost by 50% (40%) for 8 points
- Reduce design energy cost by 60% (50%) for 10 points

**As applied to LEED Lodging** Lodging facilities can save substantial amounts of energy through efficient building design and component selection. In appropriate climates, energy can be conserved by designing buildings with passive cooling instead of mechanical ventilation systems.

The LEED standard for energy performance ASHRAE (90.1-1999) applies to all lodging facilities of four stories or greater. When lodging facilities are low rise, there are two possibilities for the LEED reference standard for energy performance. For lodging facilities of three stories or lower such as motels, hotels, barracks and dormitories, use the existing LEED reference standard, ASHRAE 90.1-1999.

For lodging facilities of three stories or lower such as new residential dwellings including single-family, multi-family structures (3 stories or fewer above grade), modular and mobile homes; apply ASHRAE 90.2-1993. In ASHRAE 90.2 either the prescriptive path or the annual energy cost method can be used to demonstrate compliance. If additional energy efficiency credits are being pursued, use the annual energy cost method for this prerequisite and the energy performance credits. The standard is organized by Building Envelope, HVAC Systems and Equipment, and Service Water Heating. Each section provides minimum design criteria that can be followed directly or used to calculate an energy cost budget. If using this standard, the design team must exceed the standard by equivalent percentage reductions as the LEED Commercial Rating System to earn points in this credit.

**As applied to U S Air Force** The ASHRAE Standard 90.1-1999, Energy Standard for Buildings Except Low-Rise Residential Buildings is applicable to the Enlisted Dormitory building type, as defined in the Facility Design Guide for Enlisted Dormitories.

Energy performance in USAF dormitories can be increased by using energy efficient appliances and building system components such as motors and pumps. A variety of residential programs exist that can assist in choosing energy efficient appliances. See the local jurisdiction and utility company for guidance in residential energy efficiency. USAF dormitory projects should consult the EPA's

Energy Star program for energy efficiency measures. The greatest energy uses in dormitories include space conditioning (heating and cooling), lighting, water heating and appliances. Thus, ventilation design, lighting design, fixture selection, and appliance selection all shape the energy budget for dormitories.

The Building Systems section of the Facility Design Guide for Enlisted Dormitories guides HVAC system design, and states that the selection of the HVAC system is to be based upon the lowest total life cycle cost and provides the basis for using the Annual Energy Cost (AEC) method to show compliance. Trade-offs can be studied and the final design solution documented using the Standard methodology with one exception: non space conditioning loads are handled one way by ASHRAE, and a second way by LEED. The AEC method essentially "passes through" energy use associated with domestic hot water, lighting, appliances in order to restrict compliance trade-offs. As LEED is using the method to measure overall energy consumption, improvements in system performance can be made from the baseline to the proposed design. This is a deviation from the Standard, and care must be taken if the calculations are used to show code compliance. The Building Design section of the Facility Guide for Enlisted Dormitories includes a discussion on passive solar issues that has a significant effect on energy use. In addition, the USAF has developed a Passive Solar Handbook in three volumes.

SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

Continue to the next page.

SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging



Points 10

### Optimize Energy Performance, 20-60% New 10-50% Existing

#### Suggested steps:

- Step 1**  
Establish energy performance goals in the Project Definition phase. These goals should use either ASHRAE 90.2-1993 OR 90.1-1999 and compare the designed building to a baseline building to quantify energy savings.
- Step 2**  
Identify energy saving measures that can be used during the design phases. These measures should include heating, ventilating, and cooling equipment, as well as lighting and appliances.
- Step 3**  
Model the energy performance of the building following the appropriate ASHRAE guidelines. Include all energy saving measures in the modeling exercise and quantify the savings when compared with a baseline building. See the June 2001 LEED Reference Guide for the modeling rules.



#### Official LEED Submittal:

For Lodging, state whether the project followed ASHRAE 90.2-1993 OR ASHRAE 90.1-1999, describing whether the project falls into a residential or commercial class. Include documents summarizing the energy modeling activities. Use the LEED Calculator and the referenced standard to quantify these savings as compared to a baseline building.



#### Official LEED Submittal:

Provide a narrative highlighting energy saving measures incorporated in the building design, including an isometric of the building showing the basic floor plate shape and external projections. Include a table listing baseline and proposed comparisons of all model variables that are different.



#### Official LEED Submittal:

Demonstrate that the design energy cost is 20-60% lower for new buildings or 10-50% lower for existing buildings than the energy cost budget using the LEED Energy Modeling Protocol as described in the LEED Reference Guide. Provide a completed and signed copy of the Energy Cost Budget (ECB) Compliance Form.

#### References

#### USAF Passive Solar Handbook, Volume 1

Introduction to Passive Solar Concepts

#### USAF Passive Solar Handbook, Volumes 2 & 3

Comprehensive Planning Guide

#### Environmentally Responsible Facilities Guide

Refer to Chapter 8 on energy design issues.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

### Credit 2 **Renewable Energy, 5-20% Contribution**

**Intent** Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

**Requirements** Supply a net fraction of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

- Renewable energy, 5% contribution for 1 point
- Renewable energy, 10% contribution for 2 points
- Renewable energy, 20% contribution for 3 points

**As applied to LEED Lodging** Renewable energy is currently an expensive option to generate energy on-site and thus, may not be economically feasible for many lodging facilities. However, first costs for renewable energy strategies such as photovoltaic panels, wind turbines, and biomass gasifiers is becoming more affordable and these options should be considered on an economic basis. If renewable energy options cannot be included, lodging facility should be designed to accommodate renewable energy options in the future. For instance, roofs should be designed for future installation of photovoltaic panels and potential wind turbine locations should be identified.

**As applied to U S Air Force** USAF dormitories in remote areas may find renewable energy options beneficial from a cost standpoint and may have security benefits of independent power generation. The contribution of energy from renewable sources should be included in the Annual Energy Cost method to capture the highest number of points.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 3

### Renewable Energy, 5-20% Contribution

#### Suggested steps:

- Step 1**  
Establish renewable energy goals in the Project Definition phase. These goals should reflect a percentage of the total energy used for the project.
- Step 2**  
Research potential renewable energy options, including photovoltaics, wind turbines, and biomass generators. Assess these technologies in terms of first costs, estimated energy generation, maintenance costs, and equipment lifetime.
- Step 3**  
Select appropriate renewable energy technologies and specify these technologies in construction documents during the Contract Document Development phase.
- Step 4**  
Perform energy modeling to determine the percentage of renewable energy supplied to the project. Use ASHRAE 90.2-1993 as the referenced standard and compare the designed building to a baseline building as defined by the standard.
- Step 5**  
Monitor the installation of the renewable energy technologies to ensure proper function and commission the technologies after installation.



#### Official LEED Submittal:

Provide drawings, cut sheets, and specifications highlighting on-site renewable energy systems installed in the building.



#### Official LEED Submittal:

Provide calculations demonstrating that 5% of total energy costs are supplied by on-site renewable energy systems.



#### Official LEED Submittal:

Provide calculations demonstrating that 10% of total energy costs are supplied by on-site renewable energy systems.



#### Official LEED Submittal:

Provide calculations demonstrating that 20% of total energy costs are supplied by on-site renewable energy systems.

- Step 6**  
For the LEED application, include documents summarizing the energy model. Use the LEED Calculator and the reference standard to quantify these savings when compared with a baseline building.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

### Credit 3 **Additional Commissioning**

Intent Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirements In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks:

- Conduct a focused review of the design prior to the construction documents phase.
- Conduct a focused review of the construction documents when close to completion.
- Conduct a selective review of contractor submittals of commissioned equipment. (The above three reviews must be performed by someone other than the designer.)
- Develop a re-commissioning management manual.
- Have a contract in place for a near-warranty end or post occupancy review.

As applied to LEED Lodging Additional commissioning is an extension of Fundamental Building Systems Commissioning (E&A Prerequisite 1) and is similar for lodging facilities and commercial buildings. Additional commissioning requires tasks to review the project during the design process, prior to construction, and during construction. Re-commissioning activities must also be specified in the Commissioning Plan. Additional commissioning procedures must be performed by an independent commissioning authority. This person must not be on the project design team.

As applied to U S Air Force Additional commissioning is more comprehensive than fundamental commissioning, and goes beyond the requirements stated in the Environmentally Responsible Facilities Guide, Appendix E, Project Commissioning Tool. These additional LEED steps occur throughout the design phase.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Additional Commissioning

#### Suggested steps:

- Step 1**  
Amend the project scope of work to include designation of a commissioning agent.
- Step 2**  
Hire a commissioning agent and task the agent with the creation of the commissioning plan. The commissioning agent should be an individual well-versed in the commissioning process.
- Step 3**  
Add the following scope of work to the commissioning agent that is completing the tasks described in the Project Commissioning Tool:
  - a) Focused review of the design during Preliminary Design (35-65%)
  - b) Focused review of the Final Working Drawings (100%)
  - c) Review of contractor submittals on commissioned equipment
  - d) Modify the USAF required O&M manuals to include re-commissioning instructions
- Step 4**  
Format the USAF commissioning process to match the LEED requirements to avoid confusion when the LEED application is reviewed.
- Step 5**  
Produce a commissioning report after commissioning activities are completed.



#### Official LEED Submittal:

Provide a signed letter of certification by an independent commissioning authority confirming that Tasks 1, 2, and 3 of the credit requirements have been successfully executed. Evidence of the design review must be submitted in a written report.



#### Official LEED Submittal:

Provide a signed letter of certification by an independent commissioning authority or designer confirming that Tasks 4 and 5 of the credit requirements have been successfully executed.

- Step 6**  
For the LEED application, include two certification letters from the commissioning agent describing the separate activities that qualify as additional commissioning tasks under this credit.

#### References

#### Environmentally Responsible Facilities Guide

Refer to the Project Commissioning Tool in Appendix E.



SS	WE	EA	MR	EQ	ID
<b>Credit 4</b>					

## Lodging

### Credit 4 **Ozone Depletion**

Intent Reduce ozone depletion and support early compliance with the Montreal Protocol.

Requirements Install base building level HVAC and refrigeration equipment and fire suppression systems that do not contain HCFC's or Halon.

As applied to LEED Lodging This Credit is an extension of E&A Prerequisite 3: CFC Reduction in HVAC&R Equipment and is similar for lodging facilities and commercial buildings. HCFCs and halons are currently legal and are scheduled to be phased out of new HVAC and refrigeration equipment in future years. The LEED™ Rating System accelerates HCFC and halon phase-out schedule in this credit by awarding projects that are free of HCFCs and halons. For new projects, specify HVAC, refrigeration, and fire suppression systems that do not contain HCFCs or halons. For remodel projects, check all HVAC, refrigeration, and fire suppression equipment and replace or retrofit any components that use HCFCs or halons.

As applied to U S Air Force In USAF dormitories, it may be difficult to capture this point, as it can only be earned if HVAC is installed AND it is HCFC free. This technology is not currently widely available in the residential market. The USAF may need to adopt a bulk purchasing policy to create enough demand to accomplish this credit in numerous locations. Halons are also used in fire suppression systems. In USAF dormitory designs, fire suppression systems are water operated sprinklers, and do not contain halons. The Building Systems section of the Facility Design Guide for Enlisted Dormitories addresses fire protection issues.

SS	WE	EA	MR	EQ	ID
<b>Credit 4</b>					


## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Ozone Depletion

#### Suggested steps:

- Step 1**  
In new buildings, research HVAC and refrigeration systems that do not use HCFCs or halons. Assess the options in terms of first cost, energy performance, operations costs, maintenance costs, and equipment lifetimes. In remodeled buildings, inventory all HVAC, refrigeration, and fire suppression systems to identify equipment that utilizes HCFCs or halons.
- Step 2**  
Specify appropriate systems that do not use HCFCs or halons in construction documents during the Construction Document Development phase.
-  **Official LEED Submittal:**  
Provide a letter from the architect or engineer stating that HVAC&R systems are free of HCFC's and Halons. Include equipment schedules and cut sheets highlighting refrigerant information for all HVAC&R system components.
- Step 3**  
For the LEED application, include a letter of certification and construction documents describing the HVAC and refrigeration systems.

#### References

##### **Facility Design Guide for Enlisted Dormitories**

Refer to the section in Chapter 3 on fire protection and life safety.

## Lodging

### Credit 5 **Measurement and Verification**

**Intent** Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

**Requirements** Comply with the long term continuous measurement of performance as stated in Option B: Methods by Technology of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following:

- Lighting systems and controls
- Constant and variable motor loads
- Variable frequency drive (VFD) operation
- Chiller efficiency at variable loads (kW/ton)
- Cooling load
- Air and water economizer and heat recovery cycles
- Air distribution static pressures and ventilation air volumes
- Boiler efficiencies
- Building specific process energy efficiency systems and equipment
- Indoor water risers and outdoor irrigation systems

As applied to  
LEED Lodging

Measurement and verification (M&V) strategies are similar for lodging facilities and commercial buildings, but typically less complex. M&V may be cost prohibitive for lodging facilities due to installation costs of monitoring equipment and recurring monitoring costs. However, if infrastructure is in place that can handle M&V duties for the lodging facility, M&V activities can lead to substantial savings over the lifetime of the building. An example technology that can be applied is a centrally located Energy Management System.

As applied to  
U S Air Force

The Environmentally Responsible Facilities Guide states that HVAC Commissioning is required for all Air Force construction projects, and that periodic re-testing of systems is required. Expanding this requirement and strengthening the planning aspects can capture this point. Coupled with the other USAF practice of selecting HVAC Systems with life cycle analysis, a strong argument can be made that this credit guarantees the benefits of other credits.

There will be efficiencies of scope if the commissioning agent described in the Commissioning Prerequisite and Credit is charged with completing the M&V plan. As M&V serves as an annual checkup of building performance and results in substantial operation and maintenance savings over the lifetime of the building, base personnel need to be involved. M&V requires meters to be installed in the building that monitor water, energy, and IEQ performance.

Once M&V data has been collected, it is helpful to store this information in a database for analysis and addition of more data in the future. This allows the installation to trend savings and contribute to organizational goals for environmental improvement.

SS	WE	EA	MR	EQ	ID
<b>Credit 5</b>					

## Lodging

Easy Mod Diff

Points 1

### Measurement and Verification

#### Suggested steps:

- Step 1**  
Engage a Commissioning Agent or other Owner's representative to draft a measurement and verification plan for the project.
- Step 2**  
Specify instrumentation and controls to measure the required parameters in construction documents during the Contract Document Development phase.



#### Official LEED Submittal:

Provide a copy of the Measurement & Verification Plan.



#### Official LEED Submittal:

Include a summary schedule of the instrumentation and controls for the ten required monitoring categories, highlighting the I/O data points to be collected.



#### Official LEED Submittal:

Include cut sheets of sensors and the data collection system used to provide continuous metering per IPMVP standards.

- Step 3**  
For the LEED application, include the Measurement & Verification Plan as well as construction documents and cut sheets that describe the equipment involved.

#### References

#### Environmentally Responsible Facilities Guide

Refer to Chapter 12 on occupancy, operations, and maintenance opportunities.

SS	WE	EA	MR	EQ	ID
<b>Credit 6</b>					

## Lodging

### Credit 6 **Green Power**

Intent Encourage the development and use of grid-source energy technologies on a net zero pollution basis.

Requirements Engage in a two year contract to purchase power generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-e products certification requirements.

As applied to LEED Lodging Green power application is similar for lodging facilities and commercial buildings. The availability of green power is dependent on the local utility serving the facility. If the local utility offers green power options, these options should be researched.

As applied to U S Air Force Many USAF dormitories are located in areas where green power opportunities are not available. Currently only small hydro and certified low impact hydro facilities qualify as Green-e certified power sources. However, as the green power marketplace expands, these opportunities will become more readily available. Currently, green power is typically more expensive than conventional power. It may be acceptable to allocate a fraction of purchased base green power to meet the certified buildings, even though the green power is provided to a base sub-station that does not directly feed the certified building, if accepted by the USGBC.

SS	WE	EA	MR	EQ	ID
<b>Credit 6</b>					



## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Green Power

#### Suggested steps:

- Step 1**  
Determine if green power is available from the local utility serving the installation. If green power is available, perform a comparison between green power and conventional power to determine if it is technically and economically feasible to purchase green power from the local utility.
- Step 2**  
Draft a contract with the local utility to receive green power for a minimum of two years.
-  **Official LEED Submittal:**  
Provide a copy of the two-year electric utility purchase contract for power generated from renewable sources.
-  **Official LEED Submittal:**  
Provide documentation demonstrating that the supplied renewable power meets the referenced Green-e requirements.
- Step 3**  
For the LEED application, include a copy of the agreement with the electric utility and utility documents demonstrating that the supplied renewable power complies with the referenced standard.

## Lodging

### Prerequisite 1 **Storage & Collection of Recyclables**

Intent Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirements Provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.

As applied to LEED Lodging Recycling opportunities are similar for lodging facilities and commercial buildings. Issues surrounding sorting activities, designated storage space, and access for haulers need to be addressed in the project design. The availability of recycling support is dependent on local recycling infrastructure including recycling haulers, processors, and brokers. Recycling may not be available in some areas due to location, economics, or lack of processing facilities.

A greater number of recyclable materials as well as higher amounts of recyclable materials are generated per capita in lodging facilities. Therefore, it may be cost effective to have occupants separate their own materials instead of having a separation process or separating at a transfer station. It may also be helpful to install mechanical equipment such as cardboard balers and can crushers to condense and package recyclable materials for transport and processing. Another strategy is to reduce waste streams in the first place by using glassware and china instead of disposable styrofoam, plastic, and paper utensils in food service areas.

As applied to U S Air Force Recyclable material volumes generated in USAF dormitories include glass, aluminum, plastic, cardboard and paper. Facilities for handling these materials will vary by USAF installation but generally glass, aluminum, cardboard and paper are the most easily recycled. In some cases, revenue can be generated from the sale of aluminum and paper materials. If a reusable container program is available for items such as beverage containers and packaging, recyclable materials generation can be greatly reduced.

Food waste is a significant portion of residential units and diverting these volumes from the waste stream can result in lower disposal fees. It may be beneficial to compost paper waste with food waste volumes and apply the finished compost product to landscaped areas as a soil amendment.

SS	WE	EA	MR	EQ	ID
<b>Prerequisite 1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 0

### Storage & Collection of Recyclables

#### Suggested steps:

- Step 1**  
Estimate the potential for recycling occupant waste materials at regional recycling facilities.
- Step 2**  
Consider whether recyclables will be sorted at a designated space in the project or transferred to a central location on the installation.
- Step 3**  
Design the building with adequate facilities and square footage to collect, transport, and store recyclable materials in a designated area of the building. Use the table in the LEED Reference Guide to estimate the adequate amount of area for recycling activities.



#### Official LEED Submittal:

Provide drawings highlighting locations for collection and storage of materials separated for recycling. Indicate the path from recycling locations to the building loading dock and demonstrate that the recycling area can handle the recycling material volumes generated by building occupants.

- Step 4**  
For the LEED application, include construction documents and a narrative describing the recycling program.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section on solid waste management.



SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

### Credit 1 **Building Reuse, Maintain 75-100% of Existing Shell & 0-50% of Non-Shell**

**Intent** Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

**Requirements** Reuse large portions of existing structures during renovation or redevelopment projects:

- Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies) for 1 point
- Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies) for 2 points
- Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems) for 3 points

**As applied to LEED Lodging** The availability of an existing building for reuse will vary from project to project. All reuse strategies should be assessed economically and environmentally. In some cases, rehabilitation of an existing building may be more costly than constructing a new building or the building may have an inefficient energy design that does not warrant saving.

If a sufficient amount of the shell, structure, or non-shell cannot be reused, saved material weights should be applied to M&R Credit 2: Construction Waste Management for diversion of waste materials from landfills.

**As applied to U S Air Force** Building reuse on USAF installations will depend on availability of existing facilities for reuse. Existing facilities may or may not be appropriate for remodeling as dormitories. Issues such as structural integrity of the existing building, site location, degree of reusability and economic savings should all be addressed before deciding on a building reuse scheme. In most cases, building elements such as windows, insulation, HVAC systems, and plumbing fixtures should be removed instead of reused because they are inferior to newer products.

SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging



Points 3

### Building Reuse, Maintain 75-100% of Existing Shell & 0-50% of Non-Shell

#### Suggested steps:

- Step 1**  
Identify existing buildings on the installation with potential for reuse.
- Step 2**  
Survey potential buildings for degree of reuse and estimate reuse percentages in terms of structure, shell, and non-shell elements. See the LEED Reference Guide to categorize structure, shell, and non-shell elements.
- Step 3**  
Identify any hazardous or out-dated elements of the building and include explicit direction in demolition plans for removal of these elements during the Construction Document Development phase.
- Step 4**  
Specify degree of reuse of the existing building in construction documents and identify those elements that will be preserved during the Contract Document Development phase. Include restrictions to protect reused elements during construction.



#### Official LEED Submittal:

Provide pre-construction and post-construction plan and elevation drawings highlighting reused structure and shell elements. Include calculations demonstrating that 75% of the structure and shell was reused.



#### Official LEED Submittal:

Provide pre-construction and post-construction plan and elevation drawings highlighting reused structure and shell elements. Include calculations demonstrating that 100% of the structure and shell was reused.



#### Official LEED Submittal:

Provide pre-construction and post-construction drawings highlighting reused interior walls, floor coverings and ceilings. Include calculations demonstrating that 50% of the non-shell components were reused.

- Step 5**  
For the LEED application, include construction documents describing the reused portions of the building. Use the LEED Calculator to estimate the percentage of reuse of building elements.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section that describing conversion of buildings in the future.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

### Credit 2 **Construction Waste Management, Salvage/Recycle 50-75%**

**Intent** Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

**Requirements** Develop and implement a waste management plan, quantifying material diversion by weight. (Remember that salvage may include the donation of materials to charitable organizations such as Habitat for Humanity.)

- Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste for 1 point
- Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris for 2 points

**As applied to LEED Lodging** Construction waste management activities are similar for lodging facilities and office buildings. A Waste Management Plan should be developed to address recycling and salvage efforts for construction as well as demolition and land clearing waste volumes. Once construction is finished, end-of-project recycling rates should be calculated for the project.

**As applied to U S Air Force** Construction site recycling should be an integral part of every USAF dormitory project. Construction materials to recycle will depend on existing buildings on the site to be demolished and the types of materials used in the new project. Whenever possible, materials should be processed and reused on-site instead of being transported off-site. For instance, concrete volumes from demolition of existing buildings can be used for road base and inert fill material.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 2

### Construction Waste Management, Salvage/Recycle 50-75%

#### Suggested steps:

- Step 1**  
Establish construction waste recycling goals in the Project Definition phase. Easy materials to consider for recycling include land clearing debris, cut volumes, concrete, metals, and cardboard. Other materials to consider include clean wood and gypsum wallboard.
- Step 2**  
Draft a Construction Waste Management Plan for the project and include it in construction documents during the Contract Document Development phase.
- Step 3**  
Monitor waste management activities on site during construction activities. Document recycled and landfilled waste volumes.



#### Official LEED Submittal:

Provide a copy of the Waste Management Plan for the project highlighting recycling and salvage requirements.



#### Official LEED Submittal:

Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.



#### Official LEED Submittal:

Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

- Step 4**  
For the LEED application, include the Waste Management Plan. Use the LEED Calculator to determine the percentage of recycling occurring during construction.

#### References

#### C & D Waste Management Guide

The Guide includes seven steps to achieve C&D waste diversion, waste materials checklists, and case studies for solid waste diversion. Typical C&D waste materials to recycle include concrete, wood, metal, gypsum wallboard, asphalt, roofing materials, and land clearing debris.

#### Environmentally Responsible Facilities Guide

Refer to Chapters 10 and 11 as well as the Construction & Demolition Economics Worksheet Tool in Appendix G.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					

## Lodging

### Credit 3 **Resource Reuse, Specify 5-10%**

Intent	Extend the life cycle of targeted building materials, reducing environmental impacts related to materials manufacturing and transport.
Requirements	<ul style="list-style-type: none"><li>- Specify salvaged or refurbished materials for 5% of building materials for 1 point</li><li>- Specify salvaged or refurbished materials for 10% of building materials for 2 points</li></ul>
As applied to LEED Lodging	Resource reuse opportunities for lodging facilities are often better than for commercial buildings because there are large inventories of used residential materials available. Salvage material sources include organization inventories and local retailers. Salvage items to consider include structural beams, wood flooring, doors, cabinets, and other materials including furniture. Items to avoid salvaging include windows and plumbing fixtures that are inferior to new products in terms of efficiency.
As applied to U S Air Force	When designing USAF dormitories, reference the Defence Resource Management Office (DRMO) to discover current salvaged materials available from military sources. USAF installations generally have a stores section that may have appropriate salvaged materials.

SS	WE	EA	MR	EQ	ID
<b>Credit 3</b>					




## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 2

### Resource Reuse, Specify 5-10%

#### Suggested steps:

- Step 1**  
Establish resource reuse goals in the Project Definition phase.
- Step 2**  
Identify building components that can be specified with salvage materials during project design phases.
- Step 3**  
Identify salvage material sources within the USAF as well as in the region and determine if these sources can provide sufficient materials for the project.
- Step 4**  
Include language in construction documents to encourage or require inclusion of salvaged materials during the Contract Document Development phase.
- Step 5**  
Monitor the installation of salvage materials during construction.
-  **Official LEED Submittal:**  
Provide specifications and contractor submittals highlighting salvaged and refurbished materials used on the project.
-  **Official LEED Submittal:**  
Provide calculations demonstrating that 5% of building materials were salvaged. Include the origin and cost for salvaged materials and the total cost for building materials.
-  **Official LEED Submittal:**  
Provide calculations demonstrating that 10% of building materials were salvaged. Include the origin and cost for salvaged materials and the total cost for building materials.
- Step 6**  
For the LEED application, include construction documents that demonstrate the use of salvage materials. Use the LEED Calculator to determine the percentage of salvage materials installed on the project.

## Lodging

### Credit 4 **Recycled Content, Specify 25-50%**

Intent Increase demand for building products that have incorporated recycled content materials, therefore reducing the impacts resulting from the extraction of new materials.

Requirements

- Specify a minimum of 25% of building materials that contain in aggregate, a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average 40% post-industrial recycled content material for 1 point
- Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material for 2 points

As applied to LEED Lodging Inclusion of recycled content materials is similar for lodging facilities and commercial buildings. Availability of recycled content materials will depend on the project location and the needs of the project. These materials should be assessed for first cost, performance, and lifetime.

As applied to U S Air Force Recycled content materials are becoming more common on the marketplace and should be easy to incorporate into USAF dormitories. Typically, the cost of recycled content materials is competitive with conventional materials. Materials with recycled content include steel framing, insulation, flooring, siding, paint, and plastic materials. Government procurement regulations may prohibit achievement of this credit because there may only be a single supplier for the qualifying material.

SS	WE	EA	MR	EQ	ID
<b>Credit 4</b>					

## Lodging



Points 2

### Recycled Content, Specify 25-50%

#### Suggested steps:

- Step 1**  
Establish recycled content material goals in the Project Definition phase.
- Step 2**  
Identify building components that can be specified with recycled content materials during project design phases. Refer to the LEED Reference Guide for information on basic building materials and their recycled content.
- Step 3**  
Identify manufacturers of recycled content materials and research these materials in terms of first cost, performance, and estimated lifetimes.
- Step 4**  
Include language in construction documents to encourage or require inclusion of recycled content materials during the Contract Document Development phase.
- Step 5**  
Monitor the installation of recycled content materials during construction.



#### Official LEED Submittal:

Provide specifications and contractor submittals highlighting recycled content materials installed.



#### Official LEED Submittal:

Provide a spreadsheet of all materials used on the project highlighting recycled content materials. Include the percentage of post-consumer and post-industrial recycled content for all recycled content materials, the costs of all materials for the project, and calculations demonstrating that 25% of building materials have the required recycled content.



#### Official LEED Submittal:

Provide a spreadsheet of all materials used on the project highlighting recycled content materials. Include the percentage of post-consumer and post-industrial recycled content for all recycled content materials, the costs of all materials for the project, and calculations demonstrating that 50% of building materials have the required recycled content.

- Step 6**  
For the LEED application, list all of the materials used on the project and highlight those materials with recycled content. Use the LEED Calculator to determine the percentage of recycled content materials installed on the project.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to Chapters 3 and 4 addressing materials selection issues.



**Air Force Pollution Prevention (P2) Toolbox**

See the section on specifying recycled content.

**Affirmative Procurement Program**

See the section on specifying and purchasing recycled-content materials.

SS	WE	EA	MR	EQ	ID
<b>Credit 4</b>					

## Lodging

Continue to the next page.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.1</b>					

## Lodging

### Credit 5.1 **Local/Regional Materials, 20% Manufactured Locally**

**Intent** Increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.

**Requirements** Specify a minimum of 20% of building materials that are manufactured\* regionally within a radius of 500 miles. (\*Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesman.)

**As applied to LEED Lodging** Inclusion of local/regional materials is similar for lodging facilities and commercial buildings. Use of local/regional materials supports local economies and reduces transportation impacts related to procuring construction materials. The availability of local/regional materials will vary by project location and projects in remote locations may have few materials options.

**As applied to U S Air Force** Some Air Force installations are located in areas where local/regional materials are not available. In those areas where these materials are available, it is important to identify manufacturers and maintain an up-to-date listing or database for future reference. Government procurement regulations may prohibit achievement of this credit because there may only be a single supplier for the qualifying material. Project managers should also consider the availability of metric dimensioned materials.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Local/Regional Materials, 20% Manufactured Locally

#### Suggested steps:

- Step 1**  
Establish local/regional material goals in the Project Definition phase. Develop a spreadsheet to track the total materials base-cost for this and other credits in this category. The LEED Welcome Packet includes a sample spreadsheet.
- Step 2**  
Identify building components available from local/regional manufacturers during project design phases.
- Step 3**  
Include language in construction documents to encourage or require inclusion of local/regional manufactured materials during the Contract Document Development phase.
- Step 4**  
Monitor the installation of local/regional materials during construction.



#### Official LEED Submittal:

Provide specifications and contractor submittals highlighting local materials installed.



#### Official LEED Submittal:

Provide a spreadsheet of all materials used on the project highlighting locally manufactured materials. Include the location of the material manufacturer, the distance from the manufacturer to the project site, the costs of all materials for the project, and calculations demonstrating that 20% of building materials are manufactured within 500 miles of the project.

- Step 5**  
For the LEED application, include construction documents and contractor submittals describing the local/regional materials installed. Use the LEED Calculator to determine the percentage of local/regional manufactured materials installed on the project.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to the sections addressing materials selection issues.

##### Environmentally Responsible Facilities Guide

Refer to Chapter 9 on local materials selection.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.2</b>					

## Lodging

### Credit 5.2 **Local/Regional Materials, 50% Harvested/Extracted/Recovered Locally**

**Intent** Increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.

**Requirements** Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles.

**As applied to LEED Lodging** Inclusion of local/regional materials is similar for lodging facilities and commercial buildings. Use of local and regional materials helps local economies and reduces transportation impacts related to procuring construction materials. The availability of local/regional materials will vary by project location and projects in remote locations may have few materials options.

**As applied to U S Air Force** Some Air Force installations are located in areas where local/regional materials are not available. In those areas where these materials are available, it is important to identify manufacturers and maintain an up-to-date listing or database for future reference. This point is more difficult to capture than the MRc5.1 because the local/regional materials must be harvested, extracted, or recovered within 500 miles, as well as manufactured or assembled. Government procurement regulations may prohibit achievement of this credit because there may only be a single supplier for the qualifying material.

SS	WE	EA	MR	EQ	ID
<b>Credit 5.2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Local/Regional Materials, 50% Harvested/Extracted/Recovered Locally

#### Suggested steps:

- Step 1**  
Establish local/regional material harvesting goals in the Project Definition phase. Develop a spreadsheet to track the total materials base-cost for this and other credits in this category. The LEED Welcome Packet includes a sample spreadsheet.
- Step 2**  
Identify building components that can be sourced from local/regional manufacturers during project design phases.
- Step 3**  
Include language in construction documents to encourage or require inclusion of these local/regional harvested, extracted, or recovered materials during the Contract Document Development phase.
- Step 4**  
Monitor the installation of local/regional materials during construction.



#### Official LEED Submittal:

Provide specifications and contractor submittals highlighting local materials installed.



#### Official LEED Submittal:

Provide a spreadsheet of all materials used on the project highlighting locally manufactured materials. Include the location of the material manufacturer, the distance from the manufacturer to the project site, the costs of all materials for the project, and calculations demonstrating that 20% of building materials are manufactured within 500 miles of the project.



#### Official LEED Submittal:

Provide manufacturer information on locally manufactured materials demonstrating that 50% of these materials were extracted, harvested, or recovered within 500 miles of the project.

- Step 5**  
For the LEED application, include construction documents and contractor submittals describing the local/regional materials installed. Use the LEED Calculator to determine the percentage of local/regional manufactured materials installed on the project.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the sections addressing materials selection issues.

#### Environmentally Responsible Facilities Guide

Refer to Chapter 9 on local materials selection.

SS	WE	EA	MR	EQ	ID
<b>Credit 6</b>					

## Lodging

### Credit 6 **Rapidly Renewable Materials**

Intent Reduce the use and depletion of finite raw, and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements Specify rapidly renewable building materials for 5% of total building materials.

As applied to LEED Lodging Inclusion of rapidly renewable materials is similar for lodging facilities and commercial buildings. Applicability of rapidly renewable materials will depend on the needs of the project. First cost, performance, and lifetime should be assessed before specifying any rapidly renewable materials for a project.

As applied to U S Air Force Rapidly renewable materials are a new type of material classification and consist of products such as bamboo flooring, wheatboard sheathing, and linoleum. Material manufacturers vary by region and may not be available in all USAF installation locations. Some rapidly renewable materials are cost competitive with conventional materials while others are significantly more expensive. Government procurement regulations may prohibit achievement of this credit because there may only be a single supplier for the qualifying material.

SS	WE	EA	MR	EQ	ID
<b>Credit 6</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Rapidly Renewable Materials

#### Suggested steps:

- Step 1**  
Establish rapidly renewable material goals in the Project Definition phase. Develop a spreadsheet to track the total materials base-cost for this and other credits in this category. The LEED Welcome Packet includes a sample spreadsheet.
- Step 2**  
Identify building components that can be specified with rapidly renewable products in project design phases. Products to consider include flooring, sheathing, and finishes.
- Step 3**  
Include language in construction documents to encourage or require inclusion of rapidly renewable materials during the Contract Document Development phase.
- Step 4**  
Monitor the installation of rapidly renewable materials during construction.



#### Official LEED Submittal:

Provide written documentation from the manufacturer, declaring the rapidly renewable materials contained in the candidate products.



#### Official LEED Submittal:

Provide specifications and contractor submittals highlighting rapidly renewable materials installed.



#### Official LEED Submittal:

Provide a spreadsheet of all materials used on the project highlighting rapidly renewable materials. Include manufacturer information, the costs of all materials for the project, and calculations demonstrating that 5% of building materials are rapidly renewable.

- Step 5**  
For the LEED application, include construction documents and cut sheets for rapidly renewable materials. Use the LEED Calculator to determine the percentage of rapidly renewable materials installed on the project.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the sections addressing materials selection issues.



## Lodging

### Credit 7 **Certified Wood**

Intent Encourage environmentally responsible forest management.

Requirements Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council Guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.

As applied to LEED Lodging Inclusion of certified materials is similar for lodging facilities and commercial buildings. Availability of certified wood will vary by project location. Certified wood is typically more expensive than non-certified wood, but can be cost competitive in certain cases. As the certified wood market matures, costs will become more competitive and inclusion of certified wood in projects will be more common. Performance of certified wood is no different from non-certified wood and does not affect construction.

As applied to U S Air Force Inclusion of certified wood in USAF dormitories will depend on the cost of this wood type compared with non-certified wood. Availability and cost of certified wood should be assessed for all projects and used if possible. It is helpful to order certified wood materials well in advance because of their limited supply and to avoid construction delays. Government procurement regulations may prohibit achievement of this credit because there may only be a single supplier for the qualifying material.

SS	WE	EA	MR	EQ	ID
<b>Credit 7</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Certified Wood

#### Suggested steps:

- Step 1**  
Establish certified wood goals in the Project Definition phase. Develop a spreadsheet to track the total materials base-cost for this and other credits in this category. The LEED Welcome Packet includes a sample spreadsheet.
- Step 2**  
Identify building components that can be specified with FSC-certified wood materials in project design phases.
- Step 3**  
Include language in construction documents to encourage or require inclusion of FSC-certified wood materials during the Contract Document Development phase.
- Step 4**  
Order certified wood materials well in advance of the anticipated installation date. These materials require more lead time than conventional wood products.
- Step 5**  
Monitor the installation of FSC-certified wood materials during construction.



#### Official LEED Submittal:

Provide wood certification documentation from the manufacturer declaring conformance with Forest Stewardship Council Guidelines for certified wood building components.



#### Official LEED Submittal:

Provide specifications and contractor submittals highlighting certified wood-based materials installed.



#### Official LEED Submittal:

Provide a spreadsheet of all wood-based materials used on the project highlighting certified wood-based materials. Include calculations demonstrating that 50% of wood-based materials are certified wood.

- Step 6**  
Use the LEED Calculator to determine the percentage of FSC-certified wood materials installed on the project.

## Lodging

### Prerequisite 1 **Minimum IAQ Performance**

Intent Establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants

Requirements Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

As applied to LEED Lodging ASHRAE 62-1999 applies to lodging facilities as well as commercial buildings. Specifically, Table 2 of the referenced standard provides outdoor air requirements for ventilation that are specific to hotels, motels, resorts and dormitories. Part 2.3 of Table 2 provides additional guidance for residential facilities. ASHRAE 62-1999 applies to both mechanical and natural ventilation schemes. Lodging facilities must comply with the requirements of the referenced standard to earn this Prerequisite.

As applied to U S Air Force USAF dormitories should use ASHRAE 62-1999 as a baseline for IAQ performance. Additional performance requirements may be required by state or regional agencies, depending on the installation location. USAF dormitory projects should follow both sets of standards. It may also be desirable to exceed required IAQ standards to provide optimal living environments for building occupants. It is important to consider "trickle-down" effects from maintenance procedures that could have a negative impact on IAQ. For instance, using toxic lubricants on HVAC dampers with toxic lubricants may affect IAQ and these activities should be avoided.

SS	WE	EA	MR	EQ	ID
<b>Prerequisite 1</b>					



## Lodging

Easy Mod Diff

Points 0

### Minimum IAQ Performance

#### Suggested steps:

- Step 1**  
Review ASHRAE 62-1999 and determine the requirements for the project. Determine if other IAQ standards are required for the project.
- Step 2**  
Establish IAQ targets for the project and design the building to meet or exceed these targets during project design phases.
-  **Official LEED Submittal:**  
Provide a letter from the mechanical engineer stating compliance with ASHRAE 62-1999.
-  **Official LEED Submittal:**  
Declare the ASHRAE 62-1999 procedure employed in the IAQ analysis (Ventilation Rate Procedure or Indoor Air Quality Procedure) and include design criteria and assumptions.
- Step 3**  
For the LEED application, include a certification letter from the mechanical engineer describing compliance with the referenced standard.

#### References

##### USAF Landscape Design Guide

Refer to the section on the integrated pest management protocol. Pest management activities should be designed to have a minimal impact on IAQ.

##### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on heating, ventilation, and air conditioning.

## Lodging

### Prerequisite 2 **Environmental Tobacco Smoke (ETS) Control**

Intent Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Requirements Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, provide a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no re-circulation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge).

Performance of smoking rooms shall be verified using tracer gas testing methods as described in the ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

*As applied to  
LEED Lodging*

Environmental tobacco smoke control is a complicated issue in lodging facilities due to their residential nature. Personal use of tobacco in private residences is typically an accepted practice. However, measures can be instituted to protect non-smokers from second hand smoke while accommodating smoking residents. These measures might include physical isolation of tobacco smoking areas, designation of particular floors for tobacco smokers, and development of a zoned HVAC system to separate smoking rooms from non-smoking rooms. All communal spaces must be designated as non-smoking areas to comply with the prerequisite requirements.

If a building has smoking allowed, then air separation techniques must be used in construction.

*As applied to  
U S Air Force*

The easiest way for USAF dormitories to comply with this credit is to ban smoking indoors. However, smoking occupants can be accommodated in these buildings if they are isolated from non-smoking occupants. This will affect the overall dormitory design, HVAC system design, materials selection, and dormitory operations procedures. Both physical and mechanical separation of smoking areas and non-smoking areas should be incorporated into the building design and operations. Materials and furniture for USAF dormitories should be selected to have non-absorptive properties. Cleaning methods should be researched to eliminate or lessen the effects of cumulative smoke buildup.




## Lodging



Points 0

### Environmental Tobacco Smoke (ETS) Control

#### Suggested steps:

- Step 1**  
Prohibit smoking indoors OR avoid smoke impacts on non-smoking residents through building design, HVAC system design, materials selection, and building operation.
- Step 2**  
Throughout the project design phases, ensure that the building design protects non-smoking occupants while accommodating smoking occupants, if applicable.
-  **Official LEED Submittal:**  
Provide a letter from the building owner verifying the building policy prohibiting smoking. Include site drawings highlighting designated outdoor smoking areas if applicable.
-  **Official LEED Submittal:**  
Provide drawings and a narrative demonstrating that designated smoking rooms have ventilation systems independent of non-smoking building areas.
-  **Official LEED Submittal:**  
Provide a letter from the testing engineer stating compliance with ASHRAE 129-1997 for the smoking areas. Include the tracer gas analysis report as specified in ASHRAE 129-1997, Section 8.
- Step 3**  
For the LEED application, include a narrative describing the measures taken to isolate smoking occupants from non-smoking occupants. Include construction documents and test results as appropriate.

## Lodging

### Credit 1 **Carbon Dioxide Monitoring**

**Intent** Provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort.

**Requirements** Install a permanent carbon dioxide (CO<sub>2</sub>) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time.

**As applied to LEED Lodging** Carbon dioxide monitoring may be a complicated issue in lodging facilities depending on the HVAC system employed. For mechanically ventilated lodgings served by a centralized HVAC systems, typical commercial grade sensors and controls can be used for this credit. For decentralized HVAC systems, it is likely to be cost prohibitive to monitor carbon dioxide levels in each HVAC system. For lodgings with decentralized HVAC systems, individual control of the ventilation air flows must be provided. If there are combustion appliances such as room heaters, wall furnaces, or water heaters located in the lodging space, an individual CO<sub>2</sub> sensor must be provided along with instructions on how to operate and maintain it. However, communal areas such as television rooms, dining areas, and meeting rooms served by a centralized HVAC system can be monitored for carbon dioxide levels. In addition, select locations throughout the building should be monitored to provide an overall carbon dioxide profile.

**As applied to U S Air Force** USAF dormitories are typically designed with decentralized HVAC systems. Thus, these buildings should monitor carbon dioxide in communal areas and in select points throughout the building. Carbon dioxide monitoring equipment should be connected to building controls to automatically adjust ventilation rates to obtain optimum carbon dioxide levels. Carbon dioxide monitoring will affect the overall HVAC design and operations sequence. Sensors should be checked during commissioning activities, before occupancy, and on an annual basis after occupancy to ensure that optimal carbon dioxide levels are being maintained.

SS	WE	EA	MR	EQ	ID
<b>Credit 1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Carbon Dioxide Monitoring

#### Suggested steps:

- Step 1**  
Design the HVAC system with carbon dioxide monitoring equipment during project design phases.
- Step 2**  
Specify carbon dioxide monitoring equipment in construction documents during the Contract Document Development phase.
- Step 3**  
Verify installation of carbon dioxide monitoring equipment during construction.
- Step 4**  
Commission carbon dioxide monitoring equipment after installation to ensure proper function.



#### Official LEED Submittal:

Provide drawings, specifications and cut sheets highlighting the installed carbon dioxide monitoring system. Include a narrative describing initial operation set point parameters and the sequence of operation and control of building ventilation systems (if applicable).

- Step 5**  
For the LEED application, include construction documents and cut sheets describing the carbon dioxide monitoring system.



## Lodging

### Credit 2 **Increase Ventilation Effectiveness**

Intent Provide for the effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.

Requirements For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy.

As applied to LEED Lodging Ventilation effectiveness issues are similar for lodging facilities and commercial buildings. Ventilation effectiveness is dependent on the type of ventilation system (mechanical or natural) and the building layout. Lodging facilities often have operable windows allowing for utilization of natural ventilation properties. These facilities may also have through-the-wall mechanical ventilation units. Proper design, selection, and maintenance of these ventilation units will significantly affect ventilation effectiveness. Airflow simulations should be performed for a typical living unit as well as for communal areas.

As applied to U S Air Force Most USAF dormitories are designed with operable windows to take advantage of natural ventilation properties. Ventilation effectiveness is easier to achieve in naturally ventilated spaces but can be achieved in most spaces through proper envelope and ventilation system design. The use of ceiling fans could improve the air change effectiveness of both naturally and mechanically ventilated rooms. However, the ASHRAE standard limits the contribution to air-change effectiveness of fans in the space to 10% or less.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Increase Ventilation Effectiveness

#### Suggested steps:

- Step 1**  
Simulate ventilation of building spaces to determine methods to optimize ventilation effectiveness during early design phases.
- Step 2**  
For mechanically ventilated spaces, perform modeling to demonstrate that the required ventilation effectiveness is achieved in all building spaces. For naturally ventilated spaces, perform air flow simulations to demonstrate that all spaces conform with the LEED requirements.



#### Official LEED Submittal:

For mechanically ventilated buildings, provide a report summarizing test results and calculations demonstrating that the designed building has an air-change effectiveness value of 0.9 or greater as determined by ASHRAE 129-1997, Appendix B. If E is less than 0.9, provide documentation indicating the corrected design ventilation rate (CDVR) used in the system design.



#### Official LEED Submittal:

For mechanically ventilated buildings, provide a design narrative that describes compliance with the recommended design approaches in ASHRAE Fundamentals Chapter 31, Space Air Diffusion design for as described in the calculation details of this credit.



#### Official LEED Submittal:

For naturally ventilated spaces, provide airflow simulation results including locations of inlets, outlets, and flow patterns. Provide a narrative with graphics describing the sequence of operations of the ventilation system and demonstrate that distribution and flow patterns in all naturally ventilated spaces involve at least 90% of the room or zone area in the direction of airflow for at least 95% of hours of occupancy.



#### Step 3

For the LEED application, include construction documents and analyses demonstrating the ventilation effectiveness of the building.

#### References

#### Environmentally Responsible Facilities Guide for the U S Air Force

Refer to the section in Chapter 2 on typical building plans and the section in Chapter 3 on heating, ventilation, and air conditioning.

#### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on heating, ventilation, and air conditioning.

SS	WE	EA	MR	EQ	ID
<b>Credit 3.1</b>					

## Lodging

### Credit 3.1 **Construction IAQ Management Plan, During Construction**

Intent Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long term installer and occupant health and comfort.

Requirements Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.

As applied to LEED Lodging Construction IAQ management issues are similar for lodging facilities and commercial buildings. Adoption of a Construction IAQ Management Plan is critical to protecting the building from contamination during the construction process. This plan should be incorporated into construction documents and construction activities should be monitored to ensure that contamination does not occur.

As applied to U S Air Force IAQ is important for USAF dormitories because these buildings typically have long lifetimes and occupants have extended durations of exposure to contaminants due to the residential function of these buildings. Protection of ventilation systems during construction is a simple measure and can have far reaching impacts in the future.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 3.1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Construction IAQ Management Plan, During Construction

#### Suggested steps:

- Step 1**  
Adopt a Construction IAQ Management Plan and include the plan in construction documents during the Contract Document Development phase. Also include mechanical specifications for the filter MERV.
- Step 2**  
Ensure that the construction team is aware of the Construction IAQ Management Plan and discuss methods for implementing the plan. The general contractor and subcontractors are the essential parties involved in this credit.
- Step 3**  
Monitor construction activities to ensure that the ventilation system and absorptive materials are protected during construction and photograph all protective measures employed.



#### Official LEED Submittal:

Provide a copy of the Construction IAQ Management Plan highlighting the five requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.



#### Official LEED Submittal:

Provide photographs of construction IAQ management measures such as protection of ducts and on-site stored or installed absorptive materials.



#### Official LEED Submittal:

Provide cut sheets of filtration media used during construction and installed immediately prior to occupancy with MERV values highlighted.

- Step 4**  
For the LEED application, include the Construction IAQ Management Plan, construction documentation demonstrating that the plan was implemented, and cut sheets for the filtration media.

#### References

#### Environmentally Responsible Facilities Guide

See Chapter 9 on indoor air quality issues during construction.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 3.2</b>					

## Lodging

### Credit 3.2 **Construction IAQ Management Plan, After Construction**

Intent Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long term installer and occupant health and comfort.

Requirements Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445.

As applied to LEED Lodging Construction IAQ management issues are similar for lodging facilities and commercial buildings. Adoption of a Construction IAQ Management Plan is critical to protecting the building from contamination during the construction process. This plan should be incorporated into construction documents and construction activities should be monitored to ensure that contamination does not occur.

As applied to U S Air Force IAQ is important for USAF dormitories because these buildings typically have long lifetimes and occupants have extended durations of exposure to contaminants due to the residential function of these buildings. The ability to flush out a building for two weeks is a simple process but may be difficult to achieve if the project schedule is constrained. Performing baseline IAQ testing is an effective method to quantify air quality levels but may be cost prohibitive or overly time consuming.

SS	WE	EA	MR	EQ	ID
<b>Credit 3.2</b>					



## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Construction IAQ Management Plan, After Construction

#### Suggested steps:

- Step 1**  
Adopt a Construction IAQ Management Plan and incorporate this plan into construction documents during the Contract Document Development phase.
- Step 2**  
Determine if a two-week building flushout period or baseline IAQ testing is possible for the project.
- Step 3**  
Perform the two-week flushout or baseline IAQ testing after construction activities are complete and prior to building occupancy.
-  **Official LEED Submittal:**  
Provide a letter from the architect or engineer describing building flushout procedures including actual dates of building flushout.
-  **Official LEED Submittal:**  
Provide specifications and documentation demonstrating conformance with IAQ testing procedures and requirements as described in the referenced standard.
- Step 4**  
For the LEED application, include a certification letter describing the two-week flushout period or testing analysis documents.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.1</b>					

## Lodging

### Credit 4.1 **Low-Emitting Materials, Adhesives and Sealants**

Intent	Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.
Requirements	Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:  Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Quality Management District Reg. 8, Rule 51.
As applied to LEED Lodging	Low-emitting material selection is similar for lodging facilities and commercial buildings. Adhesives and sealants should be reviewed in terms of VOC content, first cost, maintenance, and estimated lifetime. These materials should also be specified in construction documents and installation should be verified during construction. Low-emitting adhesives and sealants may not be available in all project locations.
As applied to U S Air Force	Currently, the USAF has no product selection criteria for adhesives and sealants used in USAF dormitories. It is a simple procedure to require low-toxic or non-toxic materials in construction documents.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 4.1</b>					

## Lodging



Points 1

### Low-Emitting Materials, Adhesives and Sealants

#### Suggested steps:

- Step 1**  
Establish VOC limits for adhesives and sealants in the Project Definition phase.
- Step 2**  
Identify all adhesives and sealants used in the project during project design phases.
- Step 3**  
Research low-toxic or non-toxic substitutes for these materials in terms of first cost, VOC content, maintenance costs, and estimated lifetimes.
- Step 4**  
Specify low-toxic or non-toxic materials in construction documents and include the maximum VOC content during the Contract Document Development phase.
- Step 5**  
Monitor installation activities to ensure that the specified materials are installed during construction.



#### Official LEED Submittal:

Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each adhesive used in the building highlighting VOC limits.



#### Official LEED Submittal:

Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each sealant used in the building highlighting VOC limits.

- Step 6**  
For the LEED application, provide cut sheets for all adhesives and sealants used in the building. Ensure that these materials do not exceed the referenced standard limits.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to Chapter 9 on indoor air quality issues.



SS	WE	EA	MR	EQ	ID
<b>Credit 4.2</b>					

## Lodging

### Credit 4.2 **Low-Emitting Materials, Paints**

Intent	Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.
Requirements	Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:  Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.
As applied to LEED Lodging	Low-emitting material selection is similar for lodging facilities and commercial buildings. Paints should be reviewed in terms of VOC content, first cost, maintenance, and estimated lifetime. These materials should also be specified in construction documents and installation should be verified during construction. Low-emitting paints may not be available in all project locations.
As applied to U S Air Force	Currently, the USAF has no product selection criteria for paints used in USAF dormitories. It is a simple procedure to require low-toxic or non-toxic paints in construction documents.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Low-Emitting Materials, Paints

#### Suggested steps:

- Step 1**  
Establish VOC limits for paints in the Project Definition phase.
- Step 2**  
Identify all paints used in the project during the project design phases.
- Step 3**  
Research low-toxic or non-toxic substitutes for these materials in terms of first cost, VOC content, maintenance costs, and estimated lifetimes.
- Step 4**  
Specify low-toxic or non-toxic materials in construction documents and include the maximum VOC content during the Contract Document Development phase.
- Step 5**  
Monitor installation activities to ensure that the specified materials are installed during construction.



#### Official LEED Submittal:

Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each paint or coating used in the building highlighting VOC limits and chemical component limits.

- Step 6**  
For the LEED application, provide cut sheets for all paints used in the building. Ensure that these materials do not exceed the referenced standard limits.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on interior design.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 4.3</b>					

## Lodging

### Credit 4.3 **Low-Emitting Materials, Carpet**

Intent	Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.
Requirements	Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:  Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.
As applied to LEED Lodging	Low-emitting material selection is similar for lodging facilities and commercial buildings. Carpet products should be reviewed in terms of VOC content, first cost, maintenance, and estimated lifetime. These materials should also be specified in construction documents and installation should be verified during construction. Low-emitting carpet products may not be available in all project locations.
As applied to U S Air Force	Currently, the USAF has no product selection criteria for paints used in USAF dormitories. It is a simple procedure to require low-toxic or non-toxic carpet products in construction documents.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.3</b>					

## Lodging



Points 1

### Low-Emitting Materials, Carpet

#### Suggested steps:

- Step 1**  
Establish VOC limits for carpet products in the Project Definition phase.
- Step 2**  
Identify all carpet products used in the project during project design phases.
- Step 3**  
Research low-toxic or non-toxic substitutes for these materials in terms of first costs, VOC content, maintenance costs, and material lifetimes.
- Step 4**  
Specify low-toxic or non-toxic materials in construction documents and include the maximum VOC content during the Contract Document Development phase.
- Step 5**  
Monitor installation activities to ensure that the specified materials are installed during construction.



#### Official LEED Submittal:

Provide a cut sheet for each carpet product used in the building highlighting VOC limits.

- Step 6**  
For the LEED application, provide cut sheets for all carpet materials used in the building. Ensure that these materials do not exceed the referenced standard limits.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section in Chapter 3 on interior design.

SS	WE	EA	MR	EQ	ID
<b>Credit 4.4</b>					

## Lodging

### Credit 4.4 **Low-Emitting Materials, Composite Wood**

**Intent** Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.

**Requirements** Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

Composite wood and agrifiber products must contain no added urea-formaldehyde resins.

**As applied to LEED Lodging** Low-emitting material selection is similar for lodging facilities and commercial buildings. Composite wood products should be reviewed in terms of VOC content, urea-formaldehyde resins, first cost, maintenance, and estimated lifetime. These materials should also be specified in construction documents and installation should be verified during construction. Low-emitting composite wood products may not be available in all project locations.

**As applied to U S Air Force** Currently, the USAF has no product selection criteria for composite wood products used in USAF dormitories. The most prevalent composite wood products are wood panel products (flooring & sheathing) and cabinetry substrates. It is a simple procedure to require low-toxic or non-toxic composite wood products in construction documents.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 4.4</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Low-Emitting Materials, Composite Wood

#### Suggested steps:

- Step 1**  
Establish urea-formaldehyde criteria for composite wood products in the Project Definition phase.
- Step 2**  
Identify all composite wood products used in the project during project design phases.
- Step 3**  
Research low-toxic or non-toxic substitutes for these materials in terms of first costs, VOC content, maintenance costs, and estimated lifetimes.
- Step 4**  
Specify low-toxic or non-toxic materials in construction documents and include the maximum VOC content during the Contract Document Development phase. For panel products, specify "HUD Exposure 1" or "Exterior grade" materials. These products contain phenol formaldehyde instead of the more toxic urea formaldehyde. For cabinetry, specify VOC/formaldehyde-free particle board.
- Step 5**  
Monitor installation activities to ensure that the specified materials are installed during construction.



#### Official LEED Submittal:

Provide a cut sheet for each composite wood or agrifiber product used in the building highlighting urea-formaldehyde resin limits.

- Step 6**  
For the LEED application, provide cut sheets for all composite wood materials used in the building. Ensure that these materials do not exceed the referenced standard limits.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the Building Design section.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 5</b>					

## Lodging

### Credit 5 **Indoor Chemical and Pollutant Source Control**

Intent Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirements Design to minimize cross-contamination of regularly occupied occupancy areas by chemical pollutants: Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air re-circulation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

As applied to  
LEED Lodging

Indoor chemical and pollutant source control measures can be challenging for lodging facilities depending on the building layout. Many lodging facilities are designed with separate entryways for each living unit. In these instances, a permanent walkoff system such as a grill or grate is required for each entryway. Other lodging facilities are designed with common walkways connecting living units to the outdoors. These facilities can utilize permanent walkoff systems at the main entrances to qualify for this credit.

Chemical use areas for lodging facilities typically include housekeeping, office equipment, and recreation (e.g., swimming pool chemicals). These areas are required to have separate ventilation and plumbing systems.

Chemical use areas must have separate ventilation and plumbing systems. This may add to design and construction costs.

As applied to  
U S Air Force

Indoor chemical and pollutant source control should be easy to provide at USAF dormitories. Entryway systems should be provided at all primary entrances to avoid introduction of outdoor contaminants into living spaces. All custodial rooms, chemical handling areas, and office equipment should be isolated from residential units and communal areas. An effective way to minimize or eliminate indoor chemical use is to specify cabinetry, millwork, and fixtures that do not require hazardous chemicals for cleaning.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 5</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Indoor Chemical and Pollutant Source Control

#### Suggested steps:

- Step 1**  
Determine the routes of contamination into living spaces due to foot traffic and chemical use. Routes to identify include entrances, custodial closets, chemical storage areas, and office equipment areas.
- Step 2**  
Design the building with physical systems to reduce contamination of indoor spaces during project design phases.
- Step 3**  
Specify contaminant elimination systems in construction documents during the Contract Document Development phase.



#### Official LEED Submittal:

Provide drawings and cut sheets highlighting entryway systems, including locations of entryways in the building.



#### Official LEED Submittal:

Provide a narrative and drawings highlighting the deck-to-deck physical separation and independent ventilation system of chemical use areas and copy rooms.



#### Official LEED Submittal:

Provide a narrative and drawings highlighting the plumbing system employed in chemical mixing areas.

- Step 4**  
For the LEED application, include construction documents and narratives describing the measures employed to eliminate contamination of indoor spaces.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the section on utility space in Chapter 4



SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 6.1</b>					

## Lodging

### Credit 6.1 **Controllability of Systems, Operable Windows**

Intent Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

Requirements Provide a minimum of one operable window and one lighting control zone per 200 sq. ft. for all occupied areas within 15 feet of the perimeter wall.

As applied to LEED Lodging Operable windows and lighting controls are common design features in lodging facilities. In some areas, operable windows may be problematic due to climatic conditions (e.g., dust problems, ambient temperatures). In such areas, it may be necessary to devise alternative methods for providing fresh air to spaces without impacting IAQ.

As applied to U S Air Force All USAF dormitory designs include operable windows in residential units. Spaces where operable windows are not possible such as support facilities and other non-regularly occupied spaces should be located in the building interior. When designing facilities with operable windows, it is prudent to the windows away from sources of contamination such as building exhaust vents and areas with high vehicle traffic. While operable windows can improve IAQ conditions, they can also have a negative impact on IAQ if located in inappropriate areas.

SS	WE	EA	MR	EQ	ID
<b>Credit 6.1</b>					


## Lodging



Points 1

### Controllability of Systems, Operable Windows

#### Suggested steps:

- Step 1**  
Design all regularly occupied spaces with operable windows and lighting controls during project design phases.
- Step 2**  
Analyze areas around operable window locations to identify potential sources of contamination that could negatively impact IAQ and relocate or remove operable windows as appropriate.
-  **Official LEED Submittal:**  
For perimeter regularly occupied areas, provide drawings and cut sheets highlighting operable windows and lighting controls for perimeter areas of the building. Include calculations summarizing the total perimeter occupied area and number of operable windows and lighting controls.
- Step 3**  
For the LEED application, include construction documents and a narrative describing the occupant controllability of windows and lighting for building perimeter areas. Use the LEED Calculator to verify that the operable windows and lighting controls are sufficient to meet LEED requirements.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the typical building plans and general glazing information.

SS	WE	EA	MR	EQ	ID
<b>Credit 6.2</b>					

## Lodging

### Credit 6.2 **Controllability of Systems, Individual Controls**

Intent Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

Requirements Provide controls for each individual for airflow, temperature, and lighting for 50% of the non-perimeter, regularly occupied areas.

As applied to LEED Lodging Individual controls for airflow, temperature, and lighting are more common in lodging facilities than in commercial buildings due to the residential nature of the facilities. These controls are standard and are easy to install in residential units. They should also be installed in communal areas.

As applied to U S Air Force Installation of airflow, temperature, and lighting controls in USAF dormitories is standard practice. Non-perimeter regularly occupied areas that fall under this credit include recreation rooms, television rooms, laundry areas, and communal areas.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 6.2</b>					

## Lodging



Points 1

### Controllability of Systems, Individual Controls

#### Suggested steps:

- Step 1**  
Identify non-perimeter rooms and specify airflow, temperature, and lighting controls for these rooms during project design phases.



#### Official LEED Submittal:

For non-perimeter regularly occupied areas, provide drawings and cut sheets highlighting airflow, temperature, and lighting controls. Include calculations summarizing the total non-perimeter occupied area, number of occupants, and number of airflow, temperature, and lighting controls.

- Step 2**  
For the LEED application, include construction documents and a narrative describing the occupant controllability of airflow, temperature, and lighting for building core (i.e., non-perimeter) areas. Use the LEED Calculator to verify that the airflow, temperature, and lighting controls are sufficient to meet LEED requirements.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the sections on typical building plans and HVAC systems.

SS	WE	EA	MR	EQ	ID
<b>Credit 7.1</b>					

## Lodging

### Credit 7.1 **Thermal Comfort, Compliance with ASHRAE 55-1992**

Intent Provide a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

Requirements Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone.

As applied to LEED Lodging Thermal comfort issues are similar for lodging facilities and commercial buildings. ASHRAE 55-1992 is applicable to lodging facilities and covers a wide range of occupant activities. Humidity ranges may be difficult to maintain in some project locations where humidity control is not included in the HVAC system.

Some bathroom exhaust make-up air flow strategies in hotels, motels, and dormitories supply un-conditioned air into circulation corridors. This can complicate compliance with ASHRAE 55-1992. Oversized HVAC through-the-wall units in living quarters can create indoor air quality problems by condensing humid make-up air and causing mold and mildew on carpets, wall coverings, and gypsum wallboard. Desiccant dehumidification of make-up air supplied to corridors is the recommended approach.

As applied to U S Air Force USAF dormitories can be designed to meet or exceed ASHRAE 55-1992 thermal comfort levels and humidity levels. However, humidity may be difficult to control in naturally ventilated buildings.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 7.1</b>					

## Lodging



Points 1

### Thermal Comfort, Compliance with ASHRAE 55-1992

#### Suggested steps:



##### Step 1

Design the building to comply with the thermal comfort criteria as defined by ASHRAE 55-1992 during project design phases.



##### Official LEED Submittal:

Provide a letter from the mechanical engineer confirming that the project complies with ASHRAE Standard 55-1992, Addenda 1995. Include design criteria and assumptions for thermal comfort including temperature, humidity, and air movement ranges.



##### Step 2

For the LEED application, include a certification letter from the mechanical engineer stating compliance with the referenced standard.

#### References

##### Facility Design Guide for Enlisted Dormitories

Refer to the thermal comfort section.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 7.2</b>					

## Lodging

### Credit 7.2 **Thermal Comfort, Permanent Monitoring System**

Intent Provide a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

Requirements Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.

As applied to LEED Lodging Permanent monitoring systems for thermal comfort are not typical equipment in many lodging facilities designs. These systems may be unnecessary or prohibitively costly. In buildings where permanent monitoring systems are used, these systems should monitor for temperature and humidity as well as have the ability to be adjusted by the building operator as appropriate.

As applied to U S Air Force USAF dormitories are typically designed without a permanent monitoring system for temperature and humidity. Instead, these buildings are designed with thermal comfort control in each residential unit. A permanent monitoring system may be applicable to support areas such as recreation rooms, television rooms, laundry areas, and communal areas, but this would not likely qualify for the credit because the system does not service all regularly occupied building spaces. However, the intent of the credit is to control and avoid wide variations in temperature and humidity. This could be achieved by using other control measures such as moisture barriers and vinyl wall coverings that act to stabilize environments.

SS	WE	EA	MR	EQ	ID
<b>Credit 7.2</b>					


## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Thermal Comfort, Permanent Monitoring System

#### Suggested steps:

- Step 1**  
Determine if a permanent monitoring system for temperature and humidity is applicable to the project.
- Step 2**  
If a permanent monitoring system is applicable, design the HVAC system with controls for temperature and humidity during project design phases. If a permanent monitoring system is not applicable, determine if there are other methods to meet the intent of the credit.
-  **Official LEED Submittal:**  
Provide drawings, specifications and cut sheets highlighting the installed permanent temperature and humidity monitoring and control system. Include a narrative describing measurement points and operator interface.
- Step 3**  
For the LEED application, include construction documents and cut sheets describing the thermal control system.



SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 8.1</b>					

## Lodging

### Credit 8.1 **Daylight and Views, Distribution Quality**

Intent Provide a connection between indoor spaces and outdoor environments through the introduction of sunlight and views into the occupied areas of the building.

Requirements Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight.

As applied to LEED Lodging Daylighting measures are more easily incorporated into lodging facilities than commercial buildings due to smaller floorplates and inclusion of windows in residential units. Designs for living units and other spaces for critical visual tasks should be reviewed in terms of glazing type, glazing area, and transmissivity to optimize daylight factors. Daylighting measures can also contribute to energy efficiency.

As applied to U S Air Force USAF dormitories have many opportunities for daylighting. Building orientation, window size, and window position all contribute to daylighting schemes. Interior spaces can be designed with skylights, light tubes, and atriums to maximize natural light penetration.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 8.1</b>					

## Lodging



Points 1

### Daylight and Views, Distribution Quality

#### Suggested steps:

**Step 1**  
Establish minimum daylight factors as design criteria in the Project Definition phase.

**Step 2**  
Perform daylight analysis to determine appropriate glazing sizes, shading devices, and glazing types during project design phases.



#### Official LEED Submittal:

Provide drawings with a narrative highlighting critical visual task areas and typical room sections highlighting shading devices for direct sun control.



#### Official LEED Submittal:

Submit glazing cut sheets highlighting Tvis values and area calculations defining the daylight zone and daylight prediction calculations demonstrating a minimum Daylight Factor of 2% in these areas.

**Step 3**  
For the LEED application, include a narrative, construction documents, and cut sheets describing the daylighting strategies employed in the building. Use the LEED Calculator to estimate daylight factors for each building area for the LEED application.

#### References

**USAF Passive Solar Handbook, Volume 1**  
Introduction to Passive Solar Concepts

**USAF Passive Solar Handbook, Volumes 2 & 3**  
Comprehensive Planning Guide

**Environmentally Responsible Facilities Guide for the U S Air Force**  
Refer to Chapter 8 on lighting and daylighting.

**Facility Design Guide for Enlisted Dormitories**  
Refer to the section in Chapter 3 on interior design and architectural systems.

SS	WE	EA	MR	<b>EQ</b>	ID
<b>Credit 8.2</b>					

## Lodging

### Credit 8.2 **Daylight and Views, Access to Views**

Intent Provide a connection between indoor spaces and outdoor environments through the introduction of sunlight and views into the occupied areas of the building.

Requirements Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas.

As applied to LEED Lodging Direct line of sight to glazing is more easily incorporated into lodging facilities than in commercial buildings due to smaller floorplates and inclusion of windows in residential units. All room designs should be assessed for access to views with regard to furniture height and wall placement.

As applied to U S Air Force USAF dormitories have many opportunities for access to views. Building orientation, window size, and window position all contribute to occupant views. All perimeter areas should easily meet the credit requirements. Non-perimeter occupied spaces should be carefully designed to allow for line of sight to windows on the building perimeter.

SS	WE	EA	MR	EQ	ID
<b>Credit 8.2</b>					

## Lodging



Points 1

### Daylight and Views, Access to Views

#### Suggested steps:

**Step 1**  
Establish access to views as design criteria in the Project Definition phase.

**Step 2**  
Design all spaces with access to views during project design phases.



#### Official LEED Submittal:

Provide drawings and a narrative highlighting direct line of sight zone. Submit calculations demonstrating that 90% of these zones have direct lines of site to perimeter glazing.

**Step 3**  
For the LEED application, include construction documents and a narrative describing the access to views from interior spaces. Use the LEED Calculator to estimate access to views for each building area for the LEED application.

#### References

#### Facility Design Guide for Enlisted Dormitories

Refer to the sections on building plans and glazing information.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.1</b>					

## Lodging

### Credit 1.1 **Innovation in Design:**

**Intent** To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Building Ratings System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

**Requirements** In writing using the LEED Credit Equivalence process, identify the INTENT of the proposed innovation credit, the proposed REQUIREMENT for compliance, the proposed SUBMITTALS to demonstrate compliance, and the DESIGN APPROACH used to meet the required elements.

**As applied to LEED Lodging** Lodging facilities do not offer as many opportunities for innovation measures as commercial buildings due to their specific residential use. However, innovative measures can still be incorporated into facility design. Example measures include fostering a community atmosphere through optimal project design, sharing facilities between living units to reduce infrastructure costs, and performing acoustic analyses to ensure optimal indoor environments for occupants.

**As applied to U S Air Force** USAF dormitories have many opportunities to capture innovation in design points. One innovative measure to consider is exit strategies and future uses of dormitories. It may also be possible to share facilities between buildings on USAF installations to reduce infrastructure costs and improve community relations. There may be an opportunity for an innovation credit for performing a comprehensive life cycle assessment of sustainable building strategies. This might include analysis of several ventilation systems, a variety of interior materials, and different landscaping schemes.

It is recommended that project teams use the LEED Credit Interpretation Process to introduce the USGBC to the potential innovation measure early in the design process. This allows for dialogue between the project team and the USGBC to determine the level of effort required to earn this Credit.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.1</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Innovation in Design:

#### Suggested steps:



##### Step 1

Identify building measures or elements that could potentially qualify for innovation points. These measures must greatly exceed existing LEED credits or not be addressed by the LEED system.



##### Official LEED Submittal:

Provide a narrative and supporting documents (e.g., drawings, specifications, cut sheets) for EACH innovative measure incorporated into the project. Include information that demonstrates the sustainable benefits of each measure.



##### Step 2

For the LEED application, include a narrative and supporting documents that fully describe the innovative measure employed in the project.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.2</b>					

## Lodging

### Credit 1.2 **Innovation in Design:**

**Intent** To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Building Ratings System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

**Requirements** In writing using the LEED Credit Equivalence process, identify the INTENT of the proposed innovation credit, the proposed REQUIREMENT for compliance, the proposed SUBMITTALS to demonstrate compliance, and the DESIGN APPROACH used to meet the required elements.

**As applied to LEED Lodging** Lodging facilities do not offer as many opportunities for innovation measures as commercial buildings due to their specific residential use. However, innovative measures can still be incorporated into facility design. Example measures include fostering a community atmosphere through optimal project design, sharing facilities between living units to reduce infrastructure costs, and performing acoustic analyses to ensure optimal indoor environments for occupants.

**As applied to U S Air Force** USAF dormitories have many opportunities to capture innovation in design points. One innovative measure to consider is exit strategies and future uses of dormitories. It may also be possible to share facilities between buildings on USAF installations to reduce infrastructure costs and improve community relations. There may be an opportunity for an innovation credit for performing a comprehensive life cycle assessment of sustainable building strategies. This might include analysis of several ventilation systems, a variety of interior materials, and different landscaping schemes.

It is recommended that project teams use the LEED Credit Interpretation Process to introduce the USGBC to the potential innovation measure early in the design process. This allows for dialogue between the project team and the USGBC to determine the level of effort required to earn this Credit.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Innovation in Design:

#### Suggested steps:

- Step 1**  
Identify building measures or elements that could potentially qualify for innovation points. These measures must greatly exceed existing LEED credits or not be addressed by the LEED system.



#### Official LEED Submittal:

Provide a narrative and supporting documents (e.g., drawings, specifications, cut sheets) for EACH innovative measure incorporated into the project. Include information that demonstrates the sustainable benefits of each measure.

- Step 2**  
For the LEED application, include a narrative and supporting documents that fully describe the innovative measure employed in the project.



SS	WE	EA	MR	EQ	ID
<b>Credit 1.3</b>					

## Lodging

### Credit 1.3 **Innovation in Design:**

**Intent** To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Building Ratings System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

**Requirements** In writing using the LEED Credit Equivalence process, identify the INTENT of the proposed innovation credit, the proposed REQUIREMENT for compliance, the proposed SUBMITTALS to demonstrate compliance, and the DESIGN APPROACH used to meet the required elements.

**As applied to LEED Lodging** Lodging facilities do not offer as many opportunities for innovation measures as commercial buildings due to their specific residential use. However, innovative measures can still be incorporated into facility design. Example measures include fostering a community atmosphere through optimal project design, sharing facilities between living units to reduce infrastructure costs, and performing acoustic analyses to ensure optimal indoor environments for occupants.

**As applied to U S Air Force** USAF dormitories have many opportunities to capture innovation in design points. One innovative measure to consider is exit strategies and future uses of dormitories. It may also be possible to share facilities between buildings on USAF installations to reduce infrastructure costs and improve community relations. There may be an opportunity for an innovation credit for performing a comprehensive life cycle assessment of sustainable building strategies. This might include analysis of several ventilation systems, a variety of interior materials, and different landscaping schemes.

It is recommended that project teams use the LEED Credit Interpretation Process to introduce the USGBC to the potential innovation measure early in the design process. This allows for dialogue between the project team and the USGBC to determine the level of effort required to earn this Credit.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.3</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Innovation in Design:

#### Suggested steps:

- Step 1**  
Identify building measures or elements that could potentially qualify for innovation points. These measures must greatly exceed existing LEED credits or not be addressed by the LEED system.



#### Official LEED Submittal:

Provide a narrative and supporting documents (e.g., drawings, specifications, cut sheets) for EACH innovative measure incorporated into the project. Include information that demonstrates the sustainable benefits of each measure.

- Step 2**  
For the LEED application, include a narrative and supporting documents that fully describe the innovative measure employed in the project.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.4</b>					

## Lodging

### Credit 1.4 **Innovation in Design:**

**Intent** To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Building Ratings System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

**Requirements** In writing using the LEED Credit Equivalence process, identify the INTENT of the proposed innovation credit, the proposed REQUIREMENT for compliance, the proposed SUBMITTALS to demonstrate compliance, and the DESIGN APPROACH used to meet the required elements.

**As applied to LEED Lodging** Lodging facilities do not offer as many opportunities for innovation measures as commercial buildings due to their specific residential use. However, innovative measures can still be incorporated into facility design. Example measures include fostering a community atmosphere through optimal project design, sharing facilities between living units to reduce infrastructure costs, and performing acoustic analyses to ensure optimal indoor environments for occupants.

**As applied to U S Air Force** USAF dormitories have many opportunities to capture innovation in design points. One innovative measure to consider is exit strategies and future uses of dormitories. It may also be possible to share facilities between buildings on USAF installations to reduce infrastructure costs and improve community relations. There may be an opportunity for an innovation credit for performing a comprehensive life cycle assessment of sustainable building strategies. This might include analysis of several ventilation systems, a variety of interior materials, and different landscaping schemes.

It is recommended that project teams use the LEED Credit Interpretation Process to introduce the USGBC to the potential innovation measure early in the design process. This allows for dialogue between the project team and the USGBC to determine the level of effort required to earn this Credit.

SS	WE	EA	MR	EQ	ID
<b>Credit 1.4</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### Innovation in Design:

#### Suggested steps:



##### Step 1

1. Identify building measures or elements that could potentially qualify for innovation points. These measures must greatly exceed existing LEED credits or not be addressed by the LEED system.



##### Official LEED Submittal:

Provide a narrative and supporting documents (e.g., drawings, specifications, cut sheets) for EACH innovative measure incorporated into the project. Include information that demonstrates the sustainable benefits of each measure.



##### Step 2

For the LEED application, include a narrative and supporting documents that fully describe the innovative measure employed in the project.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

### Credit 2 **LEED™ Accredited Professional**

Intent To support and encourage the design integration required by a LEED Green Building project and to streamline the application and certification process.

Requirements At least one principal participant of the project team that has successfully completed the LEED Accredited Professional exam.

As applied to LEED Lodging This credit is similar for lodging facilities and commercial facilities. A member of the design team must be a LEED accredited professional. See the LEED website at [www.leedbuilding.org](http://www.leedbuilding.org) for more information on the LEED accreditation exam.

As applied to U S Air Force USAF dormitory projects should include a LEED accredited professional in the design team. This person should be familiar with the LEED Green Building Rating System and be conversant in sustainable building design strategies. The same person can be a project team member on multiple projects.

SS	WE	EA	MR	EQ	ID
<b>Credit 2</b>					

## Lodging

Easy	Mod	Diff
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Points 1

### **LEED™ Accredited Professional**

#### **Suggested steps:**

- Step 1**  
Identify a member of the design team who is a LEED accredited professional. If no design team members are accredited, select a person to attend a LEED workshop and successfully pass the accreditation examination.



#### **Official LEED Submittal:**

Provide a copy of the LEED™ Accredited Professional Certificate.

- Step 2**  
For the LEED application, include the certificate stating that the LEED accredited professional has successfully passed the LEED accreditation exam.

## References

The following references provide methods for the development of sustainable US Air Force lodging facilities and should be used in conjunction with the LEED Green Building Rating System and the LEED Reference Guide and LEED Welcome Packet when designing and constructing US Air Force lodging facilities. Where available, hyperlinks to web-published documents are provided.

### Affirmative Procurement Program

This program was established by federal agencies, as required under EO 13101, to assure materials composed of recovered materials will be purchased to the maximum extent practicable, consistent with federal law and procurement regulations.

[www.afcee.brooks.af.mil/eq/ap/gg/default.asp](http://www.afcee.brooks.af.mil/eq/ap/gg/default.asp)

### Air Force Interior Design Guides

This document includes general information on interior design principles as well as specific information on furniture, lighting, colors, plantings, and other interior design considerations.

[www.afcee.brooks.af.mil/dc/dcd/interior/intdespu.htm](http://www.afcee.brooks.af.mil/dc/dcd/interior/intdespu.htm)

### Air Force Pollution Prevention (P2) Toolbox

This resource provides access to a library of tools (e.g., handbooks, guides, training software, and videos) related to the pollution prevention process.

[www.hqafcee.brooks.af.mil/eq/p2toolbox/home.htm](http://www.hqafcee.brooks.af.mil/eq/p2toolbox/home.htm)

### Air Force Water Management Program

This program provides general guidance on USAF policy regarding water management procedures.

[www.afcesa.af.mil/Directorate/CES/Mechanical/Energy/AFEPPM/96-2\\_AFEPPM.html](http://www.afcesa.af.mil/Directorate/CES/Mechanical/Energy/AFEPPM/96-2_AFEPPM.html)

### Base Comprehensive Transportation Planning Bulletin

This document addresses transportation planning principles and methodologies.

### C & D Waste Management Guide

This document includes information for waste managers including potential recycling and waste reduction opportunities as well as planning and implementation of waste management plans.

[www.afcee.brooks.af.mil/eq/programs/summary.asp?rscID=870](http://www.afcee.brooks.af.mil/eq/programs/summary.asp?rscID=870)

## Appendix A

### City of Boulder Model Energy Code

[www.ci.boulder.co.us/cao/](http://www.ci.boulder.co.us/cao/)

### City of Seattle Energy Code

[www.cityofseattle.net/dclu/energy](http://www.cityofseattle.net/dclu/energy)

### Comprehensive Plan

The Comprehensive Plan is specific to each USAF installation and it serves as the master planning document for the installation.

### The Environmental Restoration Program

This program provides guidance for complying with Federal and state regulations regarding cleanup of contaminated sites.

### Environmentally Responsible Facilities Guide

This document is a checklist of sustainable measures that can be implemented in the design process for USAF facilities. The measures are applicable to new facilities as well as remodeling projects and refers to USAF procedures.

[www.afcee.brooks.af.mil/green/facilitiesguide/facguide.asp](http://www.afcee.brooks.af.mil/green/facilitiesguide/facguide.asp)

### Executive Order 12902, Energy Efficiency and Water Conservation

Superseded by Executive Order 13123

[www.eren.doe.gov/femp/resources/exec12902.html](http://www.eren.doe.gov/femp/resources/exec12902.html)

### Executive Order 13123, Energy Efficient Management

[www.eren.doe.gov/femp/resources/exec13123.html](http://www.eren.doe.gov/femp/resources/exec13123.html)

### Facility Design Guide for Enlisted Dormitories

This document provides information on programming, overall project design, functional area and space criteria, and the Vision 2020 program. It is an essential tool in designing USAF facilities.

[www.afcee.brooks.af.mil/dc/DCD/arch/dormguide.pdf](http://www.afcee.brooks.af.mil/dc/DCD/arch/dormguide.pdf)

### Facility Energy Program

This program includes a variety of energy-specific resources maintained by the USAF and includes a list of links to USAF energy documents.

[www.afcesa.af.mil/Directorate/CES/Mechanical/Energy/default.htm](http://www.afcesa.af.mil/Directorate/CES/Mechanical/Energy/default.htm)



### **Investment Opportunities for Energy and Water Conservation**

This document provides general guidance on USAF policies regarding energy and water conservation.

[www.afcesa.af.mil/Directorate/CES/Mechanical/Energy/AFEPPM/96-4\\_AFEPPM.html](http://www.afcesa.af.mil/Directorate/CES/Mechanical/Energy/AFEPPM/96-4_AFEPPM.html)

### **Land Use Planning Bulletin: Base Comprehensive Plan**

This document provides information on land use planning, including procedures for developing a land use plan for USAF facilities.

[www.afcee.brooks.af.mil/mgpg/pages/overview/overview.htm](http://www.afcee.brooks.af.mil/mgpg/pages/overview/overview.htm)

### **Master Landscape Construction Specifications**

This document provides USAF-accepted specifications for landscaping and is divided into CSI sections. The specification text can be adopted for specific projects and modified as appropriate.

[www.afcee.brooks.af.mil/dc/dcd/land/mstrland/mlcs.htm](http://www.afcee.brooks.af.mil/dc/dcd/land/mstrland/mlcs.htm)

### **USAF Landscape Design Guide**

This document includes information on a variety of landscape topics including design, planning, maintenance, specifications, cost estimating, and construction details. It also covers specialized landscaping topics such as xeriscapes, planting design, irrigation, exterior lighting, and erosion control.

[www.afcee.brooks.af.mil/dc/dcd/land/ldg/index.html](http://www.afcee.brooks.af.mil/dc/dcd/land/ldg/index.html)

### **USAF Passive Solar Handbook, Volume 1**

This document, Introduction to Passive Solar Concepts, is a general guide for passive solar design. The document addresses concepts of passive solar design, effects on energy and site planning, and energy considerations in USAF facilities.

[www.afcee.brooks.af.mil/ec/mmgpg/pages/reference/ref.htm](http://www.afcee.brooks.af.mil/ec/mmgpg/pages/reference/ref.htm)

### **USAF Passive Solar Handbook, Volumes 2 & 3**

This document includes the Comprehensive Planning Guide and the Programming Guide. These guides provide in-depth discussion of energy and site planning, facility energy use, determining appropriate passive solar design, choosing passive solar systems, and monitoring performance of passive solar systems.

[www.afcee.brooks.af.mil/ec/mmgpg/pages/reference/ref.htm](http://www.afcee.brooks.af.mil/ec/mmgpg/pages/reference/ref.htm)