Green Rehabilitation: A Tool for Sustainable Community Development

Presented By: National Center for Preservation Technology & Training
Instructed By: Donna Isaacs, President, CocoGreen, Inc.
Contact Info: Mobile 318-379-4515, Within 24-48 hours
Email: dlisaacs@ufl.edu, Within 24-48 hours

COURSE OVERVIEW AND INTRODUCTION
**Housekeeping for Instructor-led Workshop**

- Please place cell phones on vibrate
- Bathrooms
- Please keep discussion pertinent to the material being covered
- Time permitting, instructor will answer project specific questions during the breaks

**Course Overview**

**Instructor-led Workshop**

- 24 hours of classroom/streaming online instruction with self-check homework assignments
- Access to Supplementary Material
  - 1 LEED Green Associate practice exam with 100 multiple choice questions and answer key
  - LEED BD&C Summary
  - LEED EBOM Summary
Course Objectives

You will be able to:

• Describe the core strategies of historic preservation and green building
• Select the appropriate LEED Rating System for project certification
• Complete the preliminary checklist for a project attempting LEED certification
• Explain the process for documenting and certifying a LEED project
• Describe the role of green rehabilitation in sustainable community development

Minimum Requirements

• No Prerequisites
• High School Diploma or equivalent General Educational Development strongly suggested!
• Construction Industry Experience, a plus but not required
Course Material

Handbook
- Green Rehabilitation: A Tool for Sustainable Community Development

LEED Rating Systems (www.usgbc.org):
- New Construction and Major Renovations
- Existing Building Operation and Maintenance
- Neighborhood Development

Instructor-led Workshop Schedule

Day One

8:30 am Introduction & Overview
9:00 am Sustainable Community Development
10:20 am Break
10:40 am Historic Preservation & Preservation Tax Credits
12:00 pm Lunch
1:00 pm Intro to LEED Rating Systems
2:20 pm Break
2:40 pm Green Rehabilitation Projects-Synergies & Trade-offs
4:30 pm Adjourn

Day Two

Coral Gables Museum
Case Study: LEED for New Construction and Major Renovations
Sustainable Sites
10:20 am Break
10:40 am Water Efficiency
12:00 pm Lunch
1:00 pm Energy & Atmosphere
2:20 pm Break
2:40 pm Materials & Resources
3:30 pm Indoor Environmental Quality
4:15 pm Innovation in Design & Regional Priority
4:30 pm Adjourn
Instructor-led Workshop Schedule

Day Three
8:30 am NCPTT Case Study-LEED for Existing Buildings Operations & Maintenance (SS, WE, EA)
10:20 am Break
10:40 am NCPTT Case Study-LEED for Existing Buildings Operations & Maintenance (MR, IEQ, ID, RP)
12:00 pm Lunch
1:00 pm Village of Natchez Case Study-LEED for Neighborhood Development (SLL, NPD)
2:20 pm Break
2:40 pm Village of Natchez Case Study-LEED for Neighborhood Development (GIB, IDP, RP)
4:15 pm Wrap-Up
4:30 pm Adjourn

Instructor Bio

Donna Isaacs, President, CocoGreen, Inc.

- Bachelor of Science, Building Construction, University of Florida, 12/2004
- Master of Science, Coursework in Sustainable Construction, University of Florida
- Educate and advocate for the rehabilitation of buildings in pursuit of a sustainable built environment.
- Founded the Natchitoches Parish African American Cultural Heritage Initiative

University of Florida Powell Center for Construction & Environment

- Served as the Executive Director and Project Manager of the Cotton Club Museum & Cultural Center, Inc. (CCMCC), a project combining green building with historic rehabilitation.
- Appointed as Project Team Administrator for the first LEED Certified gas station and convenience store in the nation.
- Served as Conference Coordinator for Rethinking Sustainable Construction 2006 - an international sustainable construction conference with over 225 in attendance representing 26 countries.

University of Florida TREEO Center

- Instructed over 50 workshops, preparing over 2,000 people to take the Leadership in Energy and Environmental Design (LEED) exam with an average pass rate of 85%.
- Conducted onsite workshops for Suffolk Construction, Moss Construction, Associated Builders and Contractors, Zyscovich, Miami Dade County, Balfour Beaty, Progress Energy, Baptist Health, Boca Developers, Palm Beach County School Board, City of Miami, the City of Orlando, to name a few.
LEED Green Associate Exam

Download and READ the LEED Green Associate Candidate Handbook. It outlines:

- Exam Eligibility Requirements
- How to APPLY and SCHEDULE the Exam
- Subject Matter Covered on Exam
  - Synergistic Opportunities and LEED Application Process
  - Project Site Factors
  - Water Management
  - Project Systems and Energy Impacts
  - Acquisition, Installation, and Management of Project Materials
  - Stakeholder Involvement in Innovation
  - Project Surroundings and Public Outreach
- Sample Questions
  - Recognition
  - Application
  - Analysis
- Credential Maintenance

Source: www.gbci.org

Contact Information

Instructor
Donna Isaacs
- Mobile: 318-379-4515
  Within 24-48 hours
- Email: dlisaacs@ufl.edu
  Within 24-48 hours
Sustainable Community Development

Anasazi Cliff Dwellings
Designed for the Environment (DfE)

- Local Materials
- Energy Efficient Structures

National Park Service, Santa Fe, NM
Population

Current Population Clock
• U.S. 313,813,876
• World 7,022,187,961
14:46 UTC (EST+5) Jun 25, 2012

COMPONENT SETTINGS FOR JUNE 2012
• One birth every 8 seconds
• One death every 14 seconds
• One international migrant (net) every 44 seconds
• Net gain of one person every 13 seconds

(http://www.census.gov/main/www/popcloc.html)

U.S. Population Projected Growth

U.S. Population (www.census.gov)
"Working along with natural principles of development, expansion, sustainability, and correction, people can create economies that are more reliably prosperous than those we have now, and that are more harmonious with the rest of nature."

Source: www.ecotrust.org/about
Sustainable Community Development?

Millennium Development Goals
1. End Poverty and Hunger
2. Universal Education
3. Gender Equality
4. Child Health
5. Maternal Health
6. Combat HIV/AIDS
7. Environmental Sustainability
8. Global Partnerships

Calvert-Henderson Quality of Life Indicators
1. Education
2. Employment
3. Energy
4. Environment
5. Health
6. Human Rights
7. Income
8. Infrastructure
9. National Security
10. Public Safety
11. Re-creation
12. Shelter

http://www.un.org/millenniumgoals/
http://www.calvert-henderson.com/

Cultural Heritage

1. Foster Community Bonds bind communities together by promoting and preserving their identities, traditions, and values.
2. Promote a Shared Identity
3. Many Incorporate human services and community improvement and capacity building programs (Usually African American, Hispanic, and Native American Organizations)

Cultural Heritage Organizations bind communities together by promoting and preserving their identities, traditions, and values.

How Cultural Heritage Organizations Serve Communities
– Dr. Carole Rosenstein, The Urban Institute
The Benefits of Cultural Heritage

How Cultural Heritage Organizations Serve Communities

– Dr. Carole Rosenstein, The Urban Institute

1. **Cultural and Art Centers** that present, promote, and provide training in community-oriented arts and cultural activities (14 percent)
2. **Festival Organizations** that produce and sponsor public events including fairs, Fourth of July commemorations, Pioneer Days, Martin Luther King Day parades, and other annual pageants, processions, and celebrations (25 percent)
3. **Ethnic, Cultural, and Folk Organizations** that use expressive forms to encourage understanding of ethnic, cultural, racial, regional, linguistic, or religious groups or traditions (61 percent)

Cultural Heritage (cont.)

- In 2001
  - 2,664 nonprofit cultural heritage organizations
  - 9% of the Arts, Culture and the Humanities
  - $1.4 billion of revenue
  - 6% of the revenue from Arts, Culture and the Humanities
1. **Foster Community Bonds** bind communities together by promoting and preserving their identities, traditions, and values.

2. **Promote a Shared Identity**

3. Many Incorporate human services and community improvement and capacity building programs (Usually African American, Hispanic, and Native American Organizations)

Cultural Heritage Organizations bind communities together by promoting and preserving their identities, traditions, and values.

---

**Sustainable Development Planning**

- **Culture**
- **Health**
- **Education**
- **Employment**
- **Safety/Security**
- **Environment:**
  - Natural (incl. air, water, food, natural resources)
  - Built (incl. infrastructure, transportation, live, work, play)
Building Community Wealth

FORD FOUNDATION - Six Forms of Community Wealth:

1. **Financial capital** includes bank accounts, equity investments, and bonds. But any income stream flowing into or out of a community is a form of financial capital. This flow of funds can become a community asset when a community-owned bank or credit union controls it.

2. **Natural capital** is defined by Fikret Berkes and Carl Folke as including (a) non-renewable resources such as oil and minerals; (b) renewable resources such as fish, wood and water; and (c) environmental services such as climate, waste assimilation, and flood control.

3. **Social capital** is the stock of trust, relationships, and networks that support a healthy community. These can become a source of wealth, for example, when social networks allow people to come together to share ideas on organic farming.

4. **Individual capital** is the stock of skills and the physical and mental capabilities of people in a region. (Incl. the skills to operate computers, entrepreneurial ability to start new businesses, and human health, etc.

5. **Built capital** includes communication technology, wind energy towers, biofuel production plants, and other forms of infrastructure that can generate community wealth. Also included in built capital are homes and community buildings that shape community prosperity.

6. **Intellectual capital** is the stock of knowledge and innovation in a region, embodied not in individual minds — as individual capital is — but instead in the enduring intellectual products those minds have created. Intellectual capital might include inventions that lead to patents, or published writings that generate income.

Fostering Sustainable Behavior

- Barriers and Benefits
- Commitment to Act
- Reminders
- Norms

For more information: http://www.cbsm.com/public/world.lasso

CASE STUDY: THE COTTON CLUB MUSEUM & CULTURAL CENTER
Cotton Club/The Blue Note

http://www.cce.ufl.edu/cottonclub/gallery.html

Identify the Jacobs in Your Community

Charles Kibert, PhD, PE, Professor & Director of Powell Center for Construction & Environment

Roy Eugene Graham, FAIA, Beinecke-Reeves Distinguished Professor & Director of the College Preservation Programs

Vivian Filer, Retired Professor of Nursing, SFCC, Resident of Springhill, Community Activist
Seek Partners

- University of Florida
- Santa Fe Community College
- Mount Olive AME Church
- City of Gainesville
- Gainesville Community Redevelopment Agency
- Alachua County Court Services
- Springhill Neighborhood Association
- Community Leaders and Residents

Vision

The Cotton Club Museum & Cultural Center, Inc. is a non-profit, 501(c)3 corporation dedicated to:

The preservation of African American history and culture through the fine, folk and performing arts in a sustainable, user centered, transdisciplinary venue that fosters innovation and creativity.

http://www.cce.ufl.edu/cottonclub/gallery.html
Mission (04/15/2005)

1. To provide for restoration, preservation and protection of the historic building known as the Cotton Club/Blue Note
2. To develop, organize and operate an archive and museum for the African American community in Gainesville and other cities and villages in Alachua County
3. To promote the performing arts and other youth focused programs
4. To offer multigenerational educational opportunities
5. To develop a cultural tourism destination, incorporating the four shotgun houses and the Perryman’s Grocery Store

Mission (cont.)

6. To combat community deterioration through the employment of sustainable development practices:
   - Main Street
   - Green Building
   - Historic Preservation
7. To promote growth and development in East Gainesville
Background

The Site: 837 SE 7th Avenue (1.84 acres)

- There are six buildings on the site:
  - Cotton Club/Blue Note Hall (approx. 3700 sq.ft.)
  - Perryman’s Grocery Store (approx. 660 sq.ft.)
  - 4 Shotgun Houses (approx. 400-600 sq.ft. each)

Springhill Neighborhood
Adaptive Reuse

- The six buildings will be adapted for diverse purposes:
  - The Cotton Club Hall as a museum & cultural center
Adaptive Reuse

• The six buildings will be adapted for diverse purposes:
  ▪ Perryman’s Grocery Store as a visitors center, restaurant and ethnic foods store
  ▪ The Shotgun Houses as offices for CCMCC as well as incubator businesses

Building the Future

• Museum Support Facility
• North Central Florida African American Library & Archives
• Outdoor Pavilion
• Heritage Walk
• Tribute Wall
Promote the performing arts and other youth focused programs

Offer multigenerational educational opportunities

- Experiential Learning Projects
  - Electronically published book edited by Dr. Stephanie Evans
  - Documentary by UF students
  - JFest marketing plan by UF students
  - Urban Planning student volunteers
    - Brochure
    - Table Cover
    - Lowe’s and Target Registry
    - Plans for shot gun houses and library
JFEST

Develop a cultural tourism destination, incorporating the four shot-gun houses and the Perryman’s Grocery Store

- 2 Annual Juneteenth Festival & Juried Art Shows
  - 5000 participants over 2 days
  - 58 artists from across the US, 1 from Brazil, 1 from France
  - 14 food vendors
  - 20 community booths
  - Youth Tent with a focus on African American History and Culture

Yulee Railroad Days
Promote growth and development in East Gainesville

• **Perryman’s Grocery Store** converted to a visitors center with restaurant and outdoor café which can be leased to an incubator business to serve the residents of the community (GCRA $175,000)

• Establishing the **Cotton Club Marketplace** a combination of a farmers market, arts and crafts stalls, and ethnic food vendors will add to the cultural diversity while promoting commerce in the community (GCRA $22,000)

Shotgun Rehabilitated
Cotton Club Stabilized

Protecting our Heritage

THE NATIONAL HISTORIC PRESERVATION ACT AND OTHER PRESERVATION LAWS
The National Historic Preservation Program

- Historic Preservation:
  - Embraces America’s heritage
  - Creates a sense of place and community
  - Contributes to the local economy
  - Adds variety and texture to the cultural landscape
  - Is and always has been a grassroots movement

Preservation Laws

- Perception or fact:
  - Federal government, an agent of indifference
  - Responsible for needless loss of historic resources

- Transformation:
  - An agent of thoughtful change
  - Responsible steward for future generations

Penn Station Demolished 1963
Trains moved underground
MEMPHIS - Union Station (1912 – 1960s)

Now: U.S. Postal Service

ROCHESTER: NY Central Railroad Station (1914 – 1965)

Amtrak Facility
Federal Historic Preservation Laws Include:

- 1906 Antiquities Act
- 1916 National Park Service Organic Act
- 1935 Historic Sites Act
- 1949 National Trust for Historic Preservation (NTHP)
- **1966 National Historic Preservation Act (NHPA)**
- 1966 Department of Transportation Act
- 1970 National Environmental Policy Act (NEPA)
- 1974 Archaeological and Historic Preservation Act (AHPA)
- 1978 American Indian Religious Freedom Act (AIRFA)
- 1979 Archaeological Resources Protection Act (ARPA)
- 1990 Native American Graves Protection and Repatriation Act (NAGPRA)
- 1990 Americans with Disabilities Act (ADA)

National Historic Preservation Act of 1966 (NHPA)

**Purpose**

1. **the spirit and direction of the Nation are founded upon and reflected in its historic heritage**;
2. **the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people**;
3. **historic properties significant to the Nation's heritage are being lost or substantially altered, often inadvertently, with increasing frequency**;
4. **the preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans**;
National Historic Preservation Act of 1966 (NHPA)

(5) in the face of ever-increasing extensions of urban centers, highways, and residential, commercial, and industrial developments, the present governmental and nongovernmental historic preservation programs and activities are inadequate to insure future generations a genuine opportunity to appreciate and enjoy the rich heritage of our Nation;

(6) the increased knowledge of our historic resources, the establishment of better means of identifying and administering them, and the encouragement of their preservation will improve the planning and execution of Federal and federally assisted projects and will assist economic growth and development; and

(7) although the major burdens of historic preservation have been borne and major efforts initiated by private agencies and individuals, and both should continue to play a vital role, it is nevertheless necessary and appropriate for the Federal Government to accelerate its historic preservation programs and activities, to give maximum encouragement to agencies...

National Historic Preservation Act of 1966 (NHPA)

• Title1, Historic Preservation Programs (Section 101)
  – Secretary of the Interior
    • Maintain a National Register of Historic Places
    • Includes National Historic Landmarks
    • Establish criteria for the National Register
    • Nominate, Designate and Remove properties from the National Register
    • Any property nominated under this act shall be included on the National Register on the date 45 days after receipt by the Secretary of the nomination and the necessary documentation unless the Secretary disapproves such nomination within the 45 day period or unless an appeal is filed under paragraph (5).
    • In conjunction with state historic preservation officers, and the Advisory Council on Historic Preservation, at least once every four years, review threats the properties included in or eligible for inclusion on the National Register
    • At least once every four years, in conjunction with the Advisory Council on Historic Preservation review state programs.
National Historic Preservation Act of 1966 (NHPA)

• Title 1, Historic Preservation Programs
  – State Historic Preservation Officer
    • Administer State Historic Preservation Program
    • Direct and conduct a comprehensive statewide survey of historic properties and maintain inventories of such properties
    • Prepare and implement a comprehensive statewide historic preservation plan
    • Provide public information, education, and training, and technical assistance in historic preservation
    • Advise and assist in the evaluation of proposals for rehabilitation projects that may qualify for Federal assistance
  – Tribal Historic Preservation Officer
    • Same responsibilities as above
    • May be delegated to the State Historic Preservation Officer
    • May work in conjunction with State Historic Preservation Officer
    • Properties of traditional religious and call truly importance to an Indian tribe or native Hawaiian organization may be determined to be eligible for inclusion on the National Register

National Historic Preservation Act of 1966 (NHPA)

• Title 1, Historic Preservation Programs
  – Grants and Loans
  – Direct grants to Indian tribes and Native Hawaiian organizations
  – National Center for Preservation Technology and Training
    • Funding for a comprehensive preservation education and training program
    • Distribution of information on preservation technologies
    • Provision of training and skill development in trades, crafts, and disciplines related to historic preservation in federal training and development programs
    • Support for research, analysis, conservation, curation, interpretation, and display related to preservation
National Historic Preservation Act of 1966 (NHPA)

- Title 1, Historic Preservation Programs (Section 106)
  - The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any state and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.
  - The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.

SECRETARY OF INTERIOR’S STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES
What is a “Historic” Property?

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

– That are associated with events that have made a significant contribution to the broad patterns of our history; or
– That are associated with the lives of significant persons in our past; or
– That embodied the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
– That have yielded or may be likely to yield, information important in history or prehistory.

National Register of Historic Places

• How are Properties Evaluated?
  
  – **Age and Integrity.**
    • Is the property old enough to be considered historic (generally at least 50 years old)?
    • Does it still look much the way it did in the past?
  
  – **Significance.**
    • Is the property associated with:
      – events, activities, or developments that were important in the past?
      – the lives of people who were important in the past?
      – significant architectural history, landscape history, or engineering achievements?
      – an archeological investigation about our past?
Four Treatments

- **Preservation** places a high premium on the retention of all historic fabric through conservation, maintenance and repair. It reflects a building’s continuum over time, through successive occupancies, and the respectful changes and alterations that are made.

- **Rehabilitation** emphasizes the retention and repair of historic materials, but more latitude is provided for replacement because it is assumed the property is more deteriorated prior to work.

- **Restoration** focuses on the retention of materials from the most significant time in a property’s history, while permitting the removal of materials from other periods.

- **Reconstruction** establishes limited opportunities to re-create a non-surviving site, landscape, building, structure, or object in all new materials.

Secretary of the Interior Standards for Rehabilitation

The Standards (Department of Interior regulations, 36 CFR 67) pertain to **historic buildings of all materials**, **construction types**, **sizes**, and **occupancy** and encompass the **exterior** and the **interior**, **related landscape features** and the **building's site and environment** as well as **attached**, **adjacent**, or **related new construction**.

The **Standards are to be applied** to specific rehabilitation projects in a **reasonable manner**, **taking into consideration economic and technical feasibility**.
1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

10. New additions and adjacent or related new construction will be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Secretary of the Interior Standards for Rehabilitation

- Identify, Retain, Preserve
- Protect and Maintain
- Repair
- Replace
- Design for Historic Features
- Alteration/Addition to Historic Buildings
- Energy Efficiency/Accessibility and Health and Safety considerations
Facilitating the Process

**THE ADVISORY COUNCIL ON HISTORIC PRESERVATION AND SECTION 106**
National Historic Preservation Act of 1966 (NHPA)

- Title II, Advisory Council on Historic Preservation (Section 201)
- Established the ACHP
  - The Advisory Council on Historic Preservation, an independent federal agency, promotes the preservation, enhancement, and productive use of the nation’s historic resources and advises the President and Congress on national historic preservation policy.

Advisory Council on Historic Preservation (ACHP)

- Program Areas Include:
  - Preservation initiatives
    - National policy development
    - Heritage tourism partnerships and programs
    - Promote preservation’s economic and cultural benefits
  - Communications, education and outreach
  - Native American Program
  - Preserve America program
  - Federal agency programs
    - NHPA’s Section 106 review process
ACHP Section 106 Review Process

• Thresholds:
  – Federal, federally assisted, or federally licensed activity
  – Has the potential to affect properties listed in or eligible for listing in the National Register of Historic Places
• Over 100,000 undertakings undergo Section 106 review annually
• Many cases are resolved to by the State/Tribal Historic Preservation Officer but challenging preservation issues go to ACHP

Office of Federal Agency Programs

• Projects listed on or eligible for the National Register of Historic Places and may include any or all of the following:
  – Construction
  – Rehabilitation
  – Demolition
• The National Register is maintained by the National Park Service and includes:
  – Buildings
  – Structures
  – Objects
  – Sites of national, state, or local importance
• Section 106 encourages, but does not mandate, preservation
Section 106

- Code of Federal Regulations
  - 36 CFR Part 800, “Protecting Historic Properties”
- Agencies initiate 106 reviews
  - Consult with the state and tribal officials
  - Required to include:
    - Local governments
    - Applicants for federal assistance, permits, and licenses
    - Individuals or groups interested in historic preservation

Section 106 Review

- To successfully complete a section 106 review, agencies must follow all four of the following steps:
  - **Initiate** section 106 and determining if it applies to a given project
  - **Identify** historic properties in the project area
  - **Assess** the effect of the project on identified historic properties
  - **Resolve** adverse effects by exploring alternatives to avoid, minimize, or mitigate the effects
- Most reviews are resolved at the state level
- When the case may have substantial effect on policy or procedure the ACHP may elect to participate
- The ACHP provides guidance, advice, and technical assistance to federal agencies and all participants in the section 106 process
Section 106 Participants

- Agency official
  - Responsible for the protection of historic resources, including archaeological resources
  - Ensure that all actions taken by employees or contractors of the agency shall meet professional standards
  - If more than one federal agency is involved and lead federal agency may be designated
  - May use contractors but agency official remains legally responsible
  - Must involve the consulting parties, as applicable:
    - State/Tribal Historic Preservation Officer
    - Representatives of local governments
    - Applicants for Federal assistance
    - Additional consulting parties
      - The public
    - Document

Section 106 Review

CASE STUDY: NATIONAL CENTER FOR PRESERVATION, TECHNOLOGY & TRAINING
SECTION 106 REVIEW: NATIONAL CENTER FOR PRESERVATION, TECHNOLOGY & TRAINING

HISTORIC PRESERVATION TAX CREDITS: BIG-D CONSTRUCTION COMPANY HEADQUARTERS – SALT LAKE CITY, UTAH
GREEN BUILDING STRATEGIES: LIVING BUILDING CHALLENGE

Organism Diagram

Source: http://www.nps.gov/dsc/d_publications/d_1_gpsyd_6_ch6_chart.htm
Sustainable Design

Source: http://www.nps.gov/dsc/d_publications/d_1_g bpyd_6_ch6_chart2.htm

The Living Building Challenge
The Living Building Challenge

• “This certification program covers all building at all scales and is a unified tool for transformative design, allowing us to envision a future that is Socially Just, Culturally Rich and Ecologically Benign.

• - Cascadia Region Green Building Council

The International Living Building Institute issues a challenge:

• to all design professionals, contractors and building owners to create the foundation for a sustainable future in the fabric of our communities.

• to politicians and government officials to remove barriers to systemic change, and to realign incentives and market signals that truly protect the health, safety and welfare of people and all beings.

• to all of humanity to reconcile the built environment with the natural environment, into a civilization that creates greater biodiversity, resilience and opportunities for life with each adaptation and development.

– www.ilbi.org
• Site
  – Limits to Growth
  – Urban Agriculture
  – Habitat Exchange
  – Car Free Living

Image Source: http://farm1.static.flickr.com/73/184771143_5f5f666100.jpg

• Water
  – Net Zero Water
  – Ecological Water Flow

Image Source: www.regionalwater.org/summit.html
• Energy
  – Net Zero Energy

• Health
  – Civilized Environment
  – Healthy Air
  – Biophilia

“Even though people may be happy in an urban high-rise, we are still most at peace when walking in a park, looking at the ocean, or hiking in the woods.”

Biophilia, Selling the Love of Nature
By Shane Pliska
Interiorscape Magazine
January/February 2005

Source:
http://www.echostudiochicago.com/learn/images/biophilia.jpg
• Materials
  – Red List
  – Embodied Carbon Footprint
  – Responsible Industry
  – Appropriate Sourcing
  – Conservation + Reuse

• Equity
  – Human Scale + Humane Places
  – Democracy + Social Justice
  – Rights to Nature
• Beauty
  – Beauty + Spirit
  – Inspiration + Education

Creating Sustainable Communities

**COMBINING HISTORIC PRESERVATION GUIDELINES WITH THE LEED® RATING SYSTEM**
The Howard M. Metzenbaum Federal Building - Cleveland, Ohio

USGSA YouTube Video (18.31 Minutes)

Samuel Trask Dana Building, University of Michigan – Ann Arbor, Michigan
CORO CENTER FOR CIVIC LEADERSHIP – PITTSBURGH, PENNSYLVANIA

JEAN VOLLUM NATURAL CAPITAL CENTER – PORTLAND, OREGON
## Project # 0066 Ecotrust Natural Capital Center – LEED Scorecard

### Sustainable Sites

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Achieved Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Indoor Environmental Quality

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Achieved Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Energy & Atmosphere

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Achieved Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Water Efficiency

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Achieved Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Innovation & Design Process

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Achieved Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

---

The Jean Vollum Natural Capital Center
The Gerding Theater at the Armory

- Built 1891
- Oregon National Guard
- National Register of Historic Places 2000
- Renovated 2006
- LEED Platinum (September 25, 2006)
  - Achieved 53/69 points
The Gerding Theater at the Armory

- Highlights
  - 41 skylights to provide natural light
  - FSC Certified Wood
  - 25% Recycled Content
  - 45% Regional Materials

CHILDREN’S MUSEUM OF PITTSBURGH – PITTSBURGH, PENNSYLVANIA
UF Historic Campus Building

LEGEND

Edward E. Eick Buildings
Union Free Buildings
Fuente Gua Building

East Context Zone
Central Context Zone
West Context Zone

National Register District
UF Historic District Area of Significance

WOMEN’S GYM

THE HUB

UNIVERSITY OF FLORIDA – GAINESVILLE, FLORIDA
HUB Renovation

LEED-NC v. 2.1
SILVER 34
Sustainable Site 10/14
Water Efficiency 5/5
Energy & Atmosphere 4/17
Materials & Resources 5/13
Indoor Environmental Quality 8/15
Innovation & Design 2/5

Empire State Building

“One year after an innovative building retrofit project, the Empire State Building is ahead of plan and has exceeded its year one energy-efficiency guarantee by five percent, saving $2.4 million.”

http://www.esbnyc.com/sustainability_energy_efficiency.asp
INTRODUCTION TO LEED RATING SYSTEMS AND PROCESSES

USGBC History

U.S. Green Building Council (USGBC) was formed in 1993.

Initial committee members included:

- Architects
- Real Estate Agents
- Building Owner
- Lawyer
- Environmentalist
- Industry Representatives

501(c) 3 non-profit organization committed to a prosperous and sustainable future for our nation through cost-efficient and energy-saving green buildings.

- Committee-Based
- Member Driven
- Consensus-Focused
- Third Party Assessment and Certification of High Performance Buildings
- Leadership in Energy & Environmental Design Rating System

- Certifies Buildings
- Accredits Professionals
- > 18,000 member organizations
- 80 regional chapters
USGBC National Membership

- **USGBC Membership** ([www.usgbc.org](http://www.usgbc.org))
  - Organizations only-no individual membership
  - Dues based on:
    a. Type of Company
    b. Annual Sales Volume
  - NOTE: Not prorated, paid annually on anniversary of day joined

- **Benefits**
  - Online Member Directory
    - Searchable by: Company Name, Profession, State, Country
  - USGBC Member Logo
  - Discounts on USGBC Products and Services
  - Access to Tools and Resources
  - Notification of Events and Publications
  - Opportunity to Serve on Committees

USGBC National Membership (Cont.)

**Interested Organizations:**

- **Designate a Primary Contact**
  - Interfaces with the USGBC on behalf of the organization
  - Must have a site user account
  - Renews organization’s membership
  - Manages organization’s information
  - Distributes Corporate Access ID to Full Time Employee

- **Make Payment**
  - Online with Credit Card (Immediate Access)
  - Mail in Application with Check (Access 15 business days after receipt).
Leadership in Energy & Environmental Design (LEED)

- Launched first LEED Version 1.0 in August 1998
- Version 2.0 in March 2000
- LEED-NC 2.1 and 2.2
- LEED 2009 April 27, 2009
- LEED Green Building Rating System is:
  - Third Party Certification
  - Point Based System
  - Based on existing proven technology
  - Evaluates environmental performance
    - Whole Building
    - Building Lifecycle
  - All Building Types
  - Voluntary
  - Consensus-based
  - Market-driven

Leadership in Energy & Environmental Design (LEED)

- Rating Systems

<table>
<thead>
<tr>
<th>LEED 2009 Reference Guide</th>
<th>Includes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Interior Design and Construction</td>
<td>Commercial Interiors Retail Interiors</td>
</tr>
<tr>
<td>Green Building Operations and Maintenance</td>
<td>Existing Buildings: Operations and Maintenance</td>
</tr>
<tr>
<td>Homes</td>
<td>Homes</td>
</tr>
<tr>
<td>Neighborhood Development</td>
<td>Neighborhood Development</td>
</tr>
</tbody>
</table>
Leadership in Energy & Environmental Design (LEED)

- LEED Version 3 (April 27, 2009)
  - New framework, based on environmental priorities
  - LEED 2009
    i. Credits Weighted
    ii. Points Streamlined
  - LEED Online
    i. Faster
    ii. Streamlined
    iii. User Friendly
- New Building Certification Model (ISO Standards)
  - Green Building Certification Institute
    i. Certifies Buildings
    ii. Accredits Professionals
    iii. Increased:
      ◆ Capacity
      ◆ Speed
      ◆ Performance

LEED Accredited Professionals

- 1st Tier (Entry Level)
  - LEED Green Associate

- 2nd Tier (Specialization)
  - LEED Accredited Professional
    - Building Design & Construction
    - Interior Design & Construction
    - Existing Buildings: Operations and Maintenance
    - Homes
    - Neighborhood Development

- 3rd Tier
  - LEED Fellow

- Biennial Credential Maintenance
## LEED Accreditation

### Eligibility Requirements?
Any ONE of the following.

| LEED Accreditation                     | Cost                                                                 | Biennial Credential Maintenance                     |
|----------------------------------------|                                                                     |                                                     |
| 1st Tier (Entry Level)                  | 1. Previous Experience on a LEED Project                           | Renewal Fee: $50.00                                  |
| LEED Green Associate                   | 2. Work in a Sustainable Job                                       | Continuing Education: 15 CE’s (3 LEED Specific)      |
|                                        | 3. Attend a Green Building Workshop                                |                                                     |
|                                        | Application Fee: $50.00                                            |                                                     |
|                                        | Exam Fee: $150 USGBC Members/Students (F/T)                         |                                                     |
|                                        | $200 All Others                                                    |                                                     |
| 2nd Tier (Specialization)               | 1. Previous Experience on a LEED Project                           | Renewal Fee: $50.00                                  |
| LEED Accredited Professional           | Application Fee: $100.00                                           | Continuing Education: 30 CE’s (6 LEED Specific)      |
| • Building Design & Construction       | Exam Fee: $150 USGBC Members/Students (F/T)                         | 6 additional LEED specific CE’s required for each additional specialization. |
| • Interior Design & Construction       | $250 All Others                                                    |                                                     |
| • Existing Buildings: Operations and Maintenance |                                     |                                                     |
| • Homes                                |                                                                     |                                                     |
| • Neighborhood Development             |                                                                     |                                                     |
| 3rd Tier (Portfolio Evaluation)        | At least 10 years documented green building experience             |                                                     |
| LEED Fellow                            |                                                                     |                                                     |

### Leadership in Energy & Environmental Design (LEED)

- **LEED Rates Buildings NOT Products**
  * Green Building Products contribute to LEED Points

- **Point Based Rating System (Scorecard)**
  - **PREREQUISITES**
    * No points – Sets the baseline for building performance
  - **CREDITS**
    * Focused on incentivizing a specific sustainable behavior or INTENT
  - **POINTS**
    * Earned by successfully implementing the REQUIREMENTS of CREDITS
    * Weighted based on its environmental benefits
  - **EXEMPLARY PERFORMANCE**
    * Earned by significantly exceeding or expanding the scope of the specified REQUIREMENTS (Doubling or going to the next increment)
Leadership in Energy & Environmental Design (LEED)

**LEED Reference Guide**

- **Prerequisite/Credit**
- **Intent**
- **Requirements**
- **Benefits and Issues to Consider**
  - Environmental
  - Economic
- **Related Credits**
  - Synergies
  - Trade-offs
- **Referenced Standards**
- **Implementation**
- **Timeline and Team**
- **Calculations**
- **Documentation**
- **Examples**
- **Exemplary Performance**
- **Regional Variations**
- **Resources**
- **Definitions**

---

**Benefits of Building Green:**
- Third Party Verification of Building Performance
- Reduced Operation and Maintenance Costs
- Energy and Water Conservation
- Higher Lease/Occupancy Rates
- Healthy Buildings
- Demonstrate Organization’s Values

**LEED has five environmental categories:**
- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality

**One category for new technologies and practices**
- Innovation in Design

**One category for regional priorities**
- Regional Priority
  - Spreadsheet – Locked and Sorted – ZIP Codes
Leadership in Energy & Environmental Design (LEED)

- Integrated Building Design
  - Integrated Project Delivery (IPD)
  - Charrette
  - Project Team
  - Construction Industry Planning Steps

FUSION OF:
- PEOPLE
- SYSTEMS
- BUSINESS STRUCTURES
- BUSINESS PRACTICES

GUIDING PRINCIPLES:
- TRUST
- TRANSPARENT PROCESSES
- EFFECTIVE COLLABORATION
- OPEN INFORMATION SHARING
- TEAM SUCCESS = PROJECT SUCCESS
- SHARED RISK AND REWARD
- VALUE-BASED DECISION MAKING
- USE OF TECHNOLOGY

BENEFITS:
- OPTIMIZED PROJECT RESULTS
- INCREASED VALUE TO OWNER
- WASTE REDUCTION
- MAXIMIZED EFFICIENCY

Leadership in Energy & Environmental Design (LEED)

- Integrated Building Design
  - Integrated Project Delivery (IPD)
  - Charrette
  - Project Team
  - Construction Industry Planning Steps

COLLABORATIVE MEETING
- SINGLE OR MULTI-DAY
- PROJECT TEAM MEMBERS
- STAKEHOLDERS
Leadership in Energy & Environmental Design (LEED)

- Integrated Building Design
  - Charrette
  - Project Team
  - Construction Industry Planning Steps

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT OWNER</td>
<td></td>
</tr>
<tr>
<td>PROJECT USER</td>
<td></td>
</tr>
<tr>
<td>BUILDING MANAGER</td>
<td></td>
</tr>
<tr>
<td>GOVERNMENTAL AGENCIES</td>
<td></td>
</tr>
<tr>
<td>PRIVATE AUTHORITIES</td>
<td></td>
</tr>
<tr>
<td>CONSULTANTS</td>
<td></td>
</tr>
<tr>
<td>ARCHITECTS AND ENGINEERS</td>
<td>Civil Engineer, Structural Engineer, MEP Engineer, Landscape Architect, Interior Designer</td>
</tr>
<tr>
<td>CONSTRUCTION MANAGER</td>
<td></td>
</tr>
<tr>
<td>TESTING AGENCY</td>
<td></td>
</tr>
<tr>
<td>CONTRACTOR</td>
<td></td>
</tr>
<tr>
<td>SUB-CONTRACTOR</td>
<td></td>
</tr>
<tr>
<td>SUPPLIERS</td>
<td></td>
</tr>
<tr>
<td>TESTING LABORATORY</td>
<td></td>
</tr>
</tbody>
</table>

- The "OLD" Way of Building
  - Design
  - Bid
  - Build
  - Deliver

- The "NEW" Way of Building
  - Integrated Project Delivery – Collaboration of construction industry professionals with key stakeholders (owner(s), building users, facility managers, etc.) through all phases of design, construction and building operation and maintenance.

- Integrative Approach
  - Project team members establish a mutual understanding of the project’s goals, priorities, and budget.
    - Site
    - Program
    - Budget
    - Schedule
Leadership in Energy & Environmental Design (LEED)

**Integrated Building Design**
- Charrette
- Project Team
- Construction Industry Planning Steps

**Traditional Approach**
- Predesign
- Schematic Design
- Design Development
- Construction Documents
- Agency Permit/Bidding
- Construction
- Substantial Completion
- Final Completion
- Certificate of Occupancy

**Integrated Approach**
- Conceptualization
- Criteria Design
- Detailed Design
- Implementation Docs.
- Agency Coord/Final Buyout
- Construction
- Substantial Completion
- Final Completion
- Certificate of Occupancy

---

Leadership in Energy & Environmental Design (LEED)

**Integrated Building Design**
- Charrette
- Project Team
- Construction Industry Planning Steps

**Integrated Approach**
- Strategy: Increased Daylight
- Consider
  - Location
  - Building Orientation
  - Building Floor Plate
  - Glazing Choice
- Benefits
  - Reduced Electricity Useage
  - Reduced Internal Heat Loads
  - Downsizing of A/C Systems
  - Improved Lighting Conditions
  - Increased Productivity

**Results In**
- Improved Building Function
- Increased Occupant Satisfaction
Research shows that LEED certified buildings do NOT cost more than conventionally constructed buildings, if:

- Pre-design Charrette
- Integrated Design Process
- Consider
  - a. Environmental
  - b. Economic
  - c. Social
  - d. Occupant Performance

Integrated Project Design and Delivery Required

LEED Rating Systems (Product)

- LEED FOR NEW CONSTRUCTION AND MAJOR RENOVATION
- LEED FOR CORE AND SHELL
- LEED FOR SCHOOLS
- LEED FOR COMMERCIAL INTERIORS
- LEED FOR EXISTING BUILDINGS: OPERATIONS & MAINTENANCE
- LEED FOR HOMES
- LEED FOR NEIGHBORHOOD DEVELOPMENT
- LEED FOR RETAIL
- LEED FOR HEALTHCARE (GGHC)
- LEED VOLUME PROGRAM
- LEED FOR MULTIPLE BUILDINGS IN A CAMPUS SETTING
- LEED INTERNATIONAL
### LEED 2009 Point Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>New Construction (NC)</th>
<th>Schools (S)</th>
<th>Core &amp; Shell (CS)</th>
<th>Commercial Interiors (CI)</th>
<th>Existing Buildings: Operations &amp; Maintenance (EB: OM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites</td>
<td>26 points</td>
<td>24 points</td>
<td>28 points</td>
<td>21 points</td>
<td>26 points</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>10 points</td>
<td>11 points</td>
<td>10 points</td>
<td>11 points</td>
<td>14 points</td>
</tr>
<tr>
<td>Energy &amp; Atmosphere</td>
<td>33 points</td>
<td>33 points</td>
<td>37 points</td>
<td>37 points</td>
<td>35 points</td>
</tr>
<tr>
<td>Materials &amp; Resources</td>
<td>14 points</td>
<td>13 points</td>
<td>13 points</td>
<td>14 points</td>
<td>10 points</td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>15 points</td>
<td>19 points</td>
<td>12 points</td>
<td>17 points</td>
<td>15 points</td>
</tr>
<tr>
<td>Innovation in Design</td>
<td>6 points</td>
<td>6 points</td>
<td>6 points</td>
<td>6 points</td>
<td>6 points</td>
</tr>
<tr>
<td>Regional Priority</td>
<td>4 points</td>
<td>4 points</td>
<td>4 points</td>
<td>4 points</td>
<td>4 points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110 points</strong></td>
<td><strong>110 points</strong></td>
<td><strong>110 points</strong></td>
<td><strong>110 points</strong></td>
<td><strong>110 points</strong></td>
</tr>
</tbody>
</table>

**Points Required:**
- **Certified** 40 – 49
- **Silver** 50 – 59
- **Gold** 60 – 79
- **Platinum** 80 points and above

*Out of 100 possible points + 10 bonus points*

---

### LEED 2009: Green Building Design & Construction

**Building Design & Construction (BD&C) consists of performance standards for certifying:**
- **New Construction and Major Renovation**
  - Commercial Occupancies
    - Institutional buildings (libraries, schools, museums, churches, etc.)
    - Offices
    - Retail and Service Establishments
    - Hotels
    - Residential buildings of four or more habitable stories
    - High-rise residential buildings of all sizes (both public and private)
- **Core and Shell**
  - Developer Controls
    - Building Envelope
    - Mechanical, Electrical, Plumbing and Fire Protection Systems
  - Developer Does Not Control
    - Tenant Build-out
  - Developer/Owner Occupies ≤ 50% of the Leasable Square Footage.

*Note: Allows pre-certification advertising ($3,250 Members, $4,250 Non-Members, approximately one month, separate pre-certification templates, expedited fee $5,000 plus pre-certification fee).*
LEED 2009: Green Building Design & Construction

- Schools
  - K-12 (New construction and major renovation)
  - Specific Issues Faced by Schools
    a. Children's Health
    b. Educational Mission
    c. Complex programmatic spaces

Note: Non-academic buildings can use LEED for New Construction. LEED for Schools may be used for higher education and Pre-K buildings.

- Retail

- Healthcare

LEED 2009: Green Interior Design & Construction

Interior Design & Construction consists of performance standards for certifying:

- Commercial Interiors
  - New Construction and Major Renovation when:
    - Tenant Does Not Control
      a. Building Envelope
      b. Mechanical, Electrical, Plumbing and Fire Protection Systems
    - Tenant Controls
      a. Build-out of interior leased space
        i. Offices
        ii. Retail and Service Establishments
  - Focuses on:
    a. Finishes and Fixtures
    b. Purchasing Green Products
    c. Providing Good Indoor Environmental Quality

- Retail Interiors
LEED Existing Building: Operations & Maintenance

Intent:
- Promote high-performance buildings
  - Resource Efficient
  - Healthy
  - Durable
  - Affordable
- Incorporate environmentally sound practices in existing buildings
- Operations & Maintenance consists of performance standards for certifying:
  - Existing commercial or institutional buildings (at least 1 year old)- libraries, schools, museums, churches, etc.
  - Offices
  - Retail and Service Establishments
  - Hotels
  - Residential buildings of four or more habitable stories
  - High-rise residential buildings of all sizes (both public and private)

LEED Existing Building: Operations & Maintenance

- EB:OM Covers:
  - Building Operations
  - Building Processes
  - Systems Upgrades
  - Minor Space Use Change
  - Minor facility alterations/additions

- Existing Buildings:
  - Not Previously Certified under LEED
  - Certified under LEED for New Construction
  - Certified under LEED for Schools
  - Certified under LEED for Core & Shell
  - Ground-up New Construction/Major Renovations
LEED Existing Building: Operations & Maintenance

- **EB:OM Addresses:**
  - The environmental impact of buildings over their functional life-cycles
  - Site maintenance programs
  - Water and energy use
  - Environmentally preferred products and practices for cleaning and alterations
  - Sustainable purchasing policies
  - Waste stream management
  - Ongoing indoor environmental quality
  - Single buildings
  - Multi-tenanted buildings
  - Multiple-buildings

**NOTE:** It is a whole-building rating system. Individual tenant spaces are ineligible.

LEED for Homes

- **Project Eligibility**
  - **Single Family Residence**
    a. Attached or detached homes
    b. Could be production, affordable, or custom
    c. Includes townhomes that share a common vertical wall
    d. Does not include a duplex with shared floor or ceiling
  - **Low-Rise Multifamily**
    a. Two or more residences
    b. Can be either one-, two-, or three-story buildings
      - **NOTE:** four or more story buildings must utilize LEED 2009 Building Design & Construction (LEED for Homes Mid-Rise 4-6 stories is in pilot)
    c. Builder can use LEED for Homes Sampling Protocol
LEED for Homes

- **Production Homes**
  a. Builder can use LEED for Homes Sampling Protocol
  b. Community-scale Specification
  c. Reduced Verification Costs

  *NOTE: Builder must demonstrate consistency in construction practices*

- **Affordable**
  a. Applies to both Single and Multifamily Residences

- **Manufactured and Modular Housing**
  a. Constructed in a factory
  b. May require Site Visit
  c. Additional guidance available (LEED for Homes Providers)

- **Existing Homes**
  a. Stripped to studs on at least one side of all exterior walls and ceiling

  *Note: Existing homes can also utilize the REGREEN program.*

---

**LEED for Homes**

<table>
<thead>
<tr>
<th>Category</th>
<th>Homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation &amp; Design Process (ID)</td>
<td>11 points</td>
</tr>
<tr>
<td>Location &amp; Linkages (LL)</td>
<td>10 points</td>
</tr>
<tr>
<td>Sustainable Sites (SS)</td>
<td>22 points</td>
</tr>
<tr>
<td>Water Efficiency (WE)</td>
<td>15 points</td>
</tr>
<tr>
<td>Energy &amp; Atmosphere (EA)</td>
<td>38 points</td>
</tr>
<tr>
<td>Materials &amp; Resources (MR)</td>
<td>16 points</td>
</tr>
<tr>
<td>Indoor Environmental Quality (EQ)</td>
<td>21 points</td>
</tr>
<tr>
<td>Awareness &amp; Education (AE)</td>
<td>3 points</td>
</tr>
<tr>
<td>Total</td>
<td>136 points</td>
</tr>
</tbody>
</table>

**Points Required:**
- Certified 45 – 59
- Silver 60 – 74
- Gold 75 – 89
- Platinum 90 – 136 points

*NOTE: 18 Prerequisites, 67 Credits, 136 Points*
LEED for Homes

Home Size Adjustment

- **Single Family Home**
  - a. Used to compensate for additional materials (+50%) and energy (+25%) utilized in larger homes
  - b. Adjustment equates to approximately 33% of the points available in MR and EA for each doubling in house size
  - c. Adjustment calculated automatically when square footage and number of rooms entered
  - d. Based on ANSI Standard Z765 (include ALL directly conditioned square footage: conditioned or not)
  - e. Threshold Adjustment
    \[ \text{Threshold Adjustment} = 18 \times \log \left( \frac{\text{actual home size}}{\text{neutral home size}} \right) \times \log (2) \]

- **Multifamily Home**
  - a. Weighted Average based on Number of Units, Size of Unit, Number of Rooms
  - b. Weighted Average Home Size Adjustment for Building
    \[ = \frac{\sum \text{by Unit Type} (\text{Home Size Adjustment for Unit} \times \text{Number of Units of that Type in Project})}{\text{Total Units in Project}} \]

---

### Home Size Adjustment for Single Family Homes

<table>
<thead>
<tr>
<th>≤ 1 Bedroom</th>
<th>2 Bedrooms</th>
<th>3 Bedrooms</th>
<th>4 Bedrooms</th>
<th>5 Bedrooms</th>
<th>Adjustment Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>610</td>
<td>950</td>
<td>1290</td>
<td>1770</td>
<td>2190</td>
<td>-10</td>
</tr>
<tr>
<td>640</td>
<td>1000</td>
<td>1340</td>
<td>1840</td>
<td>2360</td>
<td>-6</td>
</tr>
<tr>
<td>660</td>
<td>1030</td>
<td>1400</td>
<td>1910</td>
<td>2470</td>
<td>-8</td>
</tr>
<tr>
<td>680</td>
<td>1070</td>
<td>1450</td>
<td>1990</td>
<td>2480</td>
<td>-7</td>
</tr>
<tr>
<td>710</td>
<td>1110</td>
<td>1500</td>
<td>2060</td>
<td>2570</td>
<td>-6</td>
</tr>
<tr>
<td>740</td>
<td>1150</td>
<td>1570</td>
<td>2140</td>
<td>2650</td>
<td>-5</td>
</tr>
<tr>
<td>770</td>
<td>1200</td>
<td>1630</td>
<td>2230</td>
<td>2740</td>
<td>-4</td>
</tr>
<tr>
<td>800</td>
<td>1250</td>
<td>1690</td>
<td>2320</td>
<td>2850</td>
<td>-3</td>
</tr>
<tr>
<td>830</td>
<td>1300</td>
<td>1760</td>
<td>2420</td>
<td>2960</td>
<td>-2</td>
</tr>
<tr>
<td>860</td>
<td>1350</td>
<td>1830</td>
<td>2520</td>
<td>3080</td>
<td>-1</td>
</tr>
<tr>
<td>910</td>
<td>1400</td>
<td>1970</td>
<td>2700</td>
<td>3290</td>
<td>+1</td>
</tr>
<tr>
<td>940</td>
<td>1450</td>
<td>1970</td>
<td>2700</td>
<td>3290</td>
<td>+1</td>
</tr>
<tr>
<td>970</td>
<td>1510</td>
<td>2050</td>
<td>2810</td>
<td>3380</td>
<td>+2</td>
</tr>
<tr>
<td>1000</td>
<td>1570</td>
<td>2130</td>
<td>2920</td>
<td>3490</td>
<td>+3</td>
</tr>
<tr>
<td>1050</td>
<td>1630</td>
<td>2220</td>
<td>3030</td>
<td>3630</td>
<td>+4</td>
</tr>
<tr>
<td>1100</td>
<td>1700</td>
<td>2310</td>
<td>3140</td>
<td>3770</td>
<td>+5</td>
</tr>
<tr>
<td>1130</td>
<td>1760</td>
<td>2410</td>
<td>3250</td>
<td>3910</td>
<td>+6</td>
</tr>
<tr>
<td>1180</td>
<td>1830</td>
<td>2500</td>
<td>3360</td>
<td>4080</td>
<td>+7</td>
</tr>
<tr>
<td>1220</td>
<td>1890</td>
<td>2600</td>
<td>3470</td>
<td>4250</td>
<td>+8</td>
</tr>
<tr>
<td>1270</td>
<td>1950</td>
<td>2700</td>
<td>3580</td>
<td>4430</td>
<td>+9</td>
</tr>
<tr>
<td>1320</td>
<td>2000</td>
<td>2800</td>
<td>3690</td>
<td>4610</td>
<td>+10</td>
</tr>
</tbody>
</table>

Minimum points required to achieve certification level is adjusted by the "Adjustment Value"

Certified 45 ±10 = (35 – 55)
Silver 60 ±10 = (50 – 70)
Gold 75 ±10 = (65 – 85)
Platinum 90 ±10 = (80 – 100)

*Neutral Home Size for 6 or more Bedrooms:
Add 250 SF per Additional Room*
LEED for Neighborhood Development consists of performance standards for certifying:

- Development design and construction based on the following principles:
  - Smart Growth
  - New Urbanism
  - Green Building

LEED for Neighborhood Development was developed through a partnership between:

- USGBC
- Congress for the New Urbanism (CNU)
  - Walkable
  - Neighborhood Based Development
  - Mixed-Use
  - Density vs. Sprawl
- National Resource Defense Council (NRDC)
  - Protects Wildlife
  - Protects Wild Places
  - Healthy Environment for ALL Life on Earth

### LEED for Neighborhood Development Point Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Location &amp; Linkage (SLL)</td>
<td>30 points</td>
</tr>
<tr>
<td>Neighborhood Pattern &amp; Design (NPD)</td>
<td>39 points</td>
</tr>
<tr>
<td>Green Construction &amp; Technology (GCT)</td>
<td>31 points</td>
</tr>
<tr>
<td>Innovation &amp; Design Process (ID)</td>
<td>6 points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>106 points</strong></td>
</tr>
</tbody>
</table>

Points Required:
- Certified 40 – 49
- Silver 50 – 59
- Gold 60 – 79
- Platinum 80 – 106 points
Leadership in Energy & Environmental Design (LEED)

Processes

- MINIMUM PROGRAM REQUIREMENTS
- REGISTRATION
- LEED ONLINE
- CREDIT INTERPRETATION REQUESTS AND RULINGS
- REVIEW AND CERTIFICATION
- APPEALS
- FEES

Minimum Program Requirements (MPRs)

- Defines the minimum characteristics of a project eligible to be evaluated utilizing the LEED Rating System
  1. Must comply with environmental laws
  2. Must be a complete, permanent building or space
  3. Must use a reasonable site boundary
  4. Must comply with minimum floor area requirements (Min. 250 SF for CI, 1,000 SF for NC, S, CS and EB: OM)
  5. Must comply with minimum occupancy rates (≥ 1 FTE)
  6. Must commit to sharing whole-building energy and water data
  7. Must comply with a minimum building area to site area ratio (≥ 2%)
     - Gives clear guidance to customers
     - Protects the integrity of the LEED program
     - Reduces challenges during the LEED certification process

- LEED certification may be revoked if a project is found to be in non-compliance of the MPRs.
- If revoked, registration and certification fees paid will not be refunded

NOTE: Not applicable to Neighborhood Development or Homes
Registration Process

- Create a login and password with USGBC (website: [www.usgbc.org](http://www.usgbc.org))
- Register the project with the Green Building Certification Institute (GBCI) (website: [www.gbcio.org](http://www.gbcio.org))
- Provides project access ID for project management
- Provides access to the CIR Database for that product
- Requires basic information:
  - Type of Building
  - Square Footage
  - Contact Information
  - Owner Information
  - Project Address

LEED Online

- Collect information and perform calculation to meet the requirements for the prerequisites and credits
- Project teams pursuing LEED certification must use LEED Online and submittal templates (templates contain embedded calculators).
- Teams are to submit 100 percent of its documentation online.
- LEED Online enables team members to:
  a. Upload credit templates
  b. View and submit credit interpretation requests (CIRs)
  c. Manage important project details
  d. Contact customer service
  e. Communicate with reviewers
- Project Team Administrator (FULL ACCESS/AUTHORITY)
- Project Team Member (VIEW ALL/ MODIFY ASSIGNED PREREQUISITES/CREDITS)
- [www.LEEDOnline.org](http://www.LEEDOnline.org)
- Download and familiarize yourself with the sample submittal templates.
  [www.usgbc.org](http://www.usgbc.org) - LEED - LEED Resources - LEED Online - Sample Credit Templates
Credit Interpretation Requests and Rulings

- Review prerequisite or credit intent and read reference before proceeding
- Review previously posted credit interpretation requests and USGBC responses on the CIR webpage.
- If there are no existing CIRs which are relevant to the project, the LEED team should submit an online credit interpretation request.
  a. Description should be brief but explicit Max 600 words or 4000 characters including spaces)
  b. Based on prerequisite or credit information found in the Rating System and Reference Guide
  c. Emphasize the intent of the prerequisite or credit
  d. If possible offer potential solutions to the problem
  e. Solicit approval or rejection of proposed interpretation
- Do not submit cut-sheets, plans, drawings or attachments
- Proofread before submitting
- USGBC will rule on your request electronically. A ruling in your favor does not guarantee point. The ruling must be submitted with certification documentation for consideration

Review and Certification Process

- **Design Review**
  - Design Building to meet LEED requirements
  - Pay Design Review Fees
  - GBCI has 25 business days to respond
    a. Credit Achievement Anticipated
    b. Denied
    c. Clarify
  - Project Team has 25 business days to respond
  - GBCI has 15 days to rule
  - Project team can accept or appeal
    a. To appeal notify the GBCI electronically within 10 days
    b. Submit documentation within 25 business days
    c. Costs $500 per credit
    d. GBCI has 25 days to rule
    e. Ruling is final
Review and Certification Process

- **Construction Review**
  - Construct Building to meet LEED requirements
  - Pay Construction Review Fees
  - GBCI has 25 business days to respond
    - a. Credit Earned
    - b. Denied
    - c. Clarify
  - Project Team has 25 business days to respond
  - GBCI has 15 days to rule
  - Project team can accept or appeal
    - a. To appeal notify the GBCI electronically within 10 days
    - b. Submit documentation within 25 business days
    - c. Costs $500 per credit
    - d. GBCI has 25 days to rule
    - e. Ruling is final

Appeals

- **Project team can accept or appeal during design or construction review process**
  - To appeal notify the GBCI electronically within 10 business days
  - Submit documentation within 25 business days of ruling
  - Costs $500 per credit for appeal
  - GBCI has 25 business to review the appeal
  - Goes to a new review team
    - Submit description of project
    - Project Highlights
  - Ruling is final
Fees

- Registration (NC, CS, S, CI)
  - Registration is a flat fee paid up front at the time of registration. The rates are followed:
    a. USGBC Members: $900
    b. Non-Members: $1,200
  - If paying by check, please allow approximately 10 business days for processing
  - Please note all fees are subject to change and once registered, no refunds are available.

- Registration (EB:OM)
  - There is no registration fee for registering a recertification project but recertification project teams must contact LEED Customer Service at leedinfo@usgbc.org to ensure that the registration fee is waived.
  - Recertification projects are required to register under the LEED for Existing Buildings Rating System version that is current in LEED Online at the time of the recertification registration.
  - Registration fee waived on initial certification if it is a LEED certified building

Certification Fees

- Fee is based on the rating system that the project is certifying under
- Size of the project
- USGBC National Member/Non-member
- Fee is paid when the project team submits documentation for review via LEED
- Certification rates are based on the date the application is submitted to review.

NOTE: Fee structure is different for:
- Existing Buildings: Operations and Maintenance
- Homes
- Neighborhood Development
### Current Rates:

**LEED 2009: New Construction, Schools, Core & Shell, Commercial Interiors**

<table>
<thead>
<tr>
<th>Less than 50,000 Square Feet</th>
<th>50,000-500,000 Square Feet</th>
<th>More Than 500,000 Square Feet</th>
<th>Appeals (If Applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Review</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USGBC Members</td>
<td>$2,000</td>
<td>$0.04/sf</td>
<td>$20,000</td>
</tr>
<tr>
<td>Non-Members</td>
<td>$2,250</td>
<td>$0.045/sf</td>
<td>$22,500</td>
</tr>
<tr>
<td>Expedited Fee*</td>
<td>$5,000 regardless of square footage</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td><strong>Construction Review</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USGBC Members</td>
<td>$500</td>
<td>$0.010/sf</td>
<td>$5,000</td>
</tr>
<tr>
<td>Non-Members</td>
<td>$750</td>
<td>$0.015/sf</td>
<td>$7,500</td>
</tr>
<tr>
<td>Expedited Fee*</td>
<td>$5,000 regardless of square footage</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td><strong>Combined Design &amp; Construction Review</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USGBC Members</td>
<td>$2,250</td>
<td>$0.045/sf</td>
<td>$22,500</td>
</tr>
<tr>
<td>Non-Members</td>
<td>$2,750</td>
<td>$0.055/sf</td>
<td>$27,500</td>
</tr>
<tr>
<td>Expedited Fee*</td>
<td>$10,000 regardless of square footage</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td><strong>LEED for Core &amp; Shell: Precertification</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USGBC Members</td>
<td>$3,250</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td>Non-Members</td>
<td>$4,250</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td>Expedited Fee*</td>
<td>$5,000</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td><strong>CIRs (for all Rating Systems)</strong></td>
<td>$220</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*In addition to regular review fee, view more information on the Expedited Review process.**

**Certification/Recertification Fees: Operations & Maintenance**

<table>
<thead>
<tr>
<th>Initial Certification</th>
<th>Registration Fee</th>
<th>Certification Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recertification</td>
<td>No Registration Fee</td>
<td>50% Initial Certification Fee</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEED for existing Buildings</th>
<th>Less than 50,000 Square Feet</th>
<th>50,000-500,000 Square Feet</th>
<th>More Than 500,000 Square Feet</th>
<th>Appeals (If Applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Certification Review</strong></td>
<td>Fixed Rate</td>
<td>Based on Square Footage</td>
<td>Fixed Rate</td>
<td>Per Credit</td>
</tr>
<tr>
<td>USGBC Members</td>
<td>$1,500</td>
<td>$0.03/sf</td>
<td>$15,000</td>
<td>$500</td>
</tr>
<tr>
<td>Non-Members</td>
<td>$2,000</td>
<td>$0.04/sf</td>
<td>$20,000</td>
<td>$500</td>
</tr>
<tr>
<td>Expedited Fee*</td>
<td>$10,000 regardless of square footage</td>
<td>$500</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recertification Review</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USGBC Members</td>
<td>$750</td>
<td>$0.015/sf</td>
<td>$7,500</td>
<td>$500</td>
</tr>
<tr>
<td>Non-Members</td>
<td>$1,000</td>
<td>$0.02/sf</td>
<td>$10,000</td>
<td>$500</td>
</tr>
<tr>
<td>Expedited Fee*</td>
<td>$10,000 regardless of square footage</td>
<td>$500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* In addition to regular review fee, view more information on the Expedited Review process.

** In Existing Building Recertification Review fee is due when the customer submits the application for recertification review. Before submitting, please contact GBCI’s project certification staff to get a promotional code.
EB:OM Initial Certification vs. Recertification

Recertification must be at least once every five years but can be as regular as annually!

EB: O&M offers two sets of submittal templates language for each credit: one for initial certification and another for recertification:

- Use initial certification language:
  - If the project is recertifying under a later version than its previous certification.
  - For any credit that was not earned in the previous certification application even if the versions are the same.

- Use recertification language:
  - If the project is recertifying under the same version as its previous certification, but only for the credits that were earned in the previous certification application.

EB:OM Documentation

- Always keep future EB:O&M certifications in mind.
- Components can wear out
- Staff changes
- Policies, programs and plans shift
- Continuous data collection
- Ongoing commissioning
- Documentation of operational changes
- Receipts from purchases and
- New product specifications
- Monitor
  - a. Materials In
  - b. Materials Out
  - c. Administration
  - d. Green Cleaning
  - e. Site Management
  - f. Occupant Health and Productivity
  - g. Energy Metrics
  - h. Operational Effectiveness

*Keep these documents as reference for future EB:O&M certification application*
LEED Homes Certification

- **LEED for Homes Providers**
  - Local/Regional Organizations
  - Manages a team of Green Raters
  - Under Contract with USGBC

- **Green Rater**
  - Individual
  - Conducts Field Inspections and Performance Testing
  - Providers Staff or Subcontractor

- **USGBC**
  - Reviews and completes certifications

---

**Steps**

- Register Project
- Choose Green Features
- Build Green Home
- Get Home Certified
- Sell Home

**Builder/Project Team**

- Select LEED for Homes Provider
- Decide which green features to include
- Install Green Features
- Respond to Provider questions and concerns
- Post LEED for Homes Certificate & Inform Realtor

**Provider/Green Rater**

- Promote LEED for Homes
- Kick-off Meeting, LEED for Homes Training, Preliminary Rating
- Provide Technical Support
- Perform Inspections, Testing, Complete Documentation
- Provide Support

**USGBC**

- Educate Builders, Train Providers
- Maintain National Standards Green Home BMPs
- Provide Database of Registered Projects and Providers
- Review, Certify and Maintain Database of Certified Homes
- Make Available PR Toolkit, Marketing Materials
LEED for Neighborhood Development

3 Stage Certification Process

➢ Stage 1
   a. Optional Pre-Review
   b. Approval of pre-review plan will earn a USGBC letter stating that if built as proposed the project will achieve certification.

➢ Stage 2
   a. Certification of an Approved Plan
   b. Verifies that project was built to plan, reviews any changes to the pre-review plan. Eligible for listing on the USGBC website as a LEED for neighborhood development certified plan.

➢ Stage 3
   a. Certification of a completed Neighborhood Development
   b. Upon completion or nearing completion of construction, reviews any changes to the certified approved plan. If certification is achieved, USGBC will issue a plaque.

Licensed Professional Exemption

• Streamlined
• Complete Form with Licensed Professional Category
  ✓ Professional Engineer
  ✓ Registered Architect
  ✓ Registered Landscape Architect

<table>
<thead>
<tr>
<th>Credit Number</th>
<th>Credit Title</th>
<th>Submittal Eligible for Licensed Professional Exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS Credit 5</td>
<td>Reduced Site Disturbance – Protect or Restore Open Space</td>
<td>Option 2 – Narrative</td>
</tr>
<tr>
<td>SS Credit 5</td>
<td>Reduced Site Disturbance – Protect or Restore Open Space</td>
<td>Option 3 – Narrative</td>
</tr>
<tr>
<td>SS Credit 6</td>
<td>Stormwater Management</td>
<td>Option 2 - Assessment Report / Stormwater Calculator</td>
</tr>
<tr>
<td>SS Credit 7.1</td>
<td>Heat Island Reduction – Non-Roof</td>
<td>Option 2 – Third column of Option 2 Table</td>
</tr>
<tr>
<td>SS Credit 7.2</td>
<td>Heat Island Reduction – Roof</td>
<td>Option 2 – Documents Provided</td>
</tr>
<tr>
<td>EA Credit 3.1</td>
<td>Performance Measurement – Building Automation System</td>
<td>Summary report / Maintenance Plan</td>
</tr>
<tr>
<td>EA Credit 5</td>
<td>Refrigerant Management</td>
<td>Option 2 – Narrative</td>
</tr>
<tr>
<td>EQ Prerequisite 1</td>
<td>Outdoor Air Introduction and Exhaust Systems</td>
<td>Option 2 – Narrative, minimum OA flow rate calculator</td>
</tr>
<tr>
<td>EQ Credit 1.2</td>
<td>IAQ Best Management Practices – Outdoor Air Delivery Monitoring</td>
<td>Option 1 – Outdoor Air AHD Table, Airflow Measurement Devices, &amp; Trend Graph</td>
</tr>
<tr>
<td>EQ Credit 1.2</td>
<td>IAQ Best Management Practices – Outdoor Air Delivery Monitoring</td>
<td>Option 2 – Floor Plan Submittals, Airflow Measurement Devices, CO2 Data Sensor Table, &amp; Trend Graph</td>
</tr>
<tr>
<td>EQ Credit 1.2</td>
<td>IAQ Best Management Practices – Outdoor Air Delivery Monitoring</td>
<td>Option 3 – “Floor Plan Submittals,” “Airflow Measurement Devices,” “CO2 Sensor Data Table,” and “Trend Graph”</td>
</tr>
<tr>
<td>EQ Credit 2.3</td>
<td>Occupant Comfort – Thermal Comfort Monitoring</td>
<td>Supporting submittals</td>
</tr>
</tbody>
</table>

Table from USGBC LPE Form
Coral Gables Museum
### Sustainable Sites

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites</td>
<td></td>
</tr>
<tr>
<td>SS Prerequisite 1:</td>
<td>Required</td>
</tr>
<tr>
<td>Construction Activity Pollution Prevention</td>
<td></td>
</tr>
<tr>
<td>SS Credit 1: Site Selection</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 2: Development Density and Community Connectivity</td>
<td>5 points</td>
</tr>
<tr>
<td>SS Credit 3: Brownfield Redevelopment</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 4.1: Alternative Transportation-Public Transportation Access</td>
<td>6 points</td>
</tr>
<tr>
<td>SS Credit 4.2: Alternative Transportation-Bicycle Storage and Changing Rooms</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 4.3: Alternative Transportation-Low-Emitting and Fuel-Efficient Vehicles</td>
<td>3 points</td>
</tr>
<tr>
<td>SS Credit 4.4: Alternative Transportation-Parking Capacity</td>
<td>2 points</td>
</tr>
<tr>
<td>SS Credit 5.1: Site Development-Protect of Restore Habitat</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 5.2: Site Development-Maximize Open Space</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 6.1: Stormwater Design-Quantity Control</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 6.2: Stormwater Design-Quality Control</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 7.1: Heat Island Effect-Nonroof</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 7.2: Heat Island Effect-Roof</td>
<td>1 point</td>
</tr>
<tr>
<td>SS Credit 8: Light Pollution Reduction</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>Total Points Available in Sustainable Sites</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>
Terminology for Sustainable Sites

- **Building footprint**: The area on a project site defined by the building perimeter and does not include hardscape, access roads, parking lots, and non-building facilities.
- **Development footprint**: The area affected by development or by project site activity including hardscape, access roads, parking lots, non-building facilities, and the building itself.
- **Landscape area**: The total site area less the building footprint, paved surfaces, water bodies, and patios.
- **Natural areas**: Feature native or adapted vegetation or other ecologically appropriate site features.
- **LEED project boundary**: The portion of the project site submitted for LEED certification. For single building developments, this is the entire project scope and is generally limited to the site boundary. For multiple building developments, the LEED project boundary may be a portion of the development as determined by the project team.
- **Site/Property area**: The total area within the legal property boundaries of the site; it encompasses all areas of the site both constructed and non-constructed.
SS Prerequisite 1: Construction Activity Pollution Prevention

Intent:
Reduce pollution from construction activities by controlling:
• Soil Erosion
• Waterway Sedimentation
• Airborne Dust Generation

Requirements:
Create and implement an erosion and sedimentation plan based on 2003 EPA Construction General Permit or local standards and codes whichever is more stringent.

Strategies

<table>
<thead>
<tr>
<th>Method of Stabilization include:</th>
<th>Structural Control include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Seeding</td>
<td>Earth Dike</td>
</tr>
<tr>
<td>Permanent Seeding</td>
<td>Silt Fence</td>
</tr>
<tr>
<td>Mulching</td>
<td>Sediment Trap</td>
</tr>
<tr>
<td></td>
<td>Sediment Basin</td>
</tr>
</tbody>
</table>

SS Prerequisite 1: Construction Activity Pollution Prevention

**Points**

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Required</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>None or minimal added costs depending on type, location, topography, and soil.</td>
</tr>
<tr>
<td>Phase</td>
<td>Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Civil Engineer /Landscape Arch/ General Contractor</td>
</tr>
<tr>
<td>Timeline</td>
<td>Schematic</td>
</tr>
</tbody>
</table>

Referenced Standards:
• 2003 EPA Construction General Permit, U.S. Environmental Protection Agency (EPA) Office of Water
Case Study: Coral Gables Museum

Intent:
Reduce the impact of the built environment on the natural environment.

Requirements:
Do not develop in the following areas:

i. Prime farmland as defined by the US Department of Agriculture (USDA) Code of Federal Regulations (CFR)
ii. Previously undeveloped land that is not 5' above the Federal Emergency Management Agency (FEMA) 100 year flood line
iii. Habitat for threatened or endangered species (Any list)
iv. Within 100 feet (or within local setbacks if more stringent) of wetlands as defined by the US Code of Federal Regulations (CFR)
v. Previously undeveloped land within 50 feet of water body (seas, lakes, rivers, streams) based on terminology from the Clean Water Act
vi. Land that was previously public parkland unless public entity accepts equal or greater parcel in trade. (Does not apply to park authority projects)

Strategies:
Give preference to sites that are not in the prohibited areas.

SS Credit 1: Site Selection
SS Credit 1: Site Selection

Points | NC
---|---
Environmental Issues | The preferred strategy is to select a previously developed site. This:
• Limits further damage to the environment
• Reduces the need for transportation/utility expansion
• Provides building occupants access to public transportation.
Economic Issues | Appropriate site selection reduces:
• Mitigation costs
• Cost of Utility Extensions (Water, Sewer, Storm Sewer, Telecommunications, etc)
• Road Extensions
Phase | Design
Team | Owner
Timeline | Charrette

Referenced Standards:
- U.S. Department of Agriculture, United States Code of Federal Regulations Title 7, Volume 6, Parts 400 to 699, section 657.5 (citation 7CFR657.5), Definition of Prime Agricultural Land.
- Federal Emergency Management Agency, Definition of 100-Year Floodplain 1% chance of reaching or exceeding that level each year
- Endangered Species Lists, U.S. Fish and Wildlife Service, List of Threatened and Endangered Species
- National Marine Fisheries Service, List of Endangered Marine Species
Case Study: Coral Gables Museum

SS Credit 2: Development Density and Community Connectivity

Intent:
Preserve Greenfields and natural habitat by redeveloping urban areas with existing infrastructure.

Requirements:
Option 1*:
- Construct or renovate building on a previously developed site
- Develop in a community within a net minimum density of 60,000 SF/acre

OR

Option 2**:
- Construct or renovate building on a previously develop site
- Within 1/2 mile of residential neighborhood (avg. density=10 units/acre)
- Within 1/2 mile of 10 basic services (Each basic service can only be connected once, except restaurants which can be counted twice)
- Pedestrian access between project and service

**Only 1 basic service in a mixed use project can count towards the ten basic services. No more than 2 anticipated, i.e. 8 existing and operational. Anticipated businesses must be open for business within one year
SS Credit 2: Development Density and Community Connectivity

Strategies:
- Locate your project within ½ mile of a residential neighborhood
- Provide access to at least 10 basic services from the list below:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Laundry</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of Worship</td>
<td>Library</td>
<td>Supermarket</td>
</tr>
<tr>
<td>Convenience Grocery</td>
<td>Medical or Dental Office</td>
<td>Theater</td>
</tr>
<tr>
<td>Day Care Center</td>
<td>Senior Care Facility</td>
<td>Community Center</td>
</tr>
<tr>
<td>Cleaners</td>
<td>Park</td>
<td>Fitness Center</td>
</tr>
<tr>
<td>Fire Station</td>
<td>Pharmacy</td>
<td>Museum</td>
</tr>
<tr>
<td>Beauty Salon</td>
<td>Post Office</td>
<td>Restaurant (Max. 2)</td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Ensure pedestrian access between the project, residential community and basic services.

SS Credit 2: Development Density and Community Connectivity

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 points</td>
</tr>
<tr>
<td>Environmental Issues</td>
<td>Projects located in walking distance of services:</td>
</tr>
<tr>
<td></td>
<td>• Limits urban sprawl</td>
</tr>
<tr>
<td></td>
<td>• Reduces transportation impacts</td>
</tr>
<tr>
<td></td>
<td>• Improves productivity of building occupants</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>• Costs may be reduced as new infrastructure (road, utility services) may be unnecessary</td>
</tr>
<tr>
<td></td>
<td>• Increased density may add costs if system capacity is exceeded</td>
</tr>
<tr>
<td>Phase</td>
<td>Design/Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Civil Engineer/Arch/Landscape Arch/MEP</td>
</tr>
<tr>
<td></td>
<td>GC/Owner /LEED AP</td>
</tr>
<tr>
<td>Timeline</td>
<td>Charrette/Schematic/Development</td>
</tr>
<tr>
<td></td>
<td>Documentation/Administration</td>
</tr>
</tbody>
</table>

Referenced Standards:
None
## Case Study: Coral Gables Museum

### Intent:
Rehabilitate environmentally contaminated sites.

### Requirements:
- **Option 1**
  - Develop on a site documented/determined to be contaminated by conducting a Phase II Environmental Site Assessment (ASTM E 1903-97) or local cleanup program.
- **Option 2**
  - Develop on a site defined as a Brownfield by local, state or federal agency.

### Strategies:
Consider preference to brownfield sites. Identify tax incentives and property cost savings. Coordinate site development plans with remediation activity.

### Keywords:
- **Bioresmediation** any process that uses microorganisms, fungi, green plants or their enzymes to return the natural environment altered by contaminants to its original condition.
- **In Situ Remediation** any process that removes contamination onsite (in place).
- **Ex Situ Remediation** any process that requires removing the soil to remediate the contaminants.

### SS Credit 3: Brownfield Redevelopment

<table>
<thead>
<tr>
<th>Service Identification</th>
<th>Business Name</th>
<th>Service Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First United Methodist</td>
<td>Place of Worship</td>
</tr>
<tr>
<td>2</td>
<td>Coral Gables Museum</td>
<td>Museum</td>
</tr>
<tr>
<td>3</td>
<td>Coral Gables Community</td>
<td>Community Center</td>
</tr>
<tr>
<td>4</td>
<td>Hospital</td>
<td>Restaurant</td>
</tr>
<tr>
<td>5</td>
<td>Grocery Cleaners</td>
<td>Cleaners</td>
</tr>
<tr>
<td>6</td>
<td>Pub</td>
<td>Supermarket</td>
</tr>
<tr>
<td>7</td>
<td>Baney Day School</td>
<td>School</td>
</tr>
<tr>
<td>8</td>
<td>Coral Gables Fire Dept</td>
<td>Fire Station</td>
</tr>
<tr>
<td>9</td>
<td>United States Post Office</td>
<td>Post Office</td>
</tr>
<tr>
<td>10</td>
<td>Pine Circle Park</td>
<td>Park</td>
</tr>
<tr>
<td>11</td>
<td>Bank of America</td>
<td>Bank</td>
</tr>
</tbody>
</table>
SS Credit 3: Brownfield Redevelopment

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
</table>
| Environmental Issues | Redevelopment if Brownfield sites  
• Provide alternative to developing on greenfields  
• Preserve undeveloped areas  
• Decrease environmental impact |
| Economic Issues      | Remediation costs $300,000 - $500,000/acre or $3 - $6/SF          |
| Phase            | Design/Construction                                                  |
| Team             | Civil Engineering/Arch/Landscape Arch  
MEP/GC/Owner/Environmental Professional/LEED AP                      |
| Timeline         | Charrette/Schematic/Development  
Documentation/Administration                                           |

Referenced Standards:
• U.S. EPA, Definition of Brownfields
• ASTM E1527-05, Phase I Environmental Site Assessment
• ASTM E1903-97, Phase II Environmental Site Assessment, effective 2002

SS Credit 4.1: Alternative Transportation – Public Transportation Access

Intent:
Reduce pollution and development impact from automobile use.

Requirements:
Option 1
Rail Station Proximity
Locate project within \(1/2\) mile (walking distance) rail, light rail or subway station (existing or planned and funded).

OR
Option 2
Bus Stop Proximity
Locate project within \(1/4\) mile (walking distance) of at least 1 bus stop for at least 2 public, campus, or private passenger bus lines for building occupants.
**SS Credit 4.1: Alternative Transportation – Public Transportation Access**

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Issues</strong></td>
<td>6 points</td>
</tr>
<tr>
<td>Alternative transportation methods reduce:</td>
<td></td>
</tr>
<tr>
<td>• Energy demand for transportation</td>
<td></td>
</tr>
<tr>
<td>• Associated greenhouse gas emissions</td>
<td></td>
</tr>
<tr>
<td>• Parking that encroaches the green space</td>
<td></td>
</tr>
<tr>
<td><strong>Economic Issues</strong></td>
<td></td>
</tr>
<tr>
<td>• Alternative transportation reduces amount of parking needed reducing project costs</td>
<td></td>
</tr>
<tr>
<td>• Mass transit is a benefit that increases value of building since cost associated with travel can be significantly reduced by public transportation</td>
<td></td>
</tr>
</tbody>
</table>

| Phase | Design/Construction |
| Team | Civil Engineer/Arch/Landscape Arch |
| MEP/GC/Owner/LEED AP | |
| Timeline | Charrette/Schematic/Development |
| Documentation/Administration | |

Referenced Standard: None

---

**Case Study: Coral Gables Museum**

**Referenced Standard:**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>River Walk Pathways, Section A &amp; B</td>
<td>427</td>
</tr>
<tr>
<td>2</td>
<td>Coral Gables Village</td>
<td>427</td>
</tr>
</tbody>
</table>
SS Credit 4.2: Alternative Transportation – Bicycle Storage and Changing Rooms

Intent:
Reduce pollution and development impact from automobile use.

Requirements:
Case 1
Commercial or Institutional Projects
i. Install secure bike racks within 200 yards of the building entrance for ≥5% of building users.
ii. Install shower and changing facilities within 200 yards of building entrance for ≥0.5% of full-time equivalent (FTE) occupants.

Case 2
Residential Projects
Install secured covered bike racks for ≥15% building occupants.

Strategies:
Design building with transportation amenities such as bicycle and shower/changing facilities.

Referenced Standards:
None
Case Study: Coral Gables Museum

SS Credit 4.2: Alternative Transportation – Bicycle Storage and Changing Rooms

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td></td>
</tr>
<tr>
<td>The use of bicycles:</td>
<td></td>
</tr>
<tr>
<td>Produces no emissions</td>
<td></td>
</tr>
<tr>
<td>Has zero demand for petroleum-based fuels</td>
<td></td>
</tr>
<tr>
<td>Relieves traffic congestion</td>
<td></td>
</tr>
<tr>
<td>Reduces noise pollution</td>
<td></td>
</tr>
<tr>
<td>Requires far less infrastructure for roadways and parking lots</td>
<td></td>
</tr>
<tr>
<td>Improves occupant’s health through bikes and walking.</td>
<td></td>
</tr>
<tr>
<td>Economic Issues</td>
<td></td>
</tr>
<tr>
<td>Relatively inexpensive to implement</td>
<td></td>
</tr>
<tr>
<td>Cost will show up not as cost per square foot but rather in the additional square footage to be built or usable square footage reduced within a building from the development of shower facilities.</td>
<td></td>
</tr>
<tr>
<td>Very small construction or soft cost implications</td>
<td></td>
</tr>
<tr>
<td>May alleviate the need for parking spaces which can save money</td>
<td></td>
</tr>
</tbody>
</table>

Phase  Design/Construction
Team Civil/Arch/Landscape Arch/MEP/GC/Owner/LEED AP
Timeline Charrette/Schematic/Development/Documentation/Administration
**Intent:**
Reduce pollution and development impact from automobile use.

**Requirements:**
- **Option 1**
  Preferred parking for 5% of the total vehicle parking capacity for low emitting and fuel efficient vehicles. 20% parking discount for 2 years can be used to meet the requirement.
  - California Air Resources Board (CARB)
  - American Council for Energy Efficient Economy (ACEEE) Green Score ≥ 40

- **OR**
  **Option 2**
  Provide alternative fueling stations for 3% of total vehicle parking capacity for site.

**Strategies:**
Provide alternative-fuel refueling stations. Consider sharing costs with neighbors.

---

**SS Credit 4.3: Alternative Transportation-Low-Emitting and Fuel-Efficient Vehicles**

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 points</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental Issues**
- Alternative-fuel and fuel-efficient vehicles offer a reduction in:
  - Air pollutants
  - Negative environmental effects of gasoline production

**Economic Issues**
- Initial costs for vehicles and buses using alternative fuel are higher than conventional vehicles but tax incentives may be available to help offset the higher costs
  - Providing preferred parking involves minimal costs
  - Electric refueling stations typically cost much less than other refueling stations

**Phase**
Construction

**Team**
Arch/Owner

**Timeline**
Schematic/Development

**Referenced Standards:**
None
Case Study: Coral Gables Museum

Intent:
Reduce pollution and development impact from automobile use.

Requirements:

Case 1
Non-Residential Projects
Option 1
- Do not exceed minimum local zoning requirements
- Designate 5% of the total parking spaces as preferred parking for carpools.

OR

Option 2
For NC projects that provide parking for ≤5% of FTE designate 5% of the total parking spaces as preferred parking for carpool. 20% parking discount for 2 years can be used to meet the requirement.

Case 2
Residential Projects
Option 1
- Do not exceed minimum local zoning requirements facilitate shared vehicle use.
- Facilitate shared vehicle use.

SS Credit 4.4: Alternative Transportation – Parking Capacity
**SS Credit 4.4: Alternative Transportation – Parking Capacity**

**Case 3**
Mixed Use (Residential with Commercial/Retail Projects)

**Option 1**
- Mixed use less than **10%** commercial space is considered residential
- Mixed use greater than **10%** commercial space requires that commercial area meets commercial requirements and residential area meets residential requirements

**Strategies:**
- Minimize parking lot garage size, share parking facility. Consider alternative transportation.

---

**SS Credit 4.4: Alternative Transportation – Parking Capacity**

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Points</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td></td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td></td>
</tr>
<tr>
<td><strong>Phase</strong></td>
<td>Design</td>
</tr>
<tr>
<td><strong>Team</strong></td>
<td>Civil Engineer/Arch/Landscape Arch/Owner</td>
</tr>
<tr>
<td><strong>Timeline</strong></td>
<td>Charrette/Schematic</td>
</tr>
</tbody>
</table>

**Referenced Standards:**
- Institute of Transportation Engineers, Parking Generation Study, 2003

**Environmental Issues**
- Reducing private automobile use:
  - Saves energy
  - Avoids vehicle emissions that contribute to smog, air pollution, and greenhouse gas emissions
  - Avoids environmental impacts associated with oil extraction and petroleum refining
  - Parking facilities also have negative impacts because of asphalt surfaces that increase stormwater runoff and contribute to urban heat island effects

**Economic Issues**
- Carpooling helps reduce building costs since less land is needed for parking and less infrastructure is needed to support vehicles
- Can reduce construction and soft costs by reducing overall parking and vehicular circulation area
Case Study: Coral Gables Museum

Intent:
To conserve natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements:

Case 1
Greenfield Sites
Minimize site disturbance to:
- 40 feet beyond building perimeter
- 10 feet beyond walkways, patios, utility trenches <12” in diameter.
- 15 feet beyond primary roadway curbs and utility trenches ≥12”
- 25 feet beyond constructed and permeable area

Case 2
Previously Developed Areas or Graded Sites
- Protect/Restore 50% of site excluding building footprint with native/adapted vegetation.
- In urban areas (meet SSc2) protect or restore 20% including building footprint.
- Note: SSc2 Development Density and Community Connectivity = Urban Area

SS Credit 5.1: Site Development – Protect or Restore Habitat
Strategies:
- Adopt a master plan for developing the project site.
- Site the building to minimize disruption.
- Design the building to minimize its footprint.
- Regenerative design including stacking the building program, tuck-under parking and sharing parking facility.
- Minimize disturbance of the existing site and restore previously degraded areas to their natural state.
- Previously developed site use local and regional governmental agencies, consultants, educational facilities and native plant societies as resources for the selection of appropriate native or adapted plants.
- Prohibit invasive or noxious weed species.
- Native/adapted plants require:
  - Minimal or no irrigation
  - Do not require maintenance such as mowing or chemical inputs such as fertilizers, pesticides or herbicides
  - Provide habitat value and promote biodiversity

SS Credit 5.1: Site Development – Protect or Restore Habitat

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>1 point</td>
</tr>
</tbody>
</table>
| Issues          | *Developing on building sites often damages site ecology, indigenous plants, regional animal populations  
|                 | *Establishing strict boundaries and staging areas during construction reduces damage to site and helps preserve wildlife habitats and migration corridors |
| Economic Issues | *Native/adapted plantings require less maintenance than nonnative plants and reduce costs over the building life cycle |
| Phase           | Construction                             |
| Team            | Civil Engineer/Arch/Landscape Arch/Owner |
| Timeline        | Schematic/Development                   |

Referenced Standards:
None
SS Credit 5.2: Site Development – Maximize Open Space

Intent:
Promote biodiversity by leaving open space corridors

Requirements:

**Case 1** Local Zoning Addresses Open Space
Exceed local zoning requirement by **25%**.

**Case 2** No Local Zoning Requirements
Open space **equal to area of building footprint**.

**Case 3** No Open Space Requirement in Zoning Ordinance
Set aside 20% of the project’s site area as open space.

**All Cases**
- In urban areas (SSc2) you can count vegetated roof surface.
- In urban areas (SSc2) you can count pedestrian hardscape if at least 25% vegetated.
- Wetlands or naturally designed ponds count if vertical: horizontal slope is less than 1:4.

Strategies:
- Select a Suitable Building Location
- Design building footprint to minimize site disruption
- Stacking the building program
- Truck-under parking
- Sharing parking facilities
- Maximize the amount of open space

Referenced Standards:
None
SS Credit 5.2: Site Development – Maximize Open Space

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>1 point</td>
</tr>
<tr>
<td>Issues</td>
<td>Open space:</td>
</tr>
<tr>
<td></td>
<td>▪ Provides habitat for vegetation and wildlife</td>
</tr>
<tr>
<td></td>
<td>▪ Reduces heat island effect</td>
</tr>
<tr>
<td></td>
<td>▪ Increases stormwater infiltration</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>▪ Cost impacts are typically zero to minimal for rural, suburban, and campus sites</td>
</tr>
<tr>
<td></td>
<td>▪ For dense urban sites, costs can be minimal to significant due to densification of the building or addition of a green roof</td>
</tr>
<tr>
<td></td>
<td>▪ Preserving topsoil, plants, and trees can help reduce landscaping costs</td>
</tr>
<tr>
<td>Phase</td>
<td>Design/Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Civil Engineer/Arch/Landscape Arch/Owner/</td>
</tr>
<tr>
<td>Timeline</td>
<td>Schematic</td>
</tr>
</tbody>
</table>
SS Credit 6.1: Stormwater Design – Quantity Control

Intent:
Limit disruption of natural hydrology by any combination of the following:

i. Reduce impervious cover
ii. Increase onsite infiltration
iii. Reduce/eliminate pollution in stormwater runoff

Requirements:

Case 1: Existing Imperviousness ≤ 50%

Option 1
Implement a stormwater management plan such that the post-development peak discharge rate and quantity does not exceed the pre-development peak discharge rate and quality for the 1 and 2 year, 24 hour design storm.

OR

Option 2
Implement a stormwater management plan that protects receiving streams from excessive erosion.

Case 2: Existing Imperviousness > 50%
Implement a stormwater management plan such that the volume of water leaving the site is 25% less than a 2-year, 24 hour design storm

SS Credit 6.1: Stormwater Design – Quantity Control

Strategies:

- Maintain Natural Stormwater Flows
- Promote infiltration
- Install vegetated roofs
- Pervious paving
- Minimize impervious surfaces
- Reuse stormwater for non-potable uses
- Landscape irrigation
- Toilet and urinal flushing
- Custodial users.

Regional Variations:
Approach varies based on regions and climate zones.
SS Credit 6.1: Stormwater Design – Quantity Control

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>1 point</td>
</tr>
<tr>
<td>Issues</td>
<td></td>
</tr>
<tr>
<td>Economic Issues</td>
<td></td>
</tr>
</tbody>
</table>

- Stormwater is a major source of pollution for all water bodies
- Increases in frequency and magnitude of stormwater runoff causes erosion, widens channels, and downcutting in streams

- Site size plays a significant role in whether or not the stormwater related points result in additional costs
- Swales tend to have a minimal cost impact while retention or detention ponds are more expensive

Phase: Construction
Team: Civil/Arch/Landscape Arch/GC
Timeline: Development

Referenced Standards:
None

Case Study: Coral Gables Museum
SS Credit 6.2: Stormwater Design – Quality Control

Intent: Manage stormwater runoff.

Requirements:

i. Institute BMPs for stormwater that captures and treats 90% of average annual rainfall.
ii. BMPs should remove 80% of the post-development total suspended solids (TSS).

Best Management Practices (BMPs)

i. Should meet or exceed performance standards of a state or local program.
OR
ii. Comply with accepted protocols such as the Technology Acceptance Reciprocity Partnership (TARP).

Strategies:

- Reduce Imperviousness
- Increase Filtration

<table>
<thead>
<tr>
<th>Methods of Nonstructural Controls</th>
<th>Structural Controls**</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Rain Gardens</td>
<td>i. Rainwater Cisterns</td>
</tr>
<tr>
<td>ii. Vegetated Swales</td>
<td>ii. Manhole Treatment Devices</td>
</tr>
<tr>
<td>iii. Disconnection of Impervious Areas</td>
<td>iii. Ponds</td>
</tr>
<tr>
<td>iv. Pervious Pavement</td>
<td>iv. Infiltration Trench/Basin</td>
</tr>
</tbody>
</table>

* Preferred because they are less expensive to construct and have less impact on the site.

** Preferred in urban areas or constrained site because they require less space.

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Inches of Rainfall (per 24 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humid</td>
<td>1</td>
</tr>
<tr>
<td>Semiarid</td>
<td>0.75</td>
</tr>
<tr>
<td>Arid</td>
<td>0.5</td>
</tr>
</tbody>
</table>

SS Credit 6.2: Stormwater Design – Quality Control

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Issues

- Stormwater contains sediment from vehicle fuel leaks, mechanical equipment wastes, and atmospheric deposits
- Pollutants degrade aquatic habitats and impact biodiversity

Economic Issues

- Early planning will allow you to utilize natural drainage systems minimizing the need for the implementation of structural measures thereby reducing costs.

Phase

Design

Team

Civil/Arch/Landscape Arch/GC/Owner

Timeline

Predesign

Referenced Standards:

None
SS Credit 7.1: Heat Island Effect – Non-Roof

Intent:
Reduce heat island effect on: Micro climates, Human habitats, Wildlife habitats
Heat island describes built up areas that are hotter than nearby rural areas.

Requirements:
Option 1
Combine any of the following for 50% of the site hardscape.
- Shade with tree canopy within 5 Years
- Shade with solar panels that produce energy
- Shade with architectural devices (SRI ≥ 29)
- Utilize hardscape materials with SRI ≥ 29
- Open-grid pavers ≥ 50% pervious

OR
Option 2
Place 50% of parking spaces under cover. Any of the following may be considered cover:
- Roof with SRI ≥ 29
- Vegetated green roof
- Solar panels that produce energy

Strategies:
- Utilize materials that reduce the heat absorption.
- Use shade June 21, noon solar time (baseline)
- Native or adapted trees & Large shrubs
- Vegetated Trellises & Other exterior structures supporting vegetation
- Asphalts to achieve light colored surfaces instead of blacktop, consider using new coating and integral colorants.
- Replace construction surfaces with vegetated surfaces
- Specify high albedo materials to reduce heat absorption.

Referenced Standards:
SS Credit 7.1: Heat Island Effect – Non-Roof

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Issues
The use of dark, non-reflective surfaces for parking, roofs, walkways, and other hardscapes contributes to the heat island effect by absorbing the sun’s warmth.

Economic Issues
Reducing heat islands can significantly lower cooling costs over time and higher initial costs for additional landscaping, open grid paving, or shading devices will be paid back when integrated into a systems approach to maximize energy savings.

Phase
Construction

Team
Civil Engineer/Arch/Landscape Arch/GC

Timeline
Development/Documentation

Case Study: Coral Gables Museum
Intent:
Reduce heat island effect on:
  i. Microclimates
  ii. Human and wildlife habitats

Requirements:
Option 1
75% of roof area material must meet SRI 78 for a low-sloped roof (≤ 2:12).
75% of roof area material must meet SRI 29 for a steep-sloped roof (> 2:12).

Option 2
Vegetated roof that covers 50% of roof area.

OR

Option 3
Combination of SRI and vegetated roof to cover entire roof area.

SS Credit 7.2: Heat island Effect – Roof

Strategies:
Install high-albedo and vegetated roofs

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>NC</td>
</tr>
<tr>
<td></td>
<td>1 point</td>
</tr>
<tr>
<td></td>
<td>• The use of dark, non-reflective roofing contributes to the heat island effect by absorbing the sun’s warmth</td>
</tr>
<tr>
<td></td>
<td>• Ambient temperatures in urban areas are artificially elevated by at least 10 degrees resulting in increased cooling consumption</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>NC</td>
</tr>
<tr>
<td></td>
<td>Vegetated roofs and roof surfaces with high SRIs can reduce costs associated with HVAC equipment but added cost of a green roof is significant, adding $10 - $30/SF</td>
</tr>
</tbody>
</table>

Phase  Construction
Team    Civil Engineer/Arch/Landscape Arch/GC
Timeline Development/Documentation
SS Credit 7.2: Heat island Effect – Roof

Referenced Standards:

- ASTM E1980-01, Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces

Case Study: Coral Gables Museum
SS Credit 8: Light Pollution Reduction

Intent:
- Reduce light pollution from the site by, minimizing light trespass, reducing sky-glow and improving night time visibility, and reducing the impact on the nocturnal environment.

Requirements:

**Interior Lighting**
- **Option 1**
  - All non-emergency interior luminaires should have the power input reduced by ≥50% from 11 p.m. to 5 a.m. A manual override or an occupant sensor with a 30 minute time limit can be utilized for after-hours use.
- **OR**
  - **Option 2**
    - Any non-emergency luminaires with direct line of sight to openings in the envelope must be shielded. The automatic device must have a resultant transmittance of ≤ 10% between 11p.m. and 5 a.m.

**Exterior Lighting**
- Only light exterior areas when required for comfort and safety.
- Do not exceed power densities in ANSI/ASHRAE/IESNA Standard 90.1-2007 for the given zone (Excludes Sports Field Lighting as long as they have an automatic shut off no later than 11 p.m.).

---

<table>
<thead>
<tr>
<th>Lighting Zone</th>
<th>Maximum Illumination</th>
<th>Maximum Up-lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LZ1</strong>: Dark (Rural Areas, Parks)</td>
<td>≤ 0.01 footcandles at the boundary or beyond</td>
<td>0% of the total design fixture lumens emitted ≥ 90° above nadir</td>
</tr>
<tr>
<td><strong>LZ2</strong>: Low (Residential, mixed-Use, Light industrial)</td>
<td>≤ 0.10 footcandles at the boundary and &lt; 0.01 footcandles 10 feet beyond site boundary</td>
<td>≤ 2% of the total design fixture lumens emitted ≥ 90° above nadir</td>
</tr>
<tr>
<td><strong>LZ3</strong>: Medium (Not in LZ1, LZ2 or LZ4)</td>
<td>≤ 0.20 footcandles at the boundary and &lt; 0.01 footcandles 15 feet beyond site boundary</td>
<td>≤ 5% of the total design fixture lumens emitted ≥ 90° above nadir</td>
</tr>
<tr>
<td><strong>LZ4</strong>: High (Commercial Districts, Urban Areas)</td>
<td>≤ 0.60 footcandles at the boundary and &lt; 0.01 footcandles 15 feet beyond site boundary</td>
<td>≤ 10% of the total design fixture lumens emitted ≥ 90° above nadir</td>
</tr>
</tbody>
</table>

**LZ2, LZ3 & LZ4**: If the boundary abuts a public right of way the curb line can be used instead of the boundary line.

**LZ1, LZ2, LZ3 & LZ4**: A single luminaire at the intersection of a public roadway and a private road accessing the site may use the centerline as the site boundary for a distance of twice the width of the driveway centered at the centerline.
SS Credit 8: Light Pollution Reduction

Strategies:
Avoid off-site lighting and night sky pollution. Use computer software to model site lighting. Utilize full cutoff luminaires, low reflectance surface and low angle spotlights. Light only when required for safety and comfort.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Outdoor lighting is important for safety but lighting systems can affect the nocturnal ecosystem</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>• Exterior lighting costs can be reduced by eliminating light that does not enhance safety • Efficacious controls will further reduce energy costs (having the power to provide the desired result)</td>
</tr>
</tbody>
</table>

Phase: Design
Team: Arch/Lighting Designer/Owner
Timeline: Schematic

Referenced Standards:
Water Efficiency

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Efficiency</td>
<td>NC</td>
</tr>
<tr>
<td>WE Prerequisite 1: Water Use Reduction</td>
<td>Required</td>
</tr>
<tr>
<td>WE Credit 1: Water Efficient Landscaping</td>
<td>2-4 points</td>
</tr>
<tr>
<td>WE Credit 2: Innovative Wastewater Technologies</td>
<td>2 points</td>
</tr>
<tr>
<td>WE Credit 3: Water Use Reduction</td>
<td>2-4 points</td>
</tr>
<tr>
<td><strong>Total Points Available in Water Efficiency</strong></td>
<td>10 points</td>
</tr>
</tbody>
</table>

**Intent:**
Reduce potable water use in buildings.

**Requirements:**
Reduce potable water use in the building by **20%** from the calculated baseline.

<table>
<thead>
<tr>
<th>Include the following fixtures in your calculations</th>
<th>Do not include the following fixtures in your calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Closets</td>
<td>Commercial Steam Cookers</td>
</tr>
<tr>
<td>Urinals</td>
<td>Commercial Dishwashers</td>
</tr>
<tr>
<td>Lavatory Faucets</td>
<td>Automatic Commercial Ice Makers</td>
</tr>
<tr>
<td>Showers</td>
<td>Commercial (family-sized) Clothes Washers</td>
</tr>
<tr>
<td>Kitchen Sink Faucets</td>
<td>Residential Clothes Washers</td>
</tr>
<tr>
<td>Pre-rinse Spray Valves</td>
<td>Standard and Compact Residential Dishwashers</td>
</tr>
</tbody>
</table>
WE Prerequisite 1: Water Use Reduction

Strategies:
- Use WaterSense-certified fixtures and fittings.
- Use high efficiency fixtures and dry fixtures to reduce potable water damage.
- Rainwater to flush water closets and urinals

Commercial Fixture, Fittings, and Appliances Current Baseline
Toilets - 1.6 gallons per flush
Urinals - 1.0 gallons per flush
Lavatory (Restroom) faucets - 2.2 gallons per minute
Showerheads - 2.5 gallons per minute

Standard
- Males
  - Water Closet: 1 time/day
  - Urinals: 2 times/day
- Females
  - Water Closet: 3 times/day

Regional Variations:
Health codes differ by regions.

WE Prerequisite 1: Water Use Reduction

<table>
<thead>
<tr>
<th>Points</th>
<th>NC Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>Reducing potable water decreases the total amount of water withdrawn from</td>
</tr>
<tr>
<td>Issues</td>
<td>rivers, streams, underground aquifers, and other water bodies (Watershed)</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Reductions in water consumption decrease building operating costs and bring</td>
</tr>
<tr>
<td></td>
<td>about wider economic benefits</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Arch/GC</td>
</tr>
<tr>
<td>Timeline</td>
<td>Development</td>
</tr>
</tbody>
</table>
WE Prerequisite 1: Water Use Reduction

Referenced Standards:

• The Energy Policy Act (EPAct) of 1992 (and as amended)
• The Energy Policy Act (EPAct) of 2005
• International Association of Plumbing and Mechanical Officials Publication IAPAMO/American National Standards Institute UPC 1-2006, Uniform Plumbing Code 2006, Section 402.0, Water-Conserving Fixtures and Fittings
• International Code Council, International Plumbing Code 2006, Section 604, Design of Building Water Distribution system

Coral Gables Museum
WE Credit 1: Water Efficient Landscaping

Intent:
Reduce the amount of potable water used for irrigation.

Requirements:
Option 1
- Reduce by 50% (2 points)
- Reduce potable water used for irrigation by 50% from a mid-summer baseline

Any combination of the following strategies can be employed to reduce potable water usage:
- Xeriscaping
- Plant species, density and microclimate factor
- Landscaping Coefficient
- Regional Evapotranspiration Rate
- Project Specific Evapotranspiration Rate
- Irrigation efficiency (drip-irrigation, micro-misters, subsurface irrigation)
- Controller Efficiency (Sensors)
- Captured rainwater
- Recycled wastewater
- Water treated and conveyed by a public agency

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Inches of Rainfall (per 24 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humid</td>
<td>1</td>
</tr>
<tr>
<td>Semiarid</td>
<td>0.75</td>
</tr>
<tr>
<td>Arid</td>
<td>0.5</td>
</tr>
</tbody>
</table>

OR

Option 2
No Potable Water Use or No Irrigation (4 points)
Meet Option 1 AND

PATH 1
For irrigation use only captured rainwater, recycled wastewater recycled graywater or water treated and conveyed by a public agency.

OR

PATH 2
Install landscaping that does not require a permanent irrigation system.
(Temporary system may be utilized for one year.)
WE Credit 1: Water Efficient Landscaping

Strategies:
Landscaping with native or adapted plants, use high efficiency equipment and/or climate based controllers.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>2-4 points</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Impeive landscaping practices can dramatically reduce and even eliminate irrigation needs</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Arch/MEP/GC</td>
</tr>
<tr>
<td>Timeline</td>
<td>Development</td>
</tr>
</tbody>
</table>

Referenced Standards:
None

Case Study: Coral Gables Museum
Case Study: Coral Gables Museum

Intent:
Reduce the use of potable water to convey sewage.

Requirements:

Option 1
Reduce potable water to convey building sewage by 50%.

Strategies to utilize include:
- Water-conserving fixtures
- Non potable water
- Water closets
- Urinals
- Captured rainwater
- Recycled graywater
- Onsite or municipally treated wastewater

OR

Option 2
Treat 50% of the wastewater to tertiary standards and infiltrate onsite.

WE Credit 2: Innovative Wastewater Technologies

Intent:
Reduce the use of potable water to convey sewage.

Requirements:

Option 1
Reduce potable water to convey building sewage by 50%.

Strategies to utilize include:
- Water-conserving fixtures
- Non potable water
- Water closets
- Urinals
- Captured rainwater
- Recycled graywater
- Onsite or municipally treated wastewater

OR

Option 2
Treat 50% of the wastewater to tertiary standards and infiltrate onsite.
### WE Credit 2: Innovative Wastewater Technologies

#### Strategies:
- Use high efficiency fixtures and dry fixtures. Consider reusing stormwater or graywater for sewage conveyance
  - Package biological nutrient removal systems
  - Constructed wetlands
  - High efficiency filtration system

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 points</td>
</tr>
</tbody>
</table>

#### Environmental Issues
- Reducing the amount of potable water needed for sewage conveyance reduces the total amount of water withdrawn from natural water bodies

#### Economic Issues
- Low-flow and waterless flush fixtures are typically available at no added costs

#### Phase
- Design

#### Team
- Arch/MEP/GC

#### Timeline
- Development

---

### Reference Standards:
- The Energy Policy Act (EPAct) of 1992 (and as amended)
- The Energy Policy Act (EPAct) of 2005
- International Association of Plumbing and Mechanical Officials Publication IAPAMO/American National Standards Institute UPC 1-2006, Uniform Plumbing Code 2006, Section 402.0, Water-Conserving Fixtures and Fittings
WE Credit 3: Water Use Reduction

Intent:
Increase water efficiency in buildings to reduce the burden on municipal water supply and waste water systems.

Requirements:
Use strategies that use less water than the baseline calculated for the building. Minimum water savings for each point threshold:

<table>
<thead>
<tr>
<th>% Reduction</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>2</td>
</tr>
<tr>
<td>35%</td>
<td>3</td>
</tr>
<tr>
<td>40%</td>
<td>4</td>
</tr>
</tbody>
</table>

Fixtures, fittings and appliances outside the scope of water use reduction include:
- Commercial Steam Cookers
- Commercial Dishwashers
- Automatic Commercial Ice Makers
- Commercial (family-sized) Clothes Washers
- Residential Clothes Washers
- Standard and Compact Residential Dishwashers

Strategies:
- Use high efficiency fixtures and dry fixtures.
- Consider reusing stormwater or graywater for sewage conveyance
- Package biological nutrient removal systems
- Constructed wetlands
- High efficiency filtration system

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4 points</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Issues
Reducing potable water decreases the total amount of water withdrawn from rivers, streams, underground aquifers, and other water bodies.

Economic Issues
Reductions in water consumption decrease building operating costs and bring about wider economic benefits

Phase
Design

Team
Arch/MEP/GC

Timeline
Development
WE Credit 3: Water Use Reduction

Referenced Standards:
- The Energy Policy Act (EPAct) of 1992 (and as amended)
- The Energy Policy Act (EPAct) of 2005
- International Association of Plumbing and Mechanical Officials Publication IAPAMO/American National Standards Institute UPC 1-2006, Uniform Plumbing Code 2006, Section 402.0, Water-Conserving Fixtures and Fittings

ENERGY & ATMOSPHERE
Energy & Atmosphere

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy &amp; Atmosphere</strong></td>
<td></td>
</tr>
<tr>
<td><strong>EA Prerequisite 1</strong>: Fundamental Commissioning of Building Energy Systems</td>
<td>Required</td>
</tr>
<tr>
<td><strong>EA Prerequisite 2</strong>: Minimum Energy Performance</td>
<td>Required</td>
</tr>
<tr>
<td><strong>EA Prerequisite 3</strong>: Fundamental Refrigerant Management</td>
<td>Required</td>
</tr>
<tr>
<td><strong>EA Credit 1</strong>: Optimize Energy Performance</td>
<td>1-19 points</td>
</tr>
<tr>
<td><strong>EA Credit 2</strong>: On-site Renewable Energy</td>
<td>1-7 points</td>
</tr>
<tr>
<td><strong>EA Credit 3</strong>: Enhanced Commissioning</td>
<td>2 points</td>
</tr>
<tr>
<td><strong>EA Credit 4</strong>: Enhanced Refrigerant Management</td>
<td>2 points</td>
</tr>
<tr>
<td><strong>EA Credit 5</strong>: Measurement and Verification</td>
<td>3 points</td>
</tr>
<tr>
<td><strong>EA Credit 6</strong>: Green Power</td>
<td>2 points</td>
</tr>
<tr>
<td><strong>Total Points Available in Energy and Atmosphere</strong></td>
<td>35 points</td>
</tr>
</tbody>
</table>

**NOTES:**
- Regulated Energy:
  - Lighting
  - HVAC
  - Service Water Heating
- Process Energy is NOT regulated. Process Energy Includes Power for:
  - Office Equipment
  - Computers
  - Escalators and Elevators
  - Kitchen Cooking and Refrigeration
  - Laundry Washing and Drying
  - Any lighting exempt from lighting power allowance such as medical equipment
## EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems

### Intent:
Confirm energy systems are **installed, calibrated** and **perform** in accordance with **owner’s project requirements, basis of design** and **construction documents**.

### Requirements:
Commissioning Process Requirements:
1. Designate a commissioning authority (CXA) that:
   a. Will Lead, review and oversee completion of the commissioning process.
   b. Must have experience in **2 similar projects**
   c. Independent of design & construction team (unless the project is less than **50,000SF**)
2. CXA will review the BOD and OPR
3. Develop and incorporate commissioning requirements into the construction documents
4. Develop and implement a commissioning plan
5. Verify the installation and performance of systems
6. Complete a summary commissioning report

Commissioned Systems:
1. HVAC&R and associated controls
2. Lighting and daylighting controls
3. Domestic hot water systems
4. Renewable energy systems

### Strategies:

**Commissioning:**
- Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls.
- Lighting and daylighting controls.
- Domestic hot water systems
- Renewable energy systems (e.g., wind solar)
- Engage a CXA
- Develop and maintain a commissioning plan
- Complete the commissioning report which includes:
  - Basic design
  - Commissioning plan
  - Commissioning specification
  - Performance verification documentation
  - Commissioning report

**Referenced Standards:**
None
Case Study: Coral Gables Museum

Coral Gables Museum
EA Prerequisite 2: Minimum Energy Performance

<table>
<thead>
<tr>
<th>Points</th>
<th>NC Required</th>
</tr>
</thead>
</table>
| Environmental Issues | Benefits of commissioning include:  
  ▪ Reduced energy use  
  ▪ Lower operating costs  
  ▪ Fewer contractor callbacks  
  ▪ Better building documentation  
  ▪ Improved occupant productivity  
  ▪ Verification of systems installation and operation |
| Economic Issues |  
  ▪ Commissioning is usually a soft cost but there are some additional construction costs related to commissioning  
  ▪ Basic commissioning costs in the range of $1.50 - $3.00/SF |

| Phase | Construction |
| Team | Owner/Building Occupants/O & M Staff/GC/Design Professionals/CxA |
| Timeline | None |

Intent: Determine minimum level of energy efficiency for the proposed building and systems to minimize excessive energy use.

Requirements:

Option 1 - Whole Building Energy Simulation
- New Buildings: 10% improvement in energy performance compared to baseline
- Major Renovations: 5% improvement in energy performance compared to baseline

Option 2 - Prescriptive Compliance Path
- Comply with prescriptive measures of one of the following paths:
  Building is < 20,000 SF and office occupancy
  Building is < 20,000 SF and retail occupancy
  Building is < 50,000 SF and warehouse or self-storage occupancy
Option 3 - Prescriptive Compliance Oath Advanced Buildings Core Performance Guide

Comply with Advanced Buildings Core Performance Guide by meeting the following:

i. < 100,000 SF

ii. Section 1: Design Progress Strategies and Section 2 core performance guide

iii. Office, school, public assembly, & retail projects < 100,000 SF (comply with sections 1&2)

iv. Other projects < 100,000 must implement the basic procedures

v. Health care, warehouse and laboratory project are ineligible for path.

Intent: Determine minimum level of energy efficiency for the proposed building and systems to minimize excessive energy use.

Requirements:

EA Prerequisite 2: Minimum Energy Performance

Strategies:
- Design the building envelope and systems to meet baseline.

Regional Variations:
Represented in ASHRAE 90.1-2007 (8 climatic zones and 3 climatic subzones).

<table>
<thead>
<tr>
<th>Points</th>
<th>NC Required</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Energy efficiency reduces the environmental burdens associated with producing and using energy</td>
<td></td>
</tr>
<tr>
<td>Economic Issues</td>
<td>If the decision to pursue energy efficiency is made early in design, it should be possible to meet the minimum requirements without adding cost</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
<td></td>
</tr>
<tr>
<td>Team</td>
<td>Project Team</td>
<td></td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
EA Prerequisite 2: Minimum Energy Performance

Referenced Standards:
- ASHRAE Advanced Energy Design Guide for K-12 School Buildings
- New Building Institute, Advanced Buildings Core Performance Guide
- ENERGY STAR Program, Target Finder Rating Tool

Intent:
Reduce stratospheric ozone depletion.

Requirements:
No CFC based refrigerants in new heating, ventilation, air conditioning, and refrigeration systems. In existing buildings, complete a comprehensive CFC phase-out prior to project completion.

Strategies:
- Develop a Phase out plan for equipment using CFC-based refrigerants
- Monitor leakage

NOTE: Chlorofluorocarbons (CFCs) Refrigerants are banned and Hydrochlorofluorocarbons (HCFCs) is being phased out. Use natural refrigerants when possible: Water (H₂O), Carbon Dioxide (CO₂), Ammonia (NH₃) and Hydrocarbons like Propane.

EA Prerequisite 3: Fundamental Refrigerant Management

Intent:
Reduce stratospheric ozone depletion.

Requirements:
No CFC based refrigerants in new heating, ventilation, air conditioning, and refrigeration systems. In existing buildings, complete a comprehensive CFC phase-out prior to project completion.

Strategies:
- Develop a Phase out plan for equipment using CFC-based refrigerants
- Monitor leakage

NOTE: Chlorofluorocarbons (CFCs) Refrigerants are banned and Hydrochlorofluorocarbons (HCFCs) is being phased out. Use natural refrigerants when possible: Water (H₂O), Carbon Dioxide (CO₂), Ammonia (NH₃) and Hydrocarbons like Propane.
The Greenhouse Effect

Image Source: http://www.koshland-science-museum.org/exhibitgcc/images/causes02.jpg
The Greenhouse Effect

Photosynthesis

Ingredients | Product
--- | ---
Sunlight + H₂O + CO₂ + Nutrients | "CH₂O" + O₂
Water | Organic matter
Carbon dioxide | Oxygen
Nitrate NO₃ | Silica
Phosphate PO₄

EA Prerequisite 3: Fundamental Refrigerant Management

<table>
<thead>
<tr>
<th>Points</th>
<th>NC Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>CFCs cause significant damage to Earth’s protective ozone layer when they are released into the atmosphere</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Equipment replacement can be costly and is typically undertaken only when that equipment has reached the end of its useful life</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>HVAC&amp;R Specialist/Mechanical Engineer</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:
U.S. EPA Clean Air Act, Title VI, Section 608, Compliance with the Section 608 Refrigerant Recycling Rule
**EA Credit 1: Optimize Energy Performance**

**Intent:**
Exceed prerequisite requirements to minimize negative environmental and economic impacts related to excessive energy use.

**Requirements:**

<p>| Option 1 - Whole Building Energy Simulation | Calculate baseline and percentage improved in building performance using a computer simulation model for the whole building and refer to the Reference Guide for minimum energy cost savings percentage for each point threshold. |</p>
<table>
<thead>
<tr>
<th>New Building</th>
<th>Existing Building Renovation</th>
<th>New Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>12%</td>
<td>8%</td>
<td>1</td>
</tr>
</tbody>
</table>

You get additional points for every 2% improvement in efficiency to a maximum of: 19

---

**Option 2 - Prescriptive Compliance Path**

ASHRAE Advanced Energy Design Guide

Comply with prescriptive measures of one of the following paths:

   - Building is < 20,000 SF and **office** occupancy

   - Building is < 20,000 SF and **retail** occupancy

   - Building is < 50,000 SF and **warehouse or self storage** occupancy
**EA Credit 1: Optimize Energy Performance**

Option 3 - Prescriptive Compliance Path
Advanced Buildings Core Performance Guide

Comply with Advanced Buildings Core Performance Guide by meeting the following:

i. < 100,000 SF

ii. Meet the requirements for both section 1 and 2

iii. Projects cannot be health care, warehouse or laboratory

Note: 1 additional point is available for every 3 strategies implemented up to a maximum of 2 additional points (3.1 Cool Roofs, 3.8 Night Venting and 3.13 Additional Commissioning are not eligible strategies for additional points as they are already addressed in LEED)

---

**Strategies:**
Design the building envelope and system to exceed energy performance ANSI/ASHRAE/IESNA Standard 90.1-2007 (8 climatic zones and 3 climatic subzones).

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>1-19 points</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Energy efficiency reduces the environmental burdens associated with producing and using energy</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Many energy efficiency measures involve little or no additional cost but focus on: Efficient Design, Right-sizing Equipment, Improvements in basic building systems</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Energy Analyst (the modeler)/Architect/Mechanical Engineer/Commissioning Authority/LEED AP</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>
EA Credit 1: Optimize Energy Performance

Referenced Standards:
- ASHRAE Advanced Energy Design Guide for K-12 School Buildings
- New Building Institute, Advanced Buildings Core Performance Guide

Intent:
Use on-site renewable energy sources to reduce the environmental and economic impact of fossil fuel energy.

Requirements:
Calculate energy produced by renewable systems as a percentage of the building's annual energy cost.

Strategies:
- Consider solar, wind, geothermal, low-impact hydro, biomass, and bio-gas potential for the project.

EA Credit 2: On-site Renewable Energy

Intent:
Use on-site renewable energy sources to reduce the environmental and economic impact of fossil fuel energy.

Requirements:
Calculate energy produced by renewable systems as a percentage of the building's annual energy cost.

Renewable Energy Generated | NC Points
---|---
1% | 1
3% | 2
5% | 3
7% | 4
9% | 5
11% | 6
13% | 7

Strategies:
- Consider solar, wind, geothermal, low-impact hydro, biomass, and bio-gas potential for the project.
### EA Credit 2: On-site Renewable Energy

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7 points</td>
<td></td>
</tr>
</tbody>
</table>

| Environmental Issues | Renewable energy can dramatically improve outdoor environmental quality |
| Economic Issues | On-site generation of renewable energy has a substantial construction cost impact |
| Phase | Designer |
| Team | Owner/Architect Engineer |
| Timeline | None |

Referenced Standards:

### EA Credit 3: Enhanced Commissioning

**Intent:**

Begin commissioning in the design process and carry out additional activities once performance verification is finished.

**Requirements:**

Commissioning Process Requirements:
- Prior to the beginning of the construction documents phase, designate a commissioning authority (CXA) to lead the process.
  - Documented commissioning experience on 2 previous projects.
  - Not an employee of design firm, but can be hired by them.
  - Not an employee of construction firm or contracted through a contractor or construction manager holding construction contracts.
  - May be a qualified employee or consultant of the owner.
## EA Credit 3: Enhanced Commissioning

### Project Phases

<table>
<thead>
<tr>
<th>Commissioning Tasks (Steps 1-12)</th>
<th>Fundamental</th>
<th>Enhanced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-design/Design Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Request for Proposal (RFP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architect and Engineer (A/E) Selection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owners Project Requirements (OPR), Basis of Design (BOD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schematic Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Documents</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construction Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Procurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional Testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test and Balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations and Maintenance (O&amp;M) Manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantial Completion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Monitoring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Enhanced Commissioning

- **Project Phases**
  - **Pre-design/Design Phase**
    - 1. Designate a Commissioning Authority (CxA)
    - 2. Document owner’s project requirements; Develop basis of design
    - 3. Review owner’s project requirements and basis of design
    - 4. Develop and implement commissioning plan
    - 5. Incorporate commissioning requirements into construction documents
    - 6. Conduct commissioning design review prior to mid-construction documents
  - **Construction Phase**
    - 7. Review contractor submittals applicable to system being commissioned
    - 8. Verify installation and performance of commissioned system
    - 9. Develop systems manual for commissioned systems
    - 10. Verify that requirements for training are completed
    - 11. Complete a summary commissioning report
    - 12. Review building operation within 10 months after substantial completion

### Roles/Responsibilities

- Owner or project team
- Owner or CxA Design Team
- Project team or CxA Design Team
- CxA
- N/A
- Project team or CxA
## EA Credit 3: Enhanced Commissioning

<table>
<thead>
<tr>
<th>Party Acting as commissioning Authority (CxA)</th>
<th>Fundamental Commissioning Prerequisite</th>
<th>Enhanced Commissioning Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee and subcontractor of general contractor with construction responsibilities</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Employee or subcontractor, with construction responsibilities, of construction manager who holds constructor contracts</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Employee or subcontractor, with project design responsibilities, of the architect or engineer of record</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Disinterested employee or subcontractor of central contractor or construction manager</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Disinterested employee of architect or engineer</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Disinterested subcontractor to architect or engineer</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Construction manager not holding constructor contracts</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Independent consultant contracted to owner</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Owner employee or staff</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Required Commissioning Plan Components:

- Brief overview of commissioning process
- List of all systems and assemblies included in commissioning authority’s scope of work.
- Identification of commissioning team and its responsibilities.
- Description of management, communication, and reporting of commissioning process.
- Overview of commissioning process activities for pre-design, design, construction, and occupancy and operations phases, including development of owner’s project requirements, review of basis of design, schematic design, construction documents and submittals, construction phase verification, functional performance test development and implementation and 10-month warranty review
- List of expected work products
- List of commissioning process milestones.

### Strategies:

Owner engaged CxA preferred. May be engaged by design or construction management firm as long as they do not have the construction contract.
EA Credit 3: Enhanced Commissioning

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Benefits of commissioning include:</td>
</tr>
<tr>
<td></td>
<td>• Reduced energy use</td>
</tr>
<tr>
<td></td>
<td>• Lower operating costs</td>
</tr>
<tr>
<td></td>
<td>• Fewer contractor callback</td>
</tr>
<tr>
<td></td>
<td>• Better building documentation</td>
</tr>
<tr>
<td></td>
<td>• Improved occupant productivity</td>
</tr>
<tr>
<td></td>
<td>• Verification of systems</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>• Enhanced commissioning has construction and soft cost implications</td>
</tr>
<tr>
<td></td>
<td>• Additional commissioning typically costs in the rage of $1.00 - $2.00/SF</td>
</tr>
<tr>
<td>Phase</td>
<td>Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Owner/Users/Occupants/O &amp; M Staff/GC/Design Professionals/CxA</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

EA Credit 4: Enhanced Refrigerant Management

**Intent:**
Reduce ozone depletion and greenhouse gas emissions

**Requirements:**

- Option 1. Do not use refrigerants.
- OR
- Option 2. Choose refrigerants that minimize or eliminate compounds that:
  - Deplete the ozone layer
  - Contribute to global climate change.

\[ \text{LCGWP} + (\text{LCODP} \times 10^5) \leq 100 \]

*Montreal Protocol 1987*

*Updated 1990 and 1992*
ChloroFluoroCarbons (CFCs)
- Banned in developed countries that signed the Montreal Protocol
- Developing countries that signed can manufacture until 2010
- Non-signers continue to manufacture

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>ODP</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFC-12</td>
<td>1.0</td>
<td>10,720</td>
</tr>
<tr>
<td>CFC-11</td>
<td>1.0</td>
<td>4,680</td>
</tr>
<tr>
<td>CFC-114</td>
<td>0.94</td>
<td>9,800</td>
</tr>
<tr>
<td>CFC-500</td>
<td>0.605</td>
<td>7,900</td>
</tr>
<tr>
<td>CFC-502</td>
<td>0.221</td>
<td>4,600</td>
</tr>
</tbody>
</table>

HydroChloroFluoroCarbons (HCFCs)
- 2020 Phased out for New Equip. / Manufactured until 2030 for Service of Equipment

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>ODP</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCFC-22</td>
<td>0.04</td>
<td>1,780</td>
</tr>
<tr>
<td>HCFC-123</td>
<td>0.02</td>
<td>76</td>
</tr>
</tbody>
</table>

HydroFluoroCarbons (HFCs)

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>ODP</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFC-23</td>
<td>~0</td>
<td>12,240</td>
</tr>
<tr>
<td>HFC-404A</td>
<td>~0</td>
<td>3,900</td>
</tr>
<tr>
<td>HFC-507A</td>
<td>~0</td>
<td>3,900</td>
</tr>
<tr>
<td>HFC-410A</td>
<td>~0</td>
<td>1,890</td>
</tr>
<tr>
<td>HFC-407C</td>
<td>~0</td>
<td>1,700</td>
</tr>
<tr>
<td>HFC-134a</td>
<td>~0</td>
<td>1,320</td>
</tr>
<tr>
<td>HFC245fa</td>
<td>~0</td>
<td>1,020</td>
</tr>
</tbody>
</table>

Natural Refrigerants - HydroCarbons (HCs)

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>ODP</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethane</td>
<td>0</td>
<td>3.0</td>
</tr>
<tr>
<td>Propane</td>
<td>0</td>
<td>3.0</td>
</tr>
<tr>
<td>Butane</td>
<td>0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Natural Refrigerants – Other

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>ODP</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide (CO₂)</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>Ammonia (NH₃)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Water (H₂O)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Air</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

EA Credit 4: Enhanced Refrigerant Management

Calculation definitions for LCGWP + LCODP x 10⁵ ≤ 100

LCODP = [ODPr x (Lr X Life+Mr) x Rc]/Life
LCGWP = [GWPr x (Lr x Life+Mr) x Rc]/Life
LCODP: Lifecycle Ozone Depletion Potential (lb CFC 11/Ton-Year)
LCGWP: Lifecycle Direct Global Warming Potential (lb CO₂/Ton-Year)
GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lb CO₂/lbr)
ODP: Ozone Depletion Potential of Refrigerant (0 to 0.2lb CFC 11/lbr)
Lr: Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)
Mr: End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)
Rc: Refrigerant Change (0.5 lbs of refrigerant per ton of gross ARI rated cooling capacity)
Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

Note: Small equipment, defined as containing less than 0.5 pounds of refrigerant are not subject to the requirements of this credit.
EA Credit 4: Enhanced Refrigerant Management

Strategies:
Design facility without mechanical cooling and refrigeration equipment. Utilize refrigeration cycle that minimizes direct impact on ozone depletion and global climate change. Prevent leakage. No CFC, HCFC or Halons in fire suppression systems.

Referenced Standards:
None

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 points</td>
<td></td>
</tr>
<tr>
<td>Environmental Issues</td>
<td>CFCs cause significant damage to Earth’s protective ozone layer when they are released into the atmosphere</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Minor construction cost implications if any and minimal soft cost and documentation requirements</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Mechanical Engineer/HVAC&amp;R Specialist</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

EA Credit 5: Measurement and Verification

Intent:
To provide accountability of building energy consumption over time

Requirements:
Option 1
Implement a measurement and verification plan consistent with Option D: Calibrated Simulator (Savings Estimation Method 2). (Larger Buildings)
OR
Option 2
Implement a measurement and verification plan consistent with Option B: Energy Conservation Measure Isolation. (Smaller Buildings)

NOTE: Measurement and verification period must cover at least one year post construction occupancy.

Strategies:
Develop and M&V plan
Create a maintenance plan to diagnose system wear and tear
EA Credit 5: Measurement and Verification

<table>
<thead>
<tr>
<th>Points</th>
<th>NC 3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Optimizes energy performance which will minimize economic impacts associated with energy systems</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>• The cost of metering can be significant and the cost for writing and implementing measurement and verification programs is also substantial • A good quality reporting system can add $2.00 to $4.00/SF to the overall cost of the project</td>
</tr>
<tr>
<td>Phase</td>
<td>Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Diagnostics Specialists/Resource Conservation Manager</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:


EA Credit 6: Green Power

Intent:
Utilize grid-source renewable energy on a net-zero population basis.

Requirements:
Execute at least a 2 year contract for renewable energy that provides at least 35% of the building’s electricity. Renewable energy must meet the center for Resource Solutions, Green-e Product Certification Requirements

Option 1
Determine Baseline Electricity Use
Annual electricity consumption from the results of Credit EAc1: Optimized Energy Performance

OR

Option 2
Estimate Baseline Electricity Use
U.S. Department of Energy’s Commercial Buildings Energy Consumption Survey database
EA Credit 6: Green Power

Strategies:
Determine the energy needs of the building and investigate opportunities to engage in a green power contract.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 points</td>
</tr>
</tbody>
</table>

Environmental Issues
Energy production from traditional sources is a significant contributor to air pollution and green electricity products reduce the air pollution impacts of electricity.

Economic Issues
• The first cost of green power contracts is relatively low but operationally it can add to overall long term costs
• The cost of green power varies and can run from $0.01 per KWh to over $0.15 per KWh

Phase
Construction

Team
Project Team

Timeline
None

Referenced Standards:
• Center for Resource Solutions, Green-e Product Certification Requirements

MATERIALS & RESOURCES
### Materials & Resources

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MR Prerequisite 1</strong>: Storage and Collection of Recyclables</td>
<td>Required</td>
</tr>
<tr>
<td><strong>MR Credit 1.1</strong>: Building Reuse-Maintain Existing Walls.</td>
<td>1-3 points</td>
</tr>
<tr>
<td><strong>MR Credit 1.2</strong>: Building Reuse-Maintain Interior Nonstructural Elements</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>MR Credit 2</strong>: Construction Waste Management</td>
<td>1-2 points</td>
</tr>
<tr>
<td><strong>MR Credit 3</strong>: Materials Reuse</td>
<td>1-2 points</td>
</tr>
<tr>
<td><strong>MR Credit 4</strong>: Recycled Content</td>
<td>1-2 points</td>
</tr>
<tr>
<td><strong>MR Credit 5</strong>: Regional Materials</td>
<td>1-2 points</td>
</tr>
<tr>
<td><strong>MR Credit 6</strong>: Rapidly Renewable Materials</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>MR Credit 7</strong>: Certified Wood</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>Total Points Available in Material and Resources</strong></td>
<td>14 points</td>
</tr>
</tbody>
</table>

**Materials & Resources Intent:**

Facilitate waste reduction generated by **building occupants** that is disposed of in landfills.

**Requirements:**

Provide **easily accessible, dedicated** areas for collection and storage of recyclable materials for the entire buildings.

The following materials must be recycled:

- Paper
- Corrugated cardboard
- Glass
- Plastics
- Metals

**Strategies:**

Designate an area for recyclable collection and storage, cardboard balers, aluminum can crushers, recycle chutes.
MR Prerequisite 1: Storage and Collection of Recyclables

<table>
<thead>
<tr>
<th>Points</th>
<th>NC Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Recycling reduces the need to extract virgin natural resources.</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>In most cases this credit has no construction or soft cost impact</td>
</tr>
<tr>
<td>Phase</td>
<td>None</td>
</tr>
<tr>
<td>Team</td>
<td>Owner</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards: None

MR Credit 1: Building Reuse Maintain Existing Walls, Floors, and Roof

Intent: Extend the life cycle of existing buildings, conserve resources, retain cultural resources, reduce waste and reduce the environmental impact of new buildings.

Requirements:
- Preserve the existing building structure including structural floor and roof decking and envelope.
- Remediated hazardous materials cannot be added into the calculation.
- The minimum percentage of building reuse for each threshold is:

<table>
<thead>
<tr>
<th>Building Reuse</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>55%</td>
<td>1</td>
</tr>
<tr>
<td>75%</td>
<td>2</td>
</tr>
<tr>
<td>95%</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: This credit is not eligible if the project includes an addition that is more than 2 times the square footage of the existing building.
MR Credit 1: Building Reuse Maintain Existing Walls, Floors, and Roof

Strategies:
- Give preference to existing building
- Remediate (remove/encapsulate) elements that are contaminated
- Upgrade mechanical, electrical and plumbing systems (MEP)

Regional Variations:
This credit is especially important with respect to historic neighborhoods and structures. Building reuse can preserve the history and character of an area while encouraging new development.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>1-3 points</td>
</tr>
<tr>
<td>Reuse significantly reduces the energy use associated with the demolition process as well as construction waste</td>
<td></td>
</tr>
<tr>
<td>Economic Issues</td>
<td>This credit will not necessarily add any cost to the project</td>
</tr>
<tr>
<td>Phase</td>
<td>Design/Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Owner</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:
None

Case Study: Coral Gables Museum
MR Credit 1.2: Building Reuse-Maintain Interior Nonstructural Elements

Intent:
Extend the life cycle of existing buildings, conserve resources, retain cultural resources, reduce waste and the environmental impact of new buildings.

Requirements:
Retain interior nonstructural elements in at least 50% (by area) of the completed building must be used, including additions. If the addition is more than 2 times the square footage of the existing building this credit will not apply.

Exemplary Performance:
None

Strategies:
- Give preference to existing building
- Remediate elements that are contaminated
- Upgrade mechanical and plumbing systems

Regional Variations:
This credit is especially important with respect to historic neighborhoods and structures. Building reuse can preserve the history and character of an area while encouraging new development.

Points | NC
--- | ---
1 point | 

Environmental Issues
- Reuse significantly reduces the energy use associated with the demolition process as well as construction waste

Economic Issues
- This credit will not necessarily add any cost to the project
- This credit may actually save money and schedule time for the project

Phase
Design/Construction

Team
Owner/Architect

Timeline
None

Referenced Standards:
None
MR Credit 2: Construction Waste Management

Intent:
Divert construction and demolition debris from disposal in landfills and incineration facilities.

Requirements:
Develop and implement a construction waste management plan that:
- Identifies the materials to be diverted for disposal and whether the materials will be sorted onsite or comingled
- Soil and land-clearing debris do not count towards this credit.
- Calculations can be done by weight or volume but must be consistent throughout.
- The minimum percentage debris to be recycled or salvaged for each threshold is:

<table>
<thead>
<tr>
<th>Recycled or Salvaged</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>1</td>
</tr>
<tr>
<td>75%</td>
<td>2</td>
</tr>
</tbody>
</table>

Strategies:
- Adopt a construction waste management plan
- Consider recycling: Cardboard, metal brick mineral fiber panel, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation.
- Wood derived fuel [WDF]
- Alternative daily cover material may be applied to the construction waste calculation.
- Diversion may include donation of materials to charitable organization and salvage of materials on site.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>The greatest environmental benefit is source control, which is reducing the total waste generated</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>In areas where construction waste management is widely used, the costs will be minimal but in areas where construction waste management practices are unfamiliar, the costs can be substantial</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Contractor/Subcontractors</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>
MR Credit 3: Materials Reuse

**Intent:**
Reuse building materials and products to reduce demand for virgin products and reduce waste, reducing the impacts associated with the extraction and processing of virgin resources.

**Requirements:**
- Minimum percentage materials reused for each point threshold:

<table>
<thead>
<tr>
<th>Reused Materials</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>1</td>
</tr>
<tr>
<td>10%</td>
<td>2</td>
</tr>
</tbody>
</table>

- Mechanical, electrical, plumbing (MEP), and elevator equipment cannot be included in this calculation.
- Only include permanently installed materials in the project.
- Furniture may be included if it is consistently included through MR Credit 3 – 7.

**Referenced Standard:**
None

---

**Strategies:**
Consider salvaged materials, including:
- Posts
- Beams
- Flooring
- Panels
- Doors and Frames
- Cabinetry and Furniture
- Brick and Decorative Items

<table>
<thead>
<tr>
<th>Points</th>
<th>NC&lt;br&gt;1-2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Issues</strong></td>
<td>We are depleting our natural resources faster than they can replenish themselves. Extending the life of the materials reduces our dependence on natural resources.</td>
</tr>
<tr>
<td><strong>Economic Issues</strong></td>
<td>Even though some reclaimed materials or products can be incorporated at low cost or even for a reduction in cost, the cost for compliance with these credits can be significant since the percentage thresholds are quite high</td>
</tr>
</tbody>
</table>

**Phase:** Design

**Team:** Owner/Architect

**Timeline:** None
Coral Gables Museum

MR Credit 4: Recycled Content

Intent:
Increase demand for building products that incorporate recycled content materials, reducing impacts from the extraction and processing of virgin materials.

Requirements:

i. Use materials with recycled content that the sum of postconsumer recycled content plus ½ of the pre-consumer content constitutes at least 10% (1 point) or 20% (2 points) of the total value of materials in the project.

ii. Mechanical, electrical, plumbing, and elevator equipment cannot be included in this calculation.

iii. Only include permanently installed materials in the project.

iv. Furniture may be included if is consistently included through MR Credit 3 – 7.

Strategies:
- Set a goal for recycled content materials
- Incorporate in construction documents
- Install in building
### MR Credit 4: Recycled Content

#### Recycled Content Value

<table>
<thead>
<tr>
<th>Postconsumer Recycled Content</th>
<th>Preconsumer (or Postindustrial) Recycled Content</th>
<th>Back into its own manufacturing cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>FULL VALUE</td>
<td>HALF VALUE</td>
<td>NO VALUE</td>
</tr>
</tbody>
</table>

| Glass                        | An overrun of blue jeans ➔ cotton insulation  | Rework                                |
| Plastics                     | Surplus magazine from a publishing company ➔ cellulose insulation | Reground plastic polymers             |
| Metals                       | Flyash                                        | Metal Scraps (Do not confuse with scrap metal to be recycled) |
| Corrugated Cardboard         | Burnt Furnace Slag                            |                                       |
| Paper                        |                                               |                                       |

* Default recycled content value of steel is 25% postconsumer

#### Points

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>1-2 points</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Products with recycled content reduce virgin materials use and solid waste volumes</td>
</tr>
<tr>
<td>Phase</td>
<td>None</td>
</tr>
<tr>
<td>Team</td>
<td>Architect/Contractor</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:

- International Standard ISO 14021-1999, Environmental Labels and Declarations – Self-Declared Environmental Claims (Type II Environmental Labeling)
MR Credit 5: Regional Materials

Intent:
Increase demand for building materials and products that are extracted and manufactured within the region, supporting the use of indigenous resources and reducing the impacts resulting from transportation.

Requirements:

i. Use building materials or products that have been extracted, harvested or recovered within 500 miles of the project site for a minimum of 10% (1 point) or 20% (2 points) based on cost of total materials value.

ii. Only the percentage by weight can contribute to the regional value if only a fraction of the product is extracted, harvested, or recovered and manufactured locally.

iii. Mechanical, electrical, plumbing, and elevator equipment cannot be included in this calculation.

iv. Only include permanently installed materials in the project.

v. Furniture may be included if is consistently included through MR Credit 3 – 7.

Strategies:

- Set a goal for recycled content materials
- Incorporate in specs
- Use regional material (within 500 miles of project)

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>The use of regional building materials reduces transportation activities and associated pollution</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Difficult to assess the cost implications since strategies could have major impacts on the approach to basic design and structure of each project</td>
</tr>
</tbody>
</table>

Phase: None
Team: GC
Timeline: None

Referenced Standards: None
Intent:
Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements:
Use rapidly renewable building materials and products for 2.5% of the total value of all building materials and products. Rapidly renewable materials are made from plants that are harvested within a 10 year or shorter cycle.

Strategies:
- Set a goal for recycled content materials
- Incorporate in specs
- Rapidly renewable materials (≤10 years to maturity)
- Attempt to select rapidly renewable materials that will receive the MR Credit 5 – Regional Materials as well.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>1 point</td>
</tr>
<tr>
<td>Environmental Issues</td>
<td>Rapidly renewable materials generally require fewer inputs and time to produce</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>The cost for compliance with this credit can be significant since the percentage threshold is quite high</td>
</tr>
<tr>
<td>Phase</td>
<td>None</td>
</tr>
<tr>
<td>Team</td>
<td>Architect/GC</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:
None
Case Study: Coral Gables Museum

Intent:
Encourage environmentally responsible forest management.

Requirements:
1. Use a minimum of 50% of wood-based materials and products that are certified in accordance with the Forest Stewardship Council's principle and criteria.
2. The components contain structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes.
3. Furniture may be included if it is consistently included through MR Credit 3 – 7.

Strategies:
- Set a goal for recycled content materials
- Incorporate in specs
- Certified wood (FSC criteria)

Regional Variations:
This credit is of particular importance in areas with poor forestry practices or high forest conversion rates.

MR Credit 7: Certified Wood
### MR Credit 7: Certified Wood

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point</td>
<td></td>
</tr>
</tbody>
</table>

#### Environmental Issues
Negative environmental impacts of irresponsible forest practices can include:
- Forest destruction
- Wildlife habitat loss
- Soil erosion and stream sedimentation
- Water and air pollution
- Waste

#### Economic Issues
The cost varies widely with location and timing and is dependent primarily on supply and demand

<table>
<thead>
<tr>
<th>Phase</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team</td>
<td>Owner/Architect/Contractor</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

**Referenced Standards:**
- Forest Stewardship Council Principles and Criteria

---

**INDOOR ENVIRONMENTAL QUALITY**
Indoor Environmental Quality

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Environmental Quality</td>
<td></td>
</tr>
<tr>
<td><strong>IEQ Prerequisite 1</strong>: Minimum indoor Air Quality Performance</td>
<td>Required</td>
</tr>
<tr>
<td><strong>IEQ Prerequisite 2</strong>: Environmental Tobacco Smoke (ETS) Control</td>
<td>Required</td>
</tr>
<tr>
<td><strong>IEQ Credit 1</strong>: Outdoor Air Delivery Monitoring</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 2</strong>: Increased Ventilation</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 3.1</strong>: Construction Indoor Air Quality Management Plan-During Construction</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 3.2</strong>: Construction Indoor Air Quality Management-Before Occupancy</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 4.1</strong>: Low-Emitting Materials-Adhesives and sealants</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 4.2</strong>: Low-Emitting Materials-Paints and Coatings</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 4.3</strong>: Low-Emitting Flooring Systems</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 4.4</strong>: Low-Emitting Materials-Composite Wood and Agrifiber Products</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 5</strong>: Indoor Chemical and Pollutant Source Control</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 6.1</strong>: Controllability of Systems-Lighting</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 6.2</strong>: Controllability of Systems-Thermal Comfort</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 7.1</strong>: Thermal Comfort-Design</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 7.2</strong>: Thermal Comfort-Verification</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 8.1</strong>: Daylight and Views-Daylight</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>IEQ Credit 8.2</strong>: Daylight and Views-Views</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>Total Points Available in Indoor Environmental Quality</strong></td>
<td>15 points</td>
</tr>
</tbody>
</table>

Indoor Environmental Quality

**Intent:**
Enhance indoor air quality (IAQ) in buildings by establishing minimum IAQ performance.

**Requirements:**

- **Case 1: Mechanically Ventilated Space**
  - Meet minimum requirements of sections 4 through 7 of ASHRAE 62.1-2007 and the systems must be designed using the ventilation rate procedure or applicable local code.

- **Case 2: Naturally Ventilated Spaces**
  - Comply with ASHRAE 62.1-2007 Paragraph 5.1 with errata but without addenda.

**Strategies:**
Design ventilation systems to meet or exceed ASHRAE Standard 62.1-2007
IEQ Prerequisite 1: Minimum Indoor Air Quality Performance

<table>
<thead>
<tr>
<th>Points</th>
<th>NC Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Minimum indoor air quality performance in buildings improves occupant comfort, well-being, and productivity compared with buildings with poor IAQ performance.</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>In most cases, there are no construction or soft costs.</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Architect/ME/Owner/Tenants/Facility Manager/Maintenance</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:

IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

**Intent:**
To prevent, minimize and eliminate the exposure of building occupants, indoor surfaces and ventilation air distribution systems to environmental tobacco smoke (ETS).

**Requirements:**
Case 1 - All Projects
Option 1
i. Prohibit smoking inside.
ii. Prohibit smoking on the property within 25 feet from entries, outdoor air intakes and operable windows.
iii. Post signage for designated areas.

OR
Option 2
i. Prohibit smoking in the building except in designated smoking areas.
ii. Prohibit smoking on the property within 25 feet from entries, outdoor air intakes, and operable windows
iii. Post signage for designated areas.
iv. Designated smoking rooms must be designed to contain capture and remove ETS from the building.
IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Case 2 - Residential and Hospitality Projects Only
i. Prohibit smoking in all common areas.
ii. Locate designated smoking areas at least 25 feet from entries, outdoor air intakes and operable windows including balconies on which smoking is permitted
iii. Post signage for designated areas.
iv. Weather-strip all exterior doors and operable windows.

Strategies:
Prohibit smoking in commercial buildings.
For residential buildings:
▪ Prohibit smoking in common areas and design building envelope
▪ Minimize ETS transfer

Regional Variations:
Each state may have their own laws and regulations on smoking. Consult these laws before implementing a smoking policy.

IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>ETS contains thousands of different compounds, many of which are known carcinogens</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Eliminating smoking in the building will eliminate any added construction cost</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Facility Manager/Property Manager/Owner</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:
▪ American National Standards Institute (ANSI)/ASTM 779-03, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
▪ Residential manual for Compliance with California’s 2001 Energy Efficiency Standards (For Low Rise Residential Buildings), Chapter 4
IEQ Credit 1: Outdoor Air Delivery Monitoring

Intent:
Provide capacity for ventilation system monitoring to help promote occupant comfort and well-being

Requirements:
Install permanent monitoring systems and configure equipment to generate an alarm when CO₂ levels vary by 10% or more from the design values.

AND

Case 1. Mechanically Ventilated Spaces
i. Monitor CO₂ concentrations in all densely occupied spaces (25 people or more per 1,000 SF)
ii. CO₂ monitors must be between 3 and 6 feet above the floor
iii. Provide direct outdoor airflow measurement device that measures minimum outdoor air intake with an accuracy of +/-15% where 20% or more of the design supply airflow serves non-densely occupied spaces.

Case 2. Naturally Ventilated Spaces
i. Monitor CO₂ concentrations
ii. CO₂ monitors must be between 3 and 6 feet above the floor

IEQ Credit 1: Outdoor Air Delivery Monitoring

Strategies:
Install CO₂ and airflow measurement equipment so heating, ventilating and air conditioning and building automation system can trigger corrective action.

Regional Variations:
Ambient CO₂ concentrations may fluctuate between 300 and 530 ppm based on local and regional factors.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

| Environmental Issues | High concentrations of carbon dioxide can lead to headaches, dizziness and increased heart rate |
| Economic Issues      | In most cases, little construction or soft cost impact |
| Phase                | Design |
| Team                 | Mechanical Engineer |
| Timeline             | Schematic |

Referenced Standards:
Intent:
Provide outdoor air ventilation to improve IAQ and promote occupant comfort well-being and productivity.

Requirements:
Case 1. **Mechanically Ventilated Space**
Design system so that outdoor air ventilation rates exceed the minimum requirements of ASHRAE 62.1-2007 by at least 30%.

Case 2. **Naturally Ventilated Spaces**
Design natural ventilation systems for occupied spaces to meet the Carbon Trust “Good Practice Guide 237” or Chartered Institution of Building Services Engineers (CIBSE)

AND
Option 1

OR
Option 2
Use a macroscopic, multizone, analytic model to predict airflows defined by ASHRAE 62.1-2007 Chapter 6 (with errata but without addenda) for ≥ 90% of occupied spaces.

Strategies:
Use energy recovery in mechanically ventilated spaces to minimize the additional energy consumption. Design naturally ventilated spaces according to Carbon Trust Good Practice Guide 237.

- Develop design requirements
- Plan airflow paths
- Identify building uses and features that might require special attention
- Determine ventilation requirements
- Estimate external driving pressures
- Select types of ventilation devices
- Size ventilation devices
- Analyze the design
IEQ Credit 2: Increased Ventilation

<table>
<thead>
<tr>
<th>Points</th>
<th>NC 1 point</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Issues</strong></td>
<td>Americans spend about 80-90% of their time indoors, where concentrations of pollutants are often much higher than those outside</td>
</tr>
<tr>
<td><strong>Economic Issues</strong></td>
<td>Compliance with the credit can have a very small construction cost impact, but may significantly impact the operational cost of the facility, especially in areas where outside air temperature or humidity is high</td>
</tr>
<tr>
<td><strong>Phase</strong></td>
<td>Design</td>
</tr>
<tr>
<td><strong>Team</strong></td>
<td>Architect/ME/Owner/Tenants/Facility Manager/Maintenance</td>
</tr>
<tr>
<td><strong>Timeline</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

**Referred Standards:**
- Chartered Institute of Building Service Engineers (CIBSE) Applications Manual 10-2005, Natural Ventilation in Non-Domestic Buildings

IEQ Credit 3.1: Construction Indoor Air Quality Management Plan-During Construction

**Intent:**
Reduce indoor air quality (IAQ) resulting from construction or renovation and promote the comfort and well being of construction workers and building occupants

**Requirements:**
- Develop IAQ Management Plan that:
  i. Meets or exceeds the recommended control measure of the sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007 ANSI/SMACNA 008-2008 (Chapter 3).
  ii. Protects absorptive materials from moisture damage.
  iii. Installed air handlers must have filters with a Minimum Efficiency Reporting Value (MERV) of 8.
IEQ Credit 3.1: Construction Indoor Air Quality Management Plan—During Construction

Strategies:
- Protect the heating, ventilating and air conditioning (HVAC) system during construction
- Control pollutant sources
- Interrupt contamination pathways
- Sequence the installation of materials to avoid contamination of absorptive materials

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>NC</td>
</tr>
<tr>
<td>Issues</td>
<td>NC</td>
</tr>
<tr>
<td>Economic</td>
<td>NC</td>
</tr>
<tr>
<td>Issues</td>
<td>NC</td>
</tr>
<tr>
<td>Phase</td>
<td>NC</td>
</tr>
<tr>
<td>Team</td>
<td>NC</td>
</tr>
<tr>
<td>Timeline</td>
<td>NC</td>
</tr>
</tbody>
</table>

Reducing indoor air contaminants improves comfort levels, lowers absenteeism, and increases productivity.

The cost varies with location because in areas where IAQ management is widely used the costs are minimal but in other areas costs can be substantial.

Referenced Standards:
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ

IEQ Credit 3.2: Construction Indoor Air Quality Management Plan—Before Occupancy

Intent:
Reduce IAQ problems resulting from construction and renovation and promote comfort and well-being of construction workers and building occupants.

Requirements:
- Option 1. Flush-Out
  - Path 1
    After construction ends, prior to occupancy perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of \( \geq 60^\circ F \) and relative humidity no higher than 60%.
  - OR
    Path 2
    If occupied prior to construction, flush-out building with 3,500 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of \( \geq 60^\circ F \) and relative humidity no higher than 60%. Conditions must be maintained until 14,000 cubic feet per square foot of outside air has been delivered into the space.

- Option 2 Air Testing
  Conduct baseline IAQ testing after construction and prior to occupancy consistent with the EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air.
IEQ Credit 3.2: Construction Indoor Air Quality Management Plan—Before Occupancy

Regional Variations:
Flush-out options will vary by regions.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

Environmental Issues
Reducing indoor air contaminants improves comfort levels, lowers absenteeism, and increases productivity.

Economic Issues
The cost of flush out is usually minimal, in the range of $0.25 to $0.50/SF

Phase
Construction

Team
Contractor

Timeline
None

Referenced Standards:
- U.S. Environmental Protection Agency Compendium of Methods for the Determination of Air Pollutants in Indoor Air

IEQ Credit 4.1: Low-Emitting Materials—Adhesives and Sealants

Intent:
Reduce quantity of indoor containments that are **odorous, irritating**, and/or harmful to occupants and installers.

Requirements:
- Adhesives, sealants, and sealant primers must comply with South Coast Air Quality Management District (SCAQMD) Rule # 1168.
- Aerosol Adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36.

Strategies:
- Perform a building flush-out or test the air contaminant levels in the building
- Specify low VOC materials in construction documents
- Review product cut sheets, material safety data sheets (MSDS)
IEQ Credit 4.1: Low-Emitting Materials – Adhesives and Sealants

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

**Environmental Issues**
VOCs contribute to smog generation and air pollution as well as adversely affect the well-being of building occupants

**Economic Issues**
In most cases, this credit does not have a construction or soft cost impact

**Phase**
Construction

**Team**
Contractor/Subcontractors

**Timeline**
None

Referenced Standards:
- South Coast Air Quality Management District (SCAQMD) Amendment to South Coast Rule 1168, VOC Limits, effective January 7, 2005
- Green Seal Standard 36 (GS-36), effective October 19, 2000
- California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda

IEQ Credit 4.2: Low-Emitting Materials – Paints and Coatings

**Intent:**
Reduce quantity of indoor containments that are **odorous, irritating, and/or harmful to occupants and installers**

**Requirements:**
- Paints and coatings must comply with:
  - Architectural paints and coatings must not exceed VOC limits established in Green Seal Standard GS-11
  - Anti-corrosive and anti-rust paints must not exceed VOC limits of 250 g/l established in Green Seal Standard GC-03
  - Clear wood finishes, floor coatings, stains, primers, and shellacs must not exceed VOC limits established in the South Coast Air Quality Management District (SCAQMD) Rule 1113
IEQ Credit 4.2: Low-Emitting Materials – Paints and Coatings

Strategies:
- Perform a building flush-out or test the air contaminant levels in the building
- Specify low VOC materials in construction documents
- Review product cut sheets, material safety data sheets (MSDS)

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Issues
- VOCs contribute to smog generation and air pollution as well as adversely affect the well-being of building occupants

Economic Issues
- In most cases, this credit does not have a construction or soft cost impact

Phase
- Construction

Team
- Contractor/Subcontractors

Timeline
- None

Referenced Standards:
- Green Seal Standard GS-11 (GS-11 supersedes Green Seal Standard GC-03)
- South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings
- California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda

IEQ Credit 4.3: Low-Emitting Materials – Flooring Systems

Intent:
Reduce quantity of indoor containments that are **odorous, irritating, and/or harmful to occupants and installers**

Requirements:
Option 1

Flooring must comply with the following:
1. Carpet must meet the testing and product requirements of the Carpet and Rug Institute Green Label Plus Program.
2. Carpet cushion must meet the requirements of Carpet and Rug Institute Green Label Plus Program.
3. Carpet adhesive must meet the requirements of IEQ Credit 4.1: Adhesives and Sealants VOC's ≤ 50g/l.
4. Hard surface flooring must be certified as compliant with FloorScore.
5. Alternative compliance path using FloorScore is acceptable: 100% of non-carpet finished flooring must be FloorScore-certified and must constitute at least 25% of the finished floor area.
6. Concrete, wood, bamboo, and cork floor finishes must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1113.
7. Tile setting adhesives and grout must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1168.
IEQ Credit 4.3: Low-Emitting Materials – Flooring Systems

Option 2
All flooring elements must meet the testing and product requirements of the California Department of Health Services Standard Practice for the testing of Volatile Organic Emissions from various sources using small-scale environmental chambers including 2004 addenda.

Strategies:
- Perform a building flush-out or test the air contaminant levels in the building
- Specify low VOC materials in construction documents
- Review product cut sheets, material safety data sheets (MSDS)

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

Environmental Issues: VOCs contribute to smog generation and air pollution as well as adversely affect the well-being of building occupants

Economic Issues: In most cases, this credit does not have a construction or soft cost impact

Phase: Construction
Team: Contractor/Subcontractor
Timeline: None

Referenced Standards:
- Carpet and Rug Institute (CRI) Green Label Plus Testing Program
- South Coast Air Quality Management District (SAQMD) Rule 1168, VOC Limits
- South coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings
- FloorScore Program
- California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda
- State of California Standard 1350, Section 9, Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, Testing Criteria
Case Study: Coral Gables Museum

Intent:
Reduce quantity of indoor contaminants that are odorous, irritating, and/or harmful to occupants and installers

Requirements:
Interior composite wood and agrifiber products must contain no added urea-formaldehyde resins

IEQ Credit 4.4: Low-Emitting Materials – Composite Wood

<table>
<thead>
<tr>
<th>Composite Wood &amp; Agrifiber Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particleboard</td>
</tr>
<tr>
<td>Strawboard</td>
</tr>
<tr>
<td>Medium Density Fiberboard (MDF)</td>
</tr>
<tr>
<td>Panel Substrates</td>
</tr>
<tr>
<td>Plywood</td>
</tr>
<tr>
<td>Door Cores</td>
</tr>
<tr>
<td>Wheatboard</td>
</tr>
</tbody>
</table>
IEQ Credit 4.4: Low-Emitting Materials – Composite Wood

Strategies:
- Perform a building flush-out or test the air contaminant levels in the building
- Specify low VOC materials in construction documents
- Review product cut sheets, material safety data sheets (MSDS)

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
<th>1 point</th>
</tr>
</thead>
</table>

Environmental Issues
- VOCs contribute to smog generation and air pollution as well as adversely affect the well-being of building occupants

Economic Issues
- In most cases, this credit does not have a construction or soft cost impact

Phase
- Construction

Team
- Contractor/Subcontractors

Timeline
- None

Referenced Standards:
- California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda

IEQ Credit 5: Indoor Chemical and Pollutant Source Control

Intent:
Minimize occupant’s exposure to potentially hazardous particulates and chemical pollutants.

Requirements:
- Reduce the entry of pollutants indoors and cross-contamination through the following strategies:
  i. Install entryways at least 10 feet long in the primary direction of travel. Entryways include grates, grills and slotted systems that can be cleaned underneath. Roll-out mats may be used if maintained on a weekly basis.
  ii. Exhaust each space where hazardous gases or chemicals may be present and provide self-closing doors and deck to deck partitions or hard-lid ceilings. The exhaust rate must be 0.50 cubic feet per minute per square foot with no air recirculation. The pressure differential with surrounding spaces must be at least 5 Pascals (PA) (0.02 inches of water gauge) on average and 1 Pa (0.004 inches of water) at a minimum.
  iii. In mechanically ventilated buildings filters in rooms containing potentially hazardous particulates must provide a minimum efficiency reporting value (MERV) of 13 or higher.
  iv. Provide appropriate containment and disposal of hazardous wastes.
IEQ Credit 5: Indoor Chemical and Pollutant Source Control

Strategies:
- Isolate exhaust from cleaning and maintenance areas
- Install entry way systems to capture contaminants upon entry

Regional Variations:
Local weather conditions need to be taken into consideration.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>With proper operations and maintenance, harmful chemical spills and accidents can be avoided</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Minimal added costs</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Contractor</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:

IEQ Credit 6.1: Controllability of Systems – Lighting

Intent:
Provide high level of control of lighting systems to promote productivity, comfort and well-being.

Requirements:
1. Provide lighting controls for 90% of the building occupants
2. Provide lighting system controls for all shared multi-occupant spaces

Strategies:
Design the building with occupant lighting controls to improve productivity by providing both ambient and task lighting.

Regional Variations:
Regions with strong sunlight may use less artificial lighting by day but require greater controllability in their lighting systems.
IEQ Credit 6.1: Controllability of Systems – Lighting

<table>
<thead>
<tr>
<th>Points</th>
<th>NC 1 point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Lighting controls increase occupants comfort</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Cost impact comes from enhanced lighting controls</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Owner/Lighting Designer</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:
None

IEQ Credit 6.2: Controllability of Systems – Thermal Comfort

Intent:
Provide high level of control of thermal comfort to promote productivity, comfort and well-being.

Requirements:
1. Provide individual comfort controls for 50% of the building occupants.
   OR
1. Operable windows may be used in lieu of controls for occupants located 20 feet inside and 10 feet to either side of the operable part of a window
   ii. Provide comfort system controls for all shared multi-occupant spaces

Strategies:
- Design the building and system to meet ASHRAE Standard 55-2004 (with errata but without addenda).
- Incorporate operable windows and when possible integrate with the mechanical system.
- Individual controllability may be facilitated by installing individual thermostat controls, local diffusers below desks or overhead, or control of individual radiant panels.
IEQ Credit 6.2: Controllability of Systems – Thermal Comfort

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

**Environmental Issues**
- Providing temperature controls increases occupant comfort

**Economic Issues**
- Costs can be fairly high in areas where there are single occupant controls

**Phase**
- Design

**Team**
- Property Management/Building Engineers

**Timeline**
- None

**Referenced Standards:**

**IEQ Credit 7.1: Thermal Comfort – Design**

**Intent:**
- Provide comfortable thermal environment that promotes occupant productivity and well-being.

**Requirements:**
- Design HVAC systems and the building envelope to meet the requirements of ASHRAE Standard 55-2004 Thermal Environmental Conditions for Human Occupancy (With errata but without addenda)

**Strategies:**
- Evaluate air temperature, radiant temperature, air speed and humidity when designing the building.

**Regional Variations:**
- Climate and seasonal variations can affect thermal comfort levels.
IEQ Credit 7.1: Thermal Comfort – Design

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
<tr>
<td>Environmental Issues</td>
<td>People who are comfortable are more productive and happier</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Most projects meet the requirements without any added costs</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Occupants</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards:
- Chartered Institute of Building Services Engineers (CIBSE) Applications Manual 10-2005, Natural Ventilation in Non-Domestic Buildings
- ASHRAE HVAC Applications Handbook, 2003 edition, Chapter 4 (Places of Assembly), Typical Natatorium Design Conditions

IEQ Credit 7.2: Thermal Comfort – Verification

Intent:
Provide assessment for occupant comfort over time.

Requirements:
Survey building occupants within 6 to 18 months after occupancy. Corrective action must be taken if more than 20% of the occupants are dissatisfied with thermal comfort in the building.

AND
Provide permanent monitoring system to ensure building performance meets the desired comfort criteria as determined by IEQ Credit 7.1 Thermal comfort – Design.

Note: Residential projects are not eligible for this credit.

Strategies:
Conduct a survey to ensure that at least 80% of the occupants are comfortable.

Regional Variations:
Climate and seasonal variations can affect thermal comfort levels.
IEQ Credit 7.2: Thermal Comfort – Verification

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental Issues</td>
</tr>
<tr>
<td></td>
<td>Economic Issues</td>
</tr>
<tr>
<td></td>
<td>Phase</td>
</tr>
<tr>
<td></td>
<td>Team</td>
</tr>
<tr>
<td></td>
<td>Timeline</td>
</tr>
</tbody>
</table>

Referenced Standards:

IEQ Credit 8.1: Daylight and Views – Daylight

Intent:
- Provide building occupants connection between indoor spaces and the outdoors through the introduction of daylight and views in regularly occupied spaces.

Requirements:
- Option 1: Simulation
  - Demonstrate through computer simulation 75% or more of all regularly occupied spaces achieve daylight illuminance levels of a minimum of 25 footcandles (fc) and a maximum of 500 fc in a clear sky condition on September 21 at 9am and 3 pm
- Option 2: Prescriptive
  - Refer to reference guide (page 550) for Side-lighting zone and Top-lighting Daylighting Zone
- Option 3: Measurement
  - Demonstrate that a minimum daylight illumination level of 25 fc has been achieved in at least 75% (1point) or 90% (2points) of all regularly occupied areas
- Option 4: Combination
  - Any of the above calculation methods may be combined to document the minimum daylight illumination in at least 75% (1point) or 90% (95%) (2 points) of all regularly occupied spaces.
IEQ Credit 8.1: Daylight and Views – Daylight

Strategies:

Maximize interior daylighting:
- Consider building orientation Design the building with shallow floor plates
- Increase building perimeter Utilize exterior and interior permanent shading devices
- Utilize high-performance glazing Specify ceiling materials with high reflectance values Install automatic photocell-based controls.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Issues
- A well-designed day lit building is estimated to reduce lighting energy use by 50% to 80%

Economic Issues
- Costs for high performance glazing and/or increased glazing opening sizes can range from minimal to significant

Phase
- Design

Team
- Owner/Architect/Civil Engineer/Landscape Architect

Timeline
- Schematic

Referenced Standards:
- ASTM D1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics

Case Study: Coral Gables Museum

[Image of Coral Gables Museum]
IEQ Credit 8.2: Daylight and Views – Views

Intent:
Provide building occupants connection between indoors and the outside through the introduction of daylight and views in regularly occupied spaces

Requirements:
- Achieve a direct line of sight to the outdoor environment through vision glazing between 30 inches and 90 inches above the finish floor for building occupants in 90% of all regularly occupied areas.
- For private offices, the entire square footage of the office maybe counted if 75% or more of the area has a direct line of sight to perimeter vision glazing.
IEQ Credit 8.2: Daylight and Views – Views

Strategies:
Maximize views by installing:
- Lower partitions
- Interior shading devices
- Interior glazing
- Automatic photocell-based controls

Regional Variations:
Visual appeal of exterior environment affects the subjective quality of views.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Issues</th>
<th>Allows occupants to maintain a visual connection to the surrounding environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Issues</td>
<td>Costs are minimal to moderate</td>
</tr>
<tr>
<td>Phase</td>
<td>Design</td>
</tr>
<tr>
<td>Team</td>
<td>Architect/Civil Engineer/Landscape Architect/Design Team</td>
</tr>
<tr>
<td>Timeline</td>
<td>Schematic</td>
</tr>
</tbody>
</table>

Referenced Standards:
None

**Innovation in Design**
### Innovation in Design

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation in Design</td>
<td>NC</td>
</tr>
<tr>
<td><strong>ID Credit 1</strong>: Innovation in Design</td>
<td>1-5 points</td>
</tr>
<tr>
<td><strong>ID Credit 2</strong>: LEED® Accredited Professional</td>
<td>1 point</td>
</tr>
<tr>
<td><strong>Total Points Available in Innovation in Design</strong></td>
<td>6 points</td>
</tr>
</tbody>
</table>

### Intent:
Provide opportunity to achieve *exceptional* performance and/or *innovative* performance that is not specifically addressed by the LEED System.

### Requirements:
**Path 1. Innovation in Design (1-5 points NC)**
- One point is awarded for each innovation achieved.
- Identify in writing:
  i. Intent of the proposed innovation credit
  ii. Proposed requirements for compliance
  iii. Proposed submittals to demonstrate compliance
  iv. Design approach (strategies) used to meet the requirements

**Path 2. Exemplary Performance (1-3 points)**
- An exemplary performance point may be earned for achieving double the credit requirements and/or achieving the next incremental threshold for an existing credit.
- One point is awarded for each exemplary performance achieved.

---

### ID Credit 1: Innovation in Design

**Intent:**
- Provide opportunity to achieve *exceptional* performance and/or *innovative* performance that is not specifically addressed by the LEED System.

**Requirements:**
- **Path 1. Innovation in Design (1-5 points NC)**
  - One point is awarded for each innovation achieved.
  - Identify in writing:
    i. Intent of the proposed innovation credit
    ii. Proposed requirements for compliance
    iii. Proposed submittals to demonstrate compliance
    iv. Design approach (strategies) used to meet the requirements

- **Path 2. Exemplary Performance (1-3 points)**
  - An exemplary performance point may be earned for achieving double the credit requirements and/or achieving the next incremental threshold for an existing credit.
  - One point is awarded for each exemplary performance achieved.
**ID Credit 1: Innovation in Design**

**Strategies:**
- Double or go to the next increment on a LEED credit.

**Examples Include:**
- Educational Outreach Program
- Green Housekeeping
- High Volume Fly Ash
- Low-Emitting Furniture and Furnishings
- Organic Landscaping
- Integrated Pest Management

ID credits are evaluated on a project by project basis. A previous award does not guarantee achievement on a future project.

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-5 points</td>
</tr>
<tr>
<td>Environmental Issues</td>
<td>Varies</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Varies</td>
</tr>
<tr>
<td>Phase</td>
<td>Design/Construction</td>
</tr>
<tr>
<td>Team</td>
<td>Varies</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

**ID Credit 2: LEED Accredited Professional**

**Intent:**
- Support and encourage a streamlined application and certification process.

**Requirements:**
- At least 1 principal participant of the project must be a LEED Accredited Professional.

**Strategies:**
- Educate the project team members about green building design and construction, the LEED requirements, and the application process.

**Regional Variations:**
- None
**ID Credit 2: LEED Accredited Professional**

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 point</td>
</tr>
</tbody>
</table>

**Environmental Issues**
LEED APs have the expertise required to design a building to LEED standards and to coordinate the documentation process that is necessary for LEED certification.

**Economic Issues**

<table>
<thead>
<tr>
<th>Phase</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team</td>
<td>N/A</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

**Referenced Standards:**
- LEED Accredited Professional, Green Building Certification Institute

**REGIONAL PRIORITY**
Regional Priority

<table>
<thead>
<tr>
<th>Prerequisite/Credit</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGIONAL PRIORITY</td>
<td></td>
</tr>
<tr>
<td>RP Credit 1: Regional Priority</td>
<td>1-4 points</td>
</tr>
<tr>
<td>Total Points Available in Regional Priority</td>
<td>4 points</td>
</tr>
</tbody>
</table>

Intent:
Provide an incentive for achievement of credits that address geographically specific environmental priorities.

Requirements:
- One point is awarded for each Regional Priority credit
- No more than 4 credits may be earned
- Projects outside of the U.S. are not eligible for Regional Priority credits.

Refer to the database of Regional Priority credits and their geographic applicability on the USGBC website [www.USGBC.org](http://www.USGBC.org).

Strategies:
- Pursue the credits of regional importance.

Regional Variations:
- Varies
RP Credit 1: Regional Priority

<table>
<thead>
<tr>
<th>Points</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Issues</td>
<td>Varies</td>
</tr>
<tr>
<td>Economic Issues</td>
<td>Varies</td>
</tr>
<tr>
<td>Phase</td>
<td>None</td>
</tr>
<tr>
<td>Team</td>
<td>Varies</td>
</tr>
<tr>
<td>Timeline</td>
<td>None</td>
</tr>
</tbody>
</table>

Referenced Standards: Varies

NCPTT Case Study: LEED for Existing Building Operations & Maintenance
Village of Natchez Case Study: LEED for Neighborhood Development

Wrap-Up
Additional Resources

- LEED Accreditation
  - 1 Practice Exam with Answer Key
  - LEED BD&C Summary (11”x17”)
  - LEED EBOM Summary (11”x17”)
- Other
  - www.greenexamprep.com

Contact Info:
Donna Isaacs
e: dlisaacs@ufl.edu
p: 318-379-4515
P.O. Box 372,
Natchez, LA 71456