

Comprehensive Study Guide for LEED® 2.1 AP Exam Preparation

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LEED® Products

- LEED® NC New commercial Construction and Major Renovations
- LEED® EB Existing Buildings
- LEED® CI Commercial Interiors
- LEED® CS Core and Shell - Pilot
- LEED® H Homes - Pilot
- LEED® ND Neighborhood Development - Pilot
- LEED® Application Guides for retail, campuses, schools, healthcare, laboratories and lodging.

Project Registration

- Establishes contact with USGBC
- Provides access to important information, LEED® On-Line and software tools
- Provides communication with USGBC
- Registration should occur during the early phases of the project.

Design Review

- To occur at 100% completion of Construction Documents.
- Items designated as Design Credits can be submitted for Design Review. Upon review, the USGBC will mark each credit as anticipated or denied.
- No award of certification or building ratings are given at this time.

Construction Submittal and Certification Award

- Occurs when construction is completed and all documentation has been assembled.
- Is online, paperless, includes letter templates, documentation and payment.
- Offline submittals require 2 copies of all required application materials, assembled in 3-ring binders.
- The remaining credits not submitted during the Design Review can be submitted at this time.
- Denied credits can be resubmitted and any accepted credits that have changed since the Design Review must be resubmitted.
- Within 30 days of administrative approval, USGBC Technical Staff will issue the Preliminary LEED® Review Document which identifies:
 - Anticipated credit achievement
 - Pending credits.
 - Denied credits.
 - Audited items chosen from prerequisites and credits.
 - Up to 6 items can be chosen.
 - If two or more audited items are denied additional items may be selected for a second audit and could prompt a second Preliminary LEED® Review before the project can proceed to Final LEED® Review.
- USGBC Steering Committee is responsible for certification of LEED® Registered Projects.
- The project team has 30 days to respond to the Preliminary LEED® Review. They can provide corrections, additional supporting documents, calculations cut sheets to support their response.
 - The Final LEED® Review will be conducted within 3 weeks of receiving the re-submittal.
 - The project contact will be notified of the certification status.
 - The project team then has 30 days to accept or appeal the awarded certification.
 - Appeal fee is \$500.
 - If the project team accepts the LEED® Certification, it becomes final and the following is sent to the project contact:
 - Award Letter
 - Certificate
 - Metal LEED® Plaque

FEES

Registration Cost

Member USGBC	\$450
Non-Member	\$600

Design Review Cost

	Less than 50,000 SF	50,000 SF – 500,000 SF	Greater than 500,000 SF
Member USGBC	\$1,250	.025 / sf	\$12,500
Non-Member	\$1,500	.03 / sf	\$15,000

Construction Review

	Less than 50,000 SF	50,000 SF – 500,000 SF	Greater than 500,000 SF
Member USGBC	\$500	.01 / sf	\$5,000
Non-Member	\$750	.015 / sf	\$7,500

Combined Design and Construction Reviews

	Less than 50,000 SF	50,000 SF – 500,000 SF	Greater than 500,000 SF
Member USGBC	\$1,700	.035 / sf	\$17,000
Non-Member	\$2,250	.0455 / sf	\$22,500

Costs current as of April 1, 2005, verify with USGBC website to confirm.

Credit Interpretation Request (CIR)

- Process for project applicants to ask technical and administrative questions about LEED® Credits.
- Does not award credits and does not guarantee the credit will be awarded.
- Are submitted online and are \$220 each. There are no freebies.
- Will not change language or requirements of a credit or prerequisite.
- CIR inquiry and ruling to be submitted with LEED® Application.
- CIR will be forwarded to relevant Technical Advisory Group if it concerns a broad reaching policy issue.
- Prior to submitting a CIR:
 1. Review question against intent of credit or prerequisite. Does the issue meet the intent?
 2. Review LEED® Reference Guide, it has more in-depth information and could provide the answer to the question.
 3. Review the CIR's online to determine if the same or relevant question has already been asked.
- When submitting a CIR do not:
 - List credit name
 - Include contact information
 - Include confidential project details.
 - Format CIR as a letter
- When submitting a CIR be sure to:
 - Give only essential information
 - Request guidance for only one credit or prerequisite
 - Be succinct.

LEED® Letter Template

- Used as a tally for LEED® Credits.
- Added in LEED® 2.1.

Unites States Green Building Council (USGBC)

Membership:

- Only companies can belong to USBGC.
- Only individuals can belong to local chapters.

Benefits

- Access to USGBC Publications.
- Discounts for LEED® Training, LEED® AP Exam, conferences and project registration and certification.

LEED® Categories

Sustainable Sites

Water Efficiency

Energy and Atmosphere

Materials and Resources

IEQ

Innovation and Performance

Certification Levels

Certified	26 to 32
Silver	33 to 38
Gold	39 to 51
Platinum	52 to 69

Prerequisites

Erosion and Sediment Control

Fundamental Commissioning

Minimum Energy Performance

CFC reduction in HVACR Equipment

Collection and Storage of Recyclables

Minimum IAQ Performance

ETS Control

Sustainable Sites – 1 Prerequisite, 8 Credits, 14 Points

SS P1 Erosion and Sedimentation Control

SS 1	Site Selection.....	1
SS 2	Density Development	1
SS 3	Brownfield Redevelopment.....	1
SS 4	Alternative Transportation	4
SS 5	Reduced Site disturbance	2
SS 6	Stormwater Management	2
SS 7	Heat Island Effect	2
SS 8	Light Pollution Control	1

Water Efficiency – 0 Prerequisite, 3 Credits, 5 Points

WE 1	Water Efficient Landscaping.....	2
WE 2	Innovative Wastewater Technologies.....	1
WE 3	Water Use Reduction	2

Energy and Atmosphere – 3 Prerequisites, 6 Credits, 17 Points

EA P1 Fundamental Commissioning
 EA P2 Minimum Energy Performance
 EA P3 CFC Reduction in HVACR Equipment

EA 1	Optimized Energy Performance	10
EA 2	Renewable Energy	3
EA 3	Additional Commissioning	1
EA 4	Ozone Depletion.....	1
EA 5	Measurement and Verification.....	1
EA 6	Green Power.....	1

Materials and Resources – 1 Prerequisite, 7 Credits, 13 Points

MR P1 Collection and Storage of Recyclables

MR1	Building Reuse	3
MR2	Construction Waste Management	2
MR3	Resource Reuse	2
MR4	Recycled Content	2
MR5	Local / Regional Materials	2
MR6	Rapidly Renewable Materials	1
MR7	Certified Wood	1

IEQ (Indoor Environmental Quality) – 2 Prerequisites, 8 Credits, 15 Points

IEQ P1 Minimum IAQ Performance

IEQ P2 ETS Control

EQ 1	CO2 Monitoring	1
EQ 2	Ventilation Effectiveness	1
EQ 3	Construction IAQ Performance	2
EQ 4	Low Emitting Materials	4
EQ 5	Indoor Chemical & Pollutant Source Control..	1
EQ 6	Controllability of Systems	2
EQ 7	Thermal Comfort	2
EQ 8	Daylight and Views	2

Innovation and Design – 0 Prerequisites, 2 Credits, 5 Points

ID 1 Innovation in Design

ID2 LEED® AP

Sustainable Sites

SS P1 Erosion and Sedimentation Control

Intent

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

Requirements

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

Required Submittal

LEED® Letter, list of actions used to followed EPA Standard

Referenced Standard

EPA - Storm Water Management for Construction Activities

Strategies

- Erosion Control Plan
- Use of temporary and permanent seeding mulching, earth dikes, silt fencing sediment raps and sediment basins for temporary and permanent erosion and sediment control.

Definitions and Terms

1. Erosion - being worn away thru natural action.
2. Sedimentation: Addition of soil to bodies of water thru natural and human activities. Sedimentation decreases the quality of water and accelerates the aging process of these bodies of water.
3. EPA – Environmental Protection Agency

Erosion Control Plan to include:

- Statement of erosion and stormwater control objectives.
- Comparison of pre and post- development stormwater runoff conditions.
- Description of required maintenance required to maintain the implemented methods of erosion and sedimentation control.

Technologies for Controlling Erosion & Sedimentation

- Stabilization: Temporary Seeding, Permanent Seeding, Mulching.
- Structural Control: Earth Dike, Silt Fence, Sediment Trap, Sediment Basin.

SS 1 Site Selection

Intent

Avoid development of inappropriate sites.

Requirements

Do not develop buildings, roads or parking areas on portions of sites that meet any one of the following criteria:

- The site is not Prime Farmland.
- The lowest site elevation is at least 5 feet above the current 100-year flood as defined by FEMA.
- The site is not home to any species on the Federal or State threatened or endangered list.
- The site is not within 100 feet of any wetlands.
- The site is not public parkland.

Required Submittal

LEED® Letter.

Referenced Standards

- U.S. Department of Agriculture Definition of Prime Agricultural Lands as stated in United States code of Federal Regulations.
- FEMA 100-Year Flood Definition – Flood elevation that has a 1% chance of being reached or
- Endangered Species Lists
- Definition of Wetlands in the United States of Federal Regulations, 40 CFR, Parts 230-233, and Part 22.

Strategies

- Give preference to sites without sensitive site elements or restrictive land types.
- Minimize building footprint.
- Utilize stacking building program, tuck-under parking or share facilities with neighboring properties.

Definitions and Terms

1. Ecosystem is an ecological unit consisting of complex community of organisms.

2. Endangered Species are animal or plant species in danger of becoming extinct though all or significant portion of its range due to harmful human activities or environmental factors.
3. Threatened Species are animal or plant species that are likely to become endangered with the foreseeable future.
4. Wetland Vegetation consists of plants that require saturated soils to survive as well as certain tree and other plant species that can tolerate prolonged we soil conditions.
5. NRDC (National Resources Defense Council) protects wildlife and wild places.
6. Urban Land Institute is an organization that promotes responsible use of land to enhance the environment.
7. FEMA – Federal Emergency Management Agency.

SS 2 Density Development

Intent

Continue the development of urban areas with existing infrastructure.

Requirements

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

Required Submittal

LEED® Letter, area plan, density of project and surrounding area.

Referenced Standard

None

Strategies

- Give preference to urban sites, during site selection.

Definitions and Terms

1. Greenfield is undeveloped land or land that has not been impacted by human activity.
2. Property Area is the legal property boundary of a project , includes all of the site including constructed areas and non-constructed areas. Site Area is the same as Property Area
3. Square Footage is the total area of a building inclusive of corridors, elevators, stairwells and shaft spaces.

Calculations

Required Information: Building square foot, site area, square footage of buildings and sites within Density Radius.

Site Density: $\text{Building (sf)} / \text{Site (acre)} = \text{Density of Development (sf per acre)}$

The average building density of the surrounding area has to be equal or greater than 60,000 square feet per acre to qualify for this credit.

Calculations are based on the densities of the sites surrounding the project, not the density of the project site.

SS 3 Brownfield Redevelopment

Intent

Rehabilitate damaged sites.

Requirements

Develop on a site classified as a brownfield and effectively remediate site contamination.

Required Submittal

LEED® letter plus a letter from local regulatory agency or regional EPA office or Phase II Environmental Site Assessment.

Referenced Standard

- ASTM E1903-97 Phase II Environmental Site Assessment
- EPA Brownfields Definition

Strategies

- Give preference to brownfield sites during Site Selection.
- Identify any tax incentives or property cost savings because site is a brownfield.
- Remediate site.

Definitions and Terms

1. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), is a tax on chemical and petroleum industries and allows federal authorities to respond to the releases of hazardous substances into the environment. Also known as Superfund.
2. RCRA stands for Resource Conservation and Recovery Act. This act gave the EPA the authority to control hazardous wastes from cradle to grave including generation, transportation treatment storage and disposal. There are some non-hazardous wastes also covered under this act.
3. Remediation is the process of cleaning up site contaminants.
4. Bioremediation is the treatment of pollutants or waste by the use of microorganisms and vegetation to break down undesirable substances in the soil and water.
5. Ex-Situ Remediation is the removal of contaminated soil and ground water to another location for treatment. In-Situ treats the contaminated soil and ground water in place.
6. Risk Assessment is a methodology used to evaluate for potential health effects caused by contaminants in the environment. Information from the risk assessment is used to determine cleanup levels.
7. Site Assessment is an evaluation of above ground (including facilities) and subsurface characteristics, including the geology and hydrology of the site, to determine if a release has occurred, as well as the extent and concentration of the release. Information generated during a site assessment is used to support remedial action decisions.
8. The term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.
9. ASTM – American Society for Testing and Materials.

SS 4 Alternative Transportation

Intent

Reduce automobile use to reduce pollution and associated land development issues.

Requirements

4.1 Public Transportation Access: Public Transportation, ½ Mile to Rail or ¼ mile to two bus lines, as a pedestrian would walk.

Required Submittal

LEED® Letter plus drawing or transit map showing building location, rail station or bus stops and distances to the building.

4.2 Bicycle Storage & Changing Rooms: Bicycle Storage and showers for 5% of building occupants, locate within 200 yards of building. Residential – bicycle storage for 15% of building occupants, shower facilities not required.

Required Submittal

4.3 Alternative Fuel Vehicles: Alternative Fuel Station and parking for 3% of vehicle parking capacity.

Required Submittal

LEED® Letter and proof of ownership or lease of alternative fuel vehicles. Site drawings or parking plan.

OR

LEED® Letter, specifications and site drawings and calculations.

4.4 Parking Capacity: Parking Capacity existing – no increase in parking, new – meet only minimum parking requirements, plus provide preferred parking for car/vanpools for 5% of building occupants.

Required Submittal

LEED® Letter, design narrative, parking plan, company literature demonstrating carpool, and a copy of local zoning requirements.

Referenced Standard

None

Strategies

- Determine if mass transportation meets the needs of the buildings occupants.
- Utilize existing transportation networks before creating new lines of transportation.
- Utilize existing mass transit stops by providing direct, safe sidewalks and paths.
- Encourage carpooling by providing preferred parking to HOV.
- Provide refueling stations for alternative fuel vehicles.

Definitions

1. AFV - Alternative Fuel Vehicles, are vehicles that use low-polluting, non-gasoline fuels. Fuels in this group include: electricity, hydrogen, propane or compressed natural gas, liquid natural gas, methanol, ethanol. Efficient gas-electric hybrid vehicles are also considered AFV's.
2. FTE – Full Time Equivalent Building Occupants.
3. HOV – High Occupancy Vehicle, carpool.

SS 5 Reduced Site disturbance

Intent

Conserve natural areas and restore damaged areas.

Requirements

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

Required Submittal

New Site: LEED® letter, site drawings and specifications showing limits of construction disturbance.

Existing Site: LEED® Letter, site drawings with area calculations showing 50% of site area that does not fall within building footprint has been restored.

5.2 Development Footprint: Reduce the development footprint (defined as entire building footprint, access roads and parking) to exceed the local zoning's open space requirement for the site by 25%. For areas with no local zoning requirement (e.g., some university campuses and military bases), designate open space area adjacent to the building that is equal to the development footprint.

Required Submittal

Areas with zoning: LEED® letter, copy of local zoning requirements showing criteria for open space.

Areas without zoning: Letter from owner stating that open space will be equal to development footprint and will be conserved for the life of the building.

Referenced Standard

None

Strategies

- Document existing site conditions including ecosystems, soil types, wildlife corridors, trees, vegetation and potential natural hazards.
- Prepare master plan for development of site.
- Minimize site disturbance thru location and size of building footprint.
- Establish clearly marked construction and disturbance boundaries on CD's. On site, mark tree protection, lay down, recycling and disposal areas. Use paved areas for staging.
- Stack building program, tuck-under (stacked) parking/or and sharing facilities with neighbors.
- Credit 5.2: for areas that have no established zoning requirements for open space, the project must show an open space adjacent to the building that is equal to the size of the building footprint.

Definitions

1. Building Footprint is the area of the site used by the building structure. Parking lot, landscaping, and non-building related structures are not included in the area considered the building footprint.
2. Open Space is the property area minus the development foot print. Open space is to be vegetated and pervious to provide habitat and other ecological benefits.
3. Development Footprint is the area of project impacted by development, includes building footprint, roads, parking lots and non-building related structures.
4. Pervious and permeable surfaces both allow fluid to pass thru or penetrate.

SS 6 Stormwater Management

Intent

Manage stormwater runoff to limit disruption and pollution of natural water flows.

Requirements

6.1 Rate and Quantity

- Storm Water Management Plan to have no net increase in the rate and quantity of stormwater runoff between existing and developed conditions.

OR

- If existing imperviousness is greater than 50%, decrease rate and quantity of runoff by 25%.

Required Submittal

LEED® Letter and calculations.

6.2 Treatment

Stormwater treatment system to remove 80% TSS and 40% TP, based on 2-year/24-hour storm.

Required Submittal

LEED® Letter.

Referenced Standard

Best Management Practices (BMP) - Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (Document No. EPA-840-B-92-002).

Strategies:

- Reduce amount of impervious area to maintain natural stormwater flows and promote infiltration.
- Capture stormwater from impervious areas for reuse.
- Provide vegetative swales for stormwater runoff rather than structured pipes.
- Create water ponds, retention areas, to temporarily store or delay storm water runoff.
- Design mechanical and natural treatment for site stormwater.

Definitions:

1. Constructed Wetland is an engineered system designed to simulate natural wetland functions for water purification. Constructed wetlands are essentially treatment systems that remove contaminants from wastewaters.
2. Total Phosphorous (TP) are organically bound phosphates, poly-phosphates and orthophosphates in storm water. Most phosphorous found in storm water is from fertilizer.
3. Total Suspended Solids (TSS) are particles too small or light to be removed from stormwater by gravity and require filtration.
4. Living Machine is a wastewater treatment system that utilizes natural bioremediation processes, such as wetlands.

Calculations

Types of surface at site, i.e. roof, pavement, landscape, etc.
 Areas of each surface type, and the runoff coefficient of each.
 (Area X Runoff Coefficient) / Total Area = % Impervious Area

Additional Information

Constructed wetlands, vegetated filter strips and bioswales are acceptable methods to treat site stormwater.

SS 7 Heat Island Effect

Intent

Reduce heat islands to minimize the impact on microclimate, human and wildlife habitat.

Requirements

7.1 Non-Roof

- Within 5 years 30% of non-roof impervious areas to be shaded.

OR

- Use high albedo materials for 50% for 30% of non-roof impervious areas, albedo .3.

OR

- Use open-grid pavement for at least 50% of parking lot. Open-grid paver to be less than 50% open.

Required Submittal

LEED® Letter and site plan showing paving, landscaping and building footprint.

7.2 Roof

- 75% of roof to be Energy Star, low emissive. Reflectance at least .65, three year aged .5.

OR

- 50% to be green roof.

Required Submittal

LEED® Letter and building plan showing high-albedo and vegetated roof areas.

Referenced Standard

ASTM E408-71(1996)e1 – Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection–Meter Techniques.

ASTM E903-96 – Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.

Strategies

- Shade roof, roads, sidewalks and other constructed surfaces with landscape features.
- Minimize building footprint.
- Replace constructed with permeable surfaces such as green roofs, open grid paving or used high-albedo materials.
- Use EnergyStar compliant roofing products (high albedo).
- Vegetative Roof.

Definition

1. Heat Island – thermal gradient difference between developed and undeveloped areas.
2. Albedo – Synonymous with solar reflectance – the measure of a surfaces ability to reflect sunlight.
4. Energy Star is a program that allows voluntary partnership between US Department of Energy, US EPA, product manufacturers, local utilities and retailers.
4. Pervious materials permit passage of water.
5. Porous – having small holes.
6. Emittance is the measure of a surface to emit radiant (thermal) energy.
7. Vegetative Roof – green roof.

Calculations

- Area of non-roof impervious areas.
- Shaded non-roof impervious areas of site on June 21st.
- Total parking lot area, including driving lanes, but excluding underground or stacked parking and sidewalks.
- Area of parking that has pervious paving.

Additional Information

The temperature in urban areas as compared to rural areas can be artificially elevated by 10 degrees due to heat island effect.

SS 8 Light Pollution Control

Intent

Eliminate light trespass from building and site.

Requirements

Meet or provide lower light levels and uniformity ratios than recommended by the IESNA.

- Exterior lighting with over 1,000 lumens are to be shielded.
- All lighting with over 3,500 lumens to have full cutoff.
- Interior lighting cannot shine thru windows.
- Exterior lighting cannot shine across property line.

Required Submittal

LEED® Letter.

Referenced Standard

IESNA Recommended Practice Manual: Lighting for Exterior Environments (IESNA RP-33-99)

Strategies

- Eliminate Unshielded Fixtures (flood Lights) on project site.
- Minimize or eliminate site lighting.
- Lighting professional to review project lighting needs.

- Comply with local and regional lighting ordinances or bylaws applicable to the design of project site lighting.
- Computer modeling
- Commissioning of lighting system once it is constructed.

Definitions

1. IESNA - Illuminating Engineering Society of North America.
2. Cutoff Angle is the angle formed by a line drawn from the direction of the direct light rays at the light source with respect to the vertical, beyond which no direct light is emitted.
3. Full Cutoff Fixture is a lamp and fixture assembly designed with a cutoff angle of 90°, so that no direct light is emitted above a horizontal plane. Technical description: Zero candela intensity at, or above, horizontal (90° above nadir). Also, candela intensity at 80° above nadir not to exceed a value equal to 10% of lamp lumens. Sometimes called "fully shielded"
4. Illuminance is the amount of light falling on a surface. Can be measured in foot-candles (fc) or lux (lx)
5. Footcandle is a measurement of illumination where one unit is equal to the light of a candle at a distance of one foot.
6. Glare is light emitted from a luminaire with an intensity great enough to produce annoyance, discomfort, or a reduction in a viewer's ability to see.
7. Light Pollution - All adverse effects of man-made light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and wasted energy.
8. Light Trespass is the shining of direct light produced by a luminaire beyond the boundaries of the lot or parcel on which it is located. Obtrusive, unwanted, light due to quantity, direction or spectrum attributes. Light trespass causes annoyance, discomfort, distraction or loss of visibility.
9. Luminance is the amount of visible *light* leaving a point on a surface in a given direction. This "surface" can be a physical surface or an imaginary plane, and the light leaving the surface can be due to reflection, transmission, and/or emission
10. Lumen is a measure of light energy generated by a light source. One foot candle is one lumen per square foot.
11. Shielding is part of a luminaire or lamp designed to limit glare, light trespass and/or light pollution.

Water Efficiency

WE 1 Water Efficient Landscaping

Intent

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

Requirement

1.1 Reduce by 50%: Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.

Required Submittal

LEED® Letter plus brief narrative of equipment used and / or the use of drought tolerant or native plants.

1.2 No Potable Use or No Irrigation: Site irrigation use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water, OR, do not install permanent landscape irrigation systems.

Required Submittal

LEED® Letter plus brief narrative of captured rain system, recycled site water system and their holding capacity. Plant species list. Calculations showing irrigation requirements can be met by recaptured rain or site water.

OR

LEED® Letter plus narrative describing how the landscape design meets the criteria for this credit.

Referenced Standard

None

Strategies

- Specify plant most suitable for site conditions.
- Develop landscaping water use baseline.
- Employ integrated pest management, mulching, alternative mowing and composting to maintain plant health, conserve water and foster optimal soil conditions.
- Utilize high-efficiency irrigation system or use stormwater and / or greywater for irrigation.

Definitions and Terms

1. Blackwater is wastewater from toilets and kitchen sinks that contains organic materials.
2. Greywater is wastewater from lavatories, shower, bathtubs, washing machines and sinks that are not used for disposal of hazardous or toxic ingredients or wastes from food preparation.
3. Potable Water is water that meets drinking water quality standards and is approved for human consumption by the state or local authorities having jurisdiction.
4. Transpiration is the emission of water vapor from plant leaves.
5. Evapotranspiration is the loss of water by evaporation from soil and transpiration for plants.
6. Drip Irrigation is high-efficiency irrigation method in which water drips to the soil from perforated tubes for emitters.
7. Xeriscaping is landscaping design that is projected to minimize or negate the use of irrigation.
8. TPWA – Total Potable Water Applied. Measured in gallons.
9. GPWA – Gross Potable Water Applied. Measured in gallons.

Calculations

For Month of July:

Baseline landscape irrigation.

K_L – Landscape Coefficient, volume of water lost to transpiration

k_s – Species Factor, plant species.

k_d - Density Factor, number of plants and total leaf area of landscape. Density factor has three ranges, high, medium and low.

k_{mc} – Microclimate Factor, adjustment of environmental conditions specific to the landscape.

Higher k_{mc} conditions occur where evaporative potential is greater usually caused by adjacent heat absorbing surfaces.

Additional Information

1. Pop-up sprinkler head typically will not achieve WE 1.1.
2. Bubblers and soakers or no irrigation typically work to achieve WE 1.2.

WE 2 Innovative Wastewater Technologies

Intent

Reduce wastewater output and the need for potable water.

Requirement

- Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%.

OR

- Treat 100% of wastewater on site to tertiary standards.

Required Submittal

LEED® Letter plus spread sheet calculation and narrative showing the methods employed to reduce waste water 50% from baseline conditions.

OR

LEED® Letter plus narrative describing on-site waste-water treatment system.

Referenced Standard

None

Strategies

- Determine where greywater can be used to replace functions they traditionally serve by potable water in the project.
- Determine the demand for greywater applications and the availability of greywater generated.
- Determine the amount of wastewater that will require treatment and select the most suitable treatment strategy.
- Specify high-efficiency and dry fixtures to reduce water volumes.

Definitions

1. Aquatic systems are ecologically designed treatment systems that utilize biological organisms to treat wastewater.
2. On-Site Wastewater Treatment is localized treatment systems to transport, store, treat and dispose of wastewater volumes generated on the project site.
3. Tertiary Treatment of Wastewater is the removal of organics, solids and nutrients as well as biological or chemical polishing of waste water.

Calculations

- Type, frequency of use and number of black-water generating fixtures.
- Number of male and female users in building.
- Number of typical work days.
- Total of calculation is given in gallons.

Additional Information

- Toilets use 1.6 gallons per flush (GPF), as per Energy Policy Act of 1992.
- Urinals use 1.0 gallons per flush.

WE 3 Water Use Reduction

Intent

Reduce the burden on municipal water supply and wastewater systems by maximizing building water efficiency.

Requirement

3.1 20% Reduction: Use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

Required Submittal

LEED® Letter and spread sheet calculations.

3.2 30% Reduction: Use 30% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

Required Submittal

LEED® Letter and spread sheet calculations.

Referenced Standard

Energy Policy Act (EPAct) of 1992

Strategies

- Estimate the potable and non-potable water needs for building.
- Specify water-conserving plumbing fixtures that exceed the fixture requirement stated in the Energy Policy Act of 1992.

- Consider ultra-high efficiency fixtures and control technologies, including toilets, faucets, showers, dishwashers and cooling towers.
- Consider reuse of stormwater and greywater for non-potable applications including toilet and urinal flushing, mechanical systems or custodial uses.

Definitions

1. Composting Toilet is a dry plumbing fixture that contains and treats human waste via microbiological process.
2. Waterless Urinal is a dry plumbing fixture that uses advanced hydraulic design and a buoyant fluid instead of water to maintain sanitary conditions.
3. Plumbing Fixture Sensors are sensors that are applied to water closets, lavatories, sinks and urinals to sense fixture use and automatically turn on and off.

Calculations

- Type, frequency of use and number each water generating fixture.
- Number of male and female users in building.
- Number of typical work days.
- Rainfall data.
- Total of calculation is given in gallons.

Energy and Atmosphere

EA P1 Fundamental Commissioning

Intent

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

Requirement

Implement all of the following best practice commissioning procedures:

1. Engage an independent commissioning authority.
2. Develop design intent and basis of design documentation.
3. Include commissioning requirements in the construction documents.
4. Develop and utilize a commissioning plan.
5. Verify installation, functional performance, training and documentation.
6. Complete the commissioning report.

Required Submittals

LEED® Letter

Referenced Standard

None

Strategies

- Engage a commissioning authority and adopt commissioning plan.
- Construction Documents to include commissioning requirements.
- Commissioning plan to include commissioning report at completion of commissioning activities.

Required Commissioning Plan Components

- Brief overview of commissioning process.
- List of all systems and assemblies included in the Commissioning Authority's scope of work.
- Identification of the Commissioning Team and its responsibilities.
- Overview of the commissioning process activities for the pre-design, design construction, and occupancy and operations phases, including development of the owner's project requirements, review of the 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 key commissioning process milestones.

Definitions and Terms

1. TAB – Test and Balance Report.
2. O&M – Operation and Maintenance Manual.

Additional Information

Fundamental commissioning agents are required to be independently contracted by the owner.

EA P2 Minimum Energy Performance

Intent

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

Requirement

Design to meet ASHRAE/IESNA 90.1-1999 or the local energy code, whichever is the more stringent.

Required Submittal

LEED® Letter, if local energy codes are followed demonstrate the code is equivalent to or exceeds ASHRAE 90.1.

Referenced Standard

ASHRAE 90.1

Strategies

- Building envelope and systems to maximize energy performance.
- Computer modeling so assess energy performance.
- Quantify energy performance compared to baseline building.

Definitions and Terms

1. R-Value is the unit of measure of resistance of a substance to heat flow.
2. U-Value is measure of the amount of heat that flows in or out of a substance when under constant conditions where there is a 1° in air temperature on each side of the substance. Typically used in determining the performance of a window assembly or glazing system.
3. ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers.

EA P3 CFC Reduction in HVACR Equipment

Intent

Reduce depletion of ozone.

Requirement

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

Required Submittal

LEED® Letter

Referenced Standard

None

Strategies

- Choose refrigerants that have short environmental lifetimes. Consider ODP (Ozone Depletion Potential) and GWP (Global Warming Potential).
- Consider phase-out period for CFC substitutes. Some refrigerants that are currently available today have short phase-out deadlines.

Definitions

1. Chlorofluorocarbons (CFCs) are hydrocarbons that deplete the stratospheric ozone layer.
2. Hydrochlorofluorocarbons HCFC's are refrigerants that deplete the stratospheric ozone layer, but cause less damage than CFC's.
3. Hydrofluorocarbons (HFC) are refrigerants that do not deplete the stratospheric ozone layer, but some HFC's do have high global warming potential.
4. Refrigerants are the working fluids of refrigeration cycles. They absorb heat from a reservoir at low temperatures and reject heat at higher temperatures.

EA 1 Optimized Energy Performance

Intent

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

Requirement

Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1-1999, as demonstrated by a whole building simulation using the Energy Cost Budget Method.

New Buildings	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%
Existing Buildings	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Points	1	2	3	4	5	6	7	8	9	10

Regulated Energy Systems:

- HVAC
- Service Hot Water
- Interior Lighting

Non-Regulated Energy Systems:

- Plug Loads
- Exterior Lighting
- Garage Ventilation
- Elevators

Two methods can be used to separate energy consumptions:

- Prorate as per percentage of regulated vs. non-regulated energy.
- Use separate meters in energy simulation program.

Required Submittal

LEED® Letter, quantitative summary table, summary printout from energy simulation software showing energy cost is less than ASHRAE 90.1 energy cost budget.

Referenced Standard

ASHRAE 90.1

Strategies

- Reduce Demand
 - Reduce internal loads and gains thru shell and lighting improvements.

- Increase plug load efficiencies
- Harvest Free Energy
 - Geothermal
 - Daylight
 - Natural ventilation
 - Building orientation
- Increase Efficiency
 - High performance lighting.
 - Fluorescent or Compact fluorescent lamps instead of incandescent.
 - Energy Star rated exit signs
 - Don't oversize HVAC.
 - Insulation HVAC components.
 - DDC – Direct Digital Control
 - VAV – Variable Air Volume

Definitions

1. Energy Star is a government / industry partnership managed by the EPA and US DOE. It offers guidelines for purchasing products, lists of Energy Star labeled items. It also provides management strategies and benchmarking software tools for buildings.
2. DOE - Department of Energy.
3. ECB – Energy Cost Budget.
4. DEC – Design Energy Cost.
5. Cogeneration - system typically uses heat energy that otherwise would be wasted. System that consumes a fuel, usually natural gas, to produce electricity and thermal energy in the form of steam or hot air.
6. Baseline is information gathered at the beginning of a design documenting proposed conditions from which proposed variations to the design can be compared.

Additional Information:

- Only energy regulated by ASHRAE/IESNA Standard 90.1 – 1999 can be considered in determining the percent energy savings.
- Could qualify for Innovation Credit if non-regulated energy is also reduced.

EA 2 Renewable Energy

Intent

Use renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

Requirement

2.1 5%: Supply at least 5% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

Required Submittal

LEED® Letter, narrative describing on-site renewable energy systems and calculations.

2.2 10%: Supply at least 10% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

Required Submittal

LEED® Letter, narrative describing on-site renewable energy systems and calculations.

2.3 20%: Supply at least 20% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems:

Required Submittal

LEED® Letter, narrative describing on-site renewable energy systems and calculations.

Referenced Standard

ASHRAE 90.1

Strategies

- Utilize technologies such as sun, wind, geothermal and biomass to generate usable energy.
- Use net metering with the local utility.

Definitions

1. Biomass typically refers to vegetation, but also refers to all of the living material in a given area.
2. Geothermal is the practice of harvesting the heat from the earth to use as an energy source.

Additional Information

Passive solar, solar water heating, ground source heat pumps and daylighting do not qualify under this credit because they do not generate power.

EA 3 Additional Commissioning**Intent**

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

Requirement

In addition to the Fundamental Building Commissioning prerequisite, implement or have a contract in place to execute the following additional commissioning tasks:

1. Independent commissioning authority to conduct a review of the design prior to the construction documents phase.
2. Independent commissioning authority to conduct a review of the construction documents near completion of the construction document development, prior to issuance of the contract documents for construction.
3. Independent commissioning authority to review the contractor submittals relative to systems being commissioned.
4. Commissioning authority to provide owner with a single manual that contains the information required for re-commissioning building systems.
5. Commissioning authority to have a contract in place to review building operation with O&M staff, including a plan for resolution of outstanding commissioning-related issues within one year after construction completion date.

Required Submittal

LEED® Letter.

Referenced Standard

None

Strategies

- Engage the commissioning authority early in the design phases.
- To achieve Additional Commissioning Credit, the following tasks need to be accomplished:
 1. Schematic Design Review *
 2. Construction Documents Review *
 3. Focused Review of Submittals *
 4. Systems Manual
 5. Near-Warranty End or Post-Occupancy Review

** Tasks to be performed by an independent Commissioning Authority. It is recommended, but not required that all 5 tasks be performed by an independent Commissioning Authority.*

EA 4 Ozone Protection

Intent

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

Requirement

No HCFC's or halon in HVAC refrigeration equipment or fire suppression systems.

Required Submittal

LEED® Letter.

Referenced Standard

None

Strategies

- Research, identify and specify that all building systems to have non-ozone depleting equipment.
- Systems to consider include HVAC, refrigeration, insulation and fire suppression systems.
- Review the HCFC substitutes to choose the substitute with the lowest environmental impact.
- Replace HCFC's and halons in existing buildings.
- Review phase out period of CFC substitutes. Several currently available refrigerants have short phase out deadlines.

Definitions and Terms

1. Chlorofluorocarbons (CFCs) are hydrocarbons that deplete the stratospheric ozone layer. Hydrochlorofluorocarbons (HCFC's) are refrigerants that deplete the stratospheric ozone layer, but cause less damage than CFC's.
2. Hydrofluorocarbons (HFC) are refrigerants that do not deplete the stratospheric ozone layer, but some HFC's do have high global warming potential.
3. Refrigerants are the working fluids of refrigeration cycles. They absorb heat from a reservoir at low temperatures and reject heat at higher temperatures.
4. Halons are a substance used in fire suppression systems and fire extinguishers in buildings. Deplete the stratospheric ozone layer.
5. ODP – Ozone Depleting Potential.
6. GWP – Global Warming Potential.
7. EPA SNAP - Significant New Alternatives Program.
8. Montreal Protocol – 1987 treaty that governs stratospheric ozone protection and research, and the production and use of ozone-depleting substances. It supplies the means of support to end production of ozone-depleting substances including CFCs. It also provides resources to developing nations to promote the transition to ozone-safe technologies.

EA 5 Measurement and Verification

Intent

Ongoing accountability and optimization of building energy and water consumption performance.

Requirement

Install continuous metering equipment for the following end-uses:

- Lighting systems and controls
- Constant and variable motor loads
- Variable frequency drive (VFD) operation
- Chiller efficiency at variable loads (kW/ton)
- Cooling load

- Air and water economizer and heat recovery cycles
- Air distribution static pressures and ventilation air volumes
- Boiler for heating
- Building specific process energy efficiency systems and equipment
- Indoor water risers and outdoor irrigation systems

Required Submittal

LEED® Letter, copy of measurement and verification plan and executive summary.

Referenced Standard

IPMVP - International Performance Measurement and Verification Protocol Volume 1, 2001 Version.

Strategies

- Model energy and water systems to predict savings.
- Design building with equipment to measure energy and water performance
- Prepare measurement and verification plan that will be followed during building operation that compares predicted savings to those actually achieved.

8 steps to creating a Measure & Verification Plan

1. List all measures to be monitored and verified.
2. Define the baseline.
3. Define the green building design and projected savings.
4. Define the general M&V approach.
5. Prepare a project-specific M&V plan.
6. Verify installation and commissioning of ECM's or energy-efficient strategies.
7. Determine savings under actual post-installation conditions.
8. Reevaluate at appropriate intervals.

Definitions

1. Energy Conservation Measures (ECM's) is the installation of equipment or systems, or modifications of equipment or systems for the purpose of reducing energy use and/or cost.

EA 6 Green Power

Intent

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

Requirement

Provide at least 50% of the building's electricity from renewable sources by engage in a two year contract to purchase power generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements.

Required Submittal

LEED® Letter, copy of the two-year electric utility purchase of power generated from renewable sources.

Referenced Standard

Center for Resource Solutions Green-e Product Certification Requirements.

Strategies

- Calculate electric needs for the project, this can be determined by referring to the use of grid electric determined in EA Credit 1.
- Determine if electrical power derived from non-polluting renewable technology is available from providers in area.

- In open market states, investigate green power and power marketers licensed to provide power in that state.
- Purchase Green-e certified Tradable Renewable Certificates (TRC).

Definitions and Terms

1. Green-e are renewable energy products.
2. CRS is the Center for Resource Solutions is a national not-for-profit organization the administers the Green-e Program.

Additional Information

- Acceptable forms of green power are solar, wind, geothermal, biomass, or low-impact hydro.
- Credit supports green power, to achieve EA6 a project doesn't have to have green power on site. A 2-year renewable energy contract can be purchased, known as "TRC".

Materials and Resources

MR P1 Collection and Storage of Recyclables

Intent

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

Requirement

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

Required Submittal

LEED® Letter and plan showing areas dedicated to collection and storage of recyclables.

Referenced Standard

None

Strategies

- Locate central collection and storage of recyclables in location with easy access for collection.
- Provide adequate size space and containers for collection and storage of recycling.
- Research local recycling to find best method of diverting recyclable materials from waste stream.
- Provide instructions to building occupants and maintenance personnel on recycling procedures.

Definitions

1. Recycling is the collection, reprocessing, marketing and use of materials that were diverted or recovered from the solid waste stream.
2. Landfill is a waste disposal site for the deposit of solid waste from human activities.

MR 1 Building Reuse

Intent

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

Requirement

1.1 Maintain at least 75% of existing Walls, Floors and Roof: Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies).

Required Submittal

LEED® Letter, list of retained elements.

1.2 Maintain 100% of existing Walls, Floors and Roof: Maintain an additional 100% of existing building structure and shell (exterior skin and framing excluding window assemblies and non-structural roofing material).

Required Submittal

LEED® Letter, list of retained elements.

1.3 Maintain 100% of shell / structure and 50% of non-shell / non-structure: Maintain 100% of existing building structure and shell (exterior skin and framing excluding window assemblies and non-structural roofing material) AND at least 50% of non-shell areas (interior walls, doors, floor coverings and ceiling systems).

Required Submittal

LEED® Letter, list of retained elements.

Referenced Standard

None

Strategies

- Review existing buildings structural shell.
- Determine if the existing buildings structure can accommodate the proposed programming and space planning.
- If structural shell cannot be reused, consider reusing / preserving the buildings façade, particularly in urban areas.
- Review the pros and cons of the structures attributes and potential including: solar, transportation access, existing air quality levels, and potential to upgrade outdated building components such as insulation or glazing.
- Identify existing hazardous materials including asbestos and lead paint so the appropriate removal and or isolation measures can be applied.

Calculations

- When calculating the percentage of reused building structure include footings, slab on grade, stem walls, columns, beams, exterior walls. Shell elements to include are brick cladding, roofing, siding. Windows are not to be included in either the structural or shell calculations.
- Structural quantities calculated in cubic feet.
- Shell and exterior elements are calculated in square feet.

MR 2 Construction Waste Management

Intent

Divert construction, demolition, and land clearing debris from landfill, by redirecting recyclable material.

Requirement

2.1 Divert 50% From Landfill: Develop and implement a waste management plan, quantify material diversion goals. Recycle and/or salvage at least 50% of construction, demolition and land clearing waste. Calculation can be done by weight or volume, but must be consistent throughout.

Required Submittal

LEED® Letter, tabulation of total waster material, quantities diverted the and means they were diverted.

2.2 Divert 75% From Landfill: Develop and implement a waste management plan, quantify material diversion goals. Recycle and/or salvage an additional 25% (75% total) of construction, demolition and land clearing waste. Calculation can be done by weight or volume, but must be consistent throughout.

Required Submittal

LEED® Letter, tabulation of total waster material, quantities diverted the and means they were diverted.

Referenced Standard

None

Strategies

- Minimize factors that contribute to waste.
- Establish goals for landfill diversion, develop and institute a construction waste management plan.
- Designate area of site for construction and demolition waste.
- Train workers on recycling protocol.
- Label recycling containers effectively.
- Require monthly feedback and reporting on waste management plan.

Definitions and Terms

1. Construction, demolition and land clearing (CDL) debris includes waste and recyclables generated from construction, land clearing (vegetation not soil) renovation, and demolition deconstruction of pre-existing structures.
2. Reuse is a strategy to return materials to active use in the same or related capacity.
3. Tipping Fees are fees that are charged by a landfill for disposal of waste. Fees are typically quoted for one ton of waste.

Calculations

- Computed by weight or volume, but must be consistent throughout project.
- Hazardous waste and excavated soil are not to be included in calculations for these credits.

MR3 Resource Reuse

Intent

Reuse building materials and products to reduce demand for virgin materials and to reduce waste.

Requirement

3.1 5%: Use salvaged, refurbished or reused materials, products and furnishings for at least 5% of the building materials.

Required Submittal

LEED® Letter, list of each product used to meet credit, their cost and total cost of materials for the project. Details showing the project incorporates the required percentage of reused materials and products.

3.2 10%: Use salvaged, refurbished or reused materials, products and furnishings for at least 10% of the building materials.

Required Submittal

LEED® Letter, list of each product used to meet credit, their cost and total cost of materials for the project. Details showing the project incorporates the required percentage of reused materials and products.

Referenced Standard

None

Strategies

- Develop strategy and goals to incorporate salvaged and refurbished building materials in to project.
- Research identified salvaged and refurbished materials to determine if they meet the durability, performance, code compliance and environmental requirements of the project.

Definitions and Terms

1. Chain-of-Custody is a tracking procedure that documents the status of a product from the point of harvest or extraction to the end user.
2. Salvaged Materials are construction materials recovered from existing building or construction sites and reused in other buildings or construction sites and reused in other buildings. Salvaged materials include but not limited to structural columns and beams, flooring, cabinetry, brick and decorative elements.
3. Environmental Resource Guide is a comprehensive guide documenting materials life cycle cost analysis.

Calculations

- Include all materials and products and their cost.
- Salvaged or refurbished items must be validated by a statement from the material provider.
- If cost of the salvaged or refurbished material is below market value, use the replacement cost to estimate the items value for use in the calculation.
- Figured as a percentage.

Additional Information

- Commonly salvaged and refurbished materials include wood flooring, doors and frames, cabinetry, furniture, brick and other masonry.
- To qualify for MR3 the product or material does not have to come from the project construction site.

MR 4 Recycled Content

Intent

Increase demand for building products that incorporate materials with recycled content to reduce impacts resulting from extraction and processing virgin materials.

Requirements

4.1 5% (post-consumer + ½ post-industrial): Use materials with recycled content such that the sum of the post-consumer recycled content plus one-half of the post-industrial content constitutes at least 5% of the total value of the materials in the project.

Required Submittal

LEED® Letter and details showing how the project incorporates the required recycled content materials and products, their cost, percentages of post-consumer and / or post-industrial content and the total cost of all materials for the project.

4.2 10% (post-consumer + ½ post-industrial): Use materials with recycled content such that the sum of the post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10% of the total value of the materials in the project.

Required Submittal

LEED® Letter and details showing how the project incorporates the required recycled content materials and products, their cost, percentages of post-consumer and / or post-industrial content and the total cost of all materials for the project.

Referenced Standard

FTC Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7e

Strategies

- Establish a project goal for the recycled content materials and identify material suppliers that can achieve this goal.
- During construction, ensure that the specified recycled content materials are installed and quantify the total percentage of recycled content materials installed.

Definitions and Terms

1. Post-Consumer material also known as feedstock that is collected from businesses and residential recycling programs as well as construction and demolition materials for reuse in another product.
2. Post-Industrial material that is collected from the industrial process and reused for the same or similar industrial process or is sold or traded for a different industrial process, but it is never sold as a consumer product. Does not include in-house scrap that is fed back in the same manufacturing process.
3. GreenSpec is a website that lists more than 1,500 green building products, their environmental data, manufacturer information and provides links to additional sources.
4. CFR – Code of Federal Regulations.

Calculations

- Percentage of post-consumer and post-industrial content by weight and cost.
- Post-consumer content value plus one-half the post-industrial content value are added together to determine the total sum of the recycled content.
- Figured as a percentage.

Additional Information

- Mechanical and electrical components are not applicable for this credit.
- Refurbished materials are not considered for this credit.
- The value of the recycled content portion of a material or furnishing shall be determined by dividing the weight of recycled content in the item by the total weight of all material in the item, then multiplying the resulting percentage by the total value of the item.
- Mechanical and electrical components shall not be included in this calculation. Recycled content materials shall be defined in accordance with the Federal Trade Commission document, "Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e).

MR 5 Local / Regional Materials

Intent Increase demand for building materials and products that are extracted and manufactured within the region, to support the regional economy and reduce the environmental impacts resulting from transportation.

Requirement

5.1 20% Manufactured Regionally: Use a minimum of 20% of building materials and products that are manufactured within a radius of 500 miles of the project site.

- Manufacturing is the final assembly of components of a product. The components can come from anywhere in the world, but have to be assembled within 500 miles of the project site.

Required Submittal

LEED® Letter plus calculations showing the project meets the required percentage of regional materials and products, their cost, percentage of regional components, distance from manufacturer and total cost of material for the project.

5.2 50% Extracted Regionally: Of the regionally manufactured materials documented for MR Credit 5.1, use a minimum of 50% of building materials and products that are extracted, harvested or recovered (as well as manufactured) within 500 miles of the project site.

Required Submittal

LEED® Letter plus spreadsheet showing calculations the project meets the required percentage of regional materials and products, their cost, percentage of regional components, distance from manufacturer and total cost of material for the project. Spreadsheet can also be used for MR 3, 4, 6 and 7.

Referenced Standard

None

Strategies

- Establish a project goal for locally sourced materials and identify materials and material suppliers that can achieve this goal.
- During construction verify that the specified local materials are installed and quantify the total percentage of local materials are installed.

Calculations

- Distance between project and manufacturer.
- Distance between project and extraction site.
- Value of all regionally manufactured products.

MR 6 Rapidly Renewable Materials

Intent

Use rapidly renewable materials to ease the burden of non-renewable sources and materials that have long renewal cycles.

Requirement

Specify rapidly renewable building materials and products for 5% of total value of all building materials and products used in the project.

- Use materials made from plants that have a 10-year or less harvest cycle.

Required Submittal

LEED® Letter, spreadsheet with calculations showing how the project incorporates rapidly renewable products, their cost and percentage. Also include total material costs for the project.

Referenced Standard

None

Strategies

- Establish goals for rapidly renewable materials.
- Research and specify rapidly renewable materials applicable for project.

Calculations

- All materials, including costs, used on the project.
- Product name, company, product cost, percent renewable.
- Figured as a percentage of total materials cost.

Additional Information

Bamboo flooring, wool carpets, strawboard, cotton batt insulation, linoleum flooring, poplar OSB, sunflower seed board, wheatgrass cabinetry are popular rapidly renewable materials and products.

MR 7 Certified Wood

Intent

Encourage environmentally responsible forest management.

Requirement

Use a minimum of 50% of wood-based materials that are FSC certified, Products include but are not limited to structural framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian bridges.

As per the Certified Forest Products Council: "To qualify for this credit, wood-based materials and products must constitute at least 2% of the total value of all materials for the building".

Referenced Standard

Forest Stewardship Council's Principles and Criteria

Strategies:

- Identify major areas of wood used in project.
- Research availability of identified FSC certified products.
- Determine if any of the products identified can use lower grades of Wood.
- Identify local vendors, suppliers and manufacturers that are certified for FSC Chain-of-Custody and supply information to the list of bidders.
- Specify wood products are to come from forests that are FSC certified, and that the contractor is to provide supplier invoices with vendor's chain-of-custody and identify each item by a line item basis.

Submittal Requirements

LEED® Letter, calculations, Chain-of-Custody Certification Numbers.

Definitions and Terms

1. Chain-of-Custody is a tracking procedure that documents the status of a product from the point of harvest or extraction to the end user.
2. Sustainable Forestry is the practice of managing forest resources to restore, enhance and sustain a full range of forest values - economic, social and ecological.
3. FSC – Forest Stewardship Council
 - Requires observance of regional and international treaties.
 - Respects rights of indigenous people to manage their land.
 - Protects forest workers health.
 - Does not prohibit the use of pesticides.

Calculations

- Does not include labor costs, insulation, salvaged or refurbished material or the post-consumer recycled wood fiber portion of a product.
- For assemblies, calculate percentage of FSC certified wood included in the total material.

IEQ (Indoor Environmental Quality)

IEQ improvement can increase workers productivity as much as 16%.

EQ P1 Minimum IAQ Performance

Intent

Establish minimum IAQ performance to prevent the development of indoor air quality problems.

Requirement

Meet the minimum requirements ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality, using the Ventilation Rate Procedure.

Required Submittal

LEED® Letter and description of procedure employed in the IAQ analysis.

Referenced Standard

ASHRAE 62 - 1999

Strategies

- Locate fresh air intakes away from possible sources of contamination, including loading dock, cooling towers, and exhaust air vents. Identify ventilation rates, and ensure that HVAC system is sized adequately to meet air change requirements at all times.
- Specify that at project completion include operational testing to be included in commissioning report.

Definitions

1. Ventilation is the process by which air is supplied to and removed from indoor space, this can be accomplished by mechanical or natural methods.
2. Sick Building Syndrome are the affects building occupants suffer as a direct result from their exposure to contaminated air inside a building.
3. Indoor Air Quality is the quality of indoor air in which there are no known contaminants at harmful concentrations.

EQ P2 ETS Control

Intent

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

Requirement

Prohibit smoking in building, designate smoking areas outside of building.

OR

Designate smoking area within building with the following:

- Directly exhausts to outside building.
- No-recalculation of air supplied to room.
- Room to be at negative pressure.
- Impermeable deck-to-deck partitions.
- Verify performance of room with tracer gas.

Required Submittal

LEED® Letter

OR if smoking is permitted in designations inside building:

LEED® Letter and information locating where smoking is permitted within building and demonstrating that there is no recirculation of ETS-containing air to the non-smoking areas of the building and that the space is enclosed by deck-to-deck partitions and operated at negative pressure.

Referenced Standard

ASHRAE 129 - 1997

Strategies

- Prohibit smoking in the building.
- Provide designated smoking area outside the building.
- Provide signage with smoking policy.
- If the building has interior smoking areas, provide separate ventilation system and acceptable enclosure around the space to isolate it from the rest of the building.

Definitions

1. Age of Air is the average amount of time that has elapsed since a sample of air molecules at a specific location has entered the building.
2. Air-Change Effectiveness is a measurement based on a comparison the age of air in the occupied portions of the building to the age of air that would exist under conditions of perfect mixing of the ventilation air.

3. Environmental Tobacco Smoke (ETS) also known as second hand smoke.

EQ 1 CO₂ Monitoring

Intent

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

Requirement

Install a permanent carbon dioxide (CO₂) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments. Refer to the CO₂ differential for all types of occupancy in accordance with ASHRAE 62-2001, Appendix D.

Required Submittal

LEED® Letter and summarization of the installaion, design, contols for the monitoring system.

Referenced Standard

None

Strategies

- Identify appropriate and efficient CO₂ sampling methods and sampling locations.
- Integrate sensors with Building Automation System (B.A.S.).
- Provide appropriate automatic or manual controls from spaces.
- Compare indoor and outdoor CO₂ concentrations.
- Verification of calibration and testing of CO₂ ventilation control must be part of the commissioning process.

Definitions

1. Carbon Dioxide (CO₂) is an indicator of the effectiveness of the ventilation of a space.
2. Return Air is previously conditioned air that is removed from a space.
3. Supply Air is conditioned air that is delivered to a space.

EQ 2 Ventilation Effectiveness

Intent

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

Requirement

Mechanically ventilated buildings: design ventilation systems that result in an air change effectiveness (E_{ac}) greater than or equal to 0.9 as determined by ASHRAE 129-1977.

Naturally ventilated spaces: demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy.

Required Submittal

LEED® Letter plus completed table show air change effectiveness achieved from each zone.

Referenced Standard

ASHRAE 129 -1997

ASHRAE Fundamentals Handbook 2001, Chapter 32: Space Air Diffusion

Strategies

- Design HVAC system and building envelope to optimize air change effectiveness.
- Prevent short-circuiting of airflow
- Evaluate strengths and weaknesses of mechanical vs. natural ventilation and employ the

- most appropriate method of supplying and returning air.
- Test air change effectiveness of the building after construction.

Definitions

1. Conditioned Space is the portion of the building that is heated and/or cooled for the comfort of building occupants.
2. Natural Ventilation is the process of supplying and removing air without mechanical ductwork in building spaces by using openings such as windows and doors, non-powered ventilators and filtration processes.
3. Ventilation Effectiveness refers to the movement of supply air through the occupied space.
4. E_{ac} – Air Change Effectiveness.

Calculations

- Option 1- Filed Test: To demonstrate air change effectiveness of .9 or greater for all regularly occupied spaces.
- Option 2 – Design Verification: Detailed narrative showing design approach complies with ASHRAE Fundamentals Handbook, 2001 Chapter 32, Space Air Diffusion.

EQ 3 Construction IAQ Performance

Intent

Sustain installer and occupant health and comfort by preventing indoor air quality issues caused by the construction process.

Requirement

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

- During construction meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.
- Protect stored on-site or installed absorptive materials from moisture damage.
- If air handlers are used during construction, filtration media with a MERV of 8 is to be used at each return air grill.
- Replace all filtration media immediately prior to occupancy. Filtration media shall have a MERV of 13.

Required Submittal

LEED® Letter, plus a list of air filter used during and after construction. Include MERV value, manufacturer name and model number.

AND

- A. 18 photos (6 photos on 3 occasions) and identify the SMACNA approach in each photo.

OR

- B. Brief description of design approaches employed and how they follow SMACNA IAQ Guide for Occupied Building Under Construction.

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

- After construction ends and prior to occupancy, conduct a minimum two-week building flushout with new MERV of 13 filtration media at 100% outside air. After the flush-out, replace the filtration media with new MERV 13 filtration media, except the filters solely processing outside air.

OR

- Conduct a baseline indoor air quality testing procedure consistent with the U.S. EPA's current Protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445.

Required Submittal

LEED® Letter

OR

LEED® Letter plus copy of testing results.

Referenced Standard

- SMACNA - IAQ Guidelines for Occupied Building Under Construction.
- ASHRAE 52.5
- EPA Protocol for Environmental Requirements, Testing for Indoor Air Quality, Baseline IAQ and Materials for Research Triangle Park Campus, Specification Section 01445

Strategies

- Develop IAQ Management Plan.
- Specify protection of ventilation system components during construction and cleanup of contaminated components after construction is complete.
- Require temporary ventilation in the General Conditions for the construction contract.
- Prior to occupancy perform a two week flush-out or test the contaminant levels in the building.

Definitions

1. Construction IAQ Management Plans is a document specific to a building project that outlines procedures to minimize building contamination during construction and building flush-out prior to occupancy.
2. HVAC System – Heating Ventilating and Air Conditioning.
3. MERV – Minimum Efficiency Reporting Value – measures air filtration media effectiveness.

EQ 4 Low Emitting Materials

Intent

Reduce the quantity of indoor air contaminants that contain odors, irritating and/or harmful to the installers and occupants.

Requirement

4.1 Adhesives and Sealants:

- VOC content of adhesives and sealants to be less than the limits of SCAQMD.
- Sealants used as fillers to meet or exceed Bay Area Quality Management District Regulation 8, Rule 51.

Required Submittal

LEED® Letter

4.2 Paints and Coatings: VOC emissions from paints and coating must not exceed the VOC and chemical component limits of Green Seal's Standard GS-11 requirements.

Required Submittal

LEED® Letter

4.3 Carpet: Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.

Required Submittal

LEED® Letter

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

Required Submittal

LEED® Letter

Referenced Standard

- SCAMD - South Coast Rule #1168, South Coast Air Quality Management District.
- Bay Area Air Quality Management District - Regulation 8 , Rule 51.
- Carpet and Rug Institute Green Label Testing Program.

Strategies

- Specify low-VOC products.
- Provide adhesives and sealants specification section, include VOC limits.

Definitions

1. Formaldehyde is a colorless, pungent, and irritating gas, CH₂O, used chiefly as a disinfectant and preservative and in synthesizing other compounds like resins.
2. Volatile Organic Compounds (VOC's) are organic substances capable of entering the gas phase from either a liquid or solid form at normal room temperatures.
3. Green Seal is an independent organization providing environmental performance reports for building materials.
4. Green Label is the Carpet and Rug Institute's testing program to identify low VOC products.
5. SCAQMD - South Coast Air Quality Management District.

EQ 5 Indoor Chemical & Pollutant Source Control

Intent

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

Requirement

Minimize chemical pollutant cross-contamination of regularly occupied areas by:

- Permanent entryway systems (grills, grates, etc.) to capture dirt, particulate, etc. at all high volume building entryways.
- Where chemical use occurs including housekeeping areas and copying/printing rooms, provide deck to deck partitions with separate outside exhaust at a rate of at least 0.50 cubic feet per minute per square foot, no air recirculation and maintaining a negative pressure of at least 7PA.
- Provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

Required Submittal

LEED® Letter

Referenced Standard

None

Strategies

- Design separate exhaust and plumbing systems for rooms with contaminants.
- Install permanent entry walk-off mats.

Definitions and Terms

1. Green Seal is an independent, not-for profit organization that provides product certification and purchasing guidelines for products.

IEQ 6 Controllability of Systems

Intent

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

Requirement

6.1 Perimeter Spaces: Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall.

Required Submittal

LEED® Letter

6.2 Non-Perimeter Spaces: Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas.

Required Submittal

LEED® Letter

Referenced Standard

None

Strategies

- Integrate space planning, lighting schemes and HVAC early in design process.
- Evaluate window design to provide optimal size, orientation and aspect ratio for vision and/or daylight functions desired for windows.
- Consider lighting controls, task lighting and operable windows.
- Design occupant controls for air flow, temperatures and lighting in building.

Definitions

1. Group Multi-Occupant Spaces include conference rooms, classrooms and other indoor spaces used for presentations, training, teaching, etc. Individuals in these spaces share the lighting and temperature controls.
2. Individual Multi-Occupant Space is typically an open office plan. These spaces normally contain standard work stations where each individual must have comfort controls to earn Credit 6.2.
3. Non-Occupied Spaces including all rooms used by maintenance personnel and not open for use by occupants, including janitorial, storage, equipment rooms, and closets.
4. Non-Regularly Occupied Spaces include corridors, hallways, lobbies, break rooms, copy rooms, storage rooms, kitchens and stairwells.
5. Regularly Occupied Spaces are areas where workers are seated or standing as they work inside a building.

EQ 7 Thermal Comfort

Intent

Provide thermally comfortable environment that supports the productivity and well-being of building occupants.

Requirement

7.1 ASHRAE 55 Compliance: Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. For naturally ventilated buildings, utilize the adaptive comfort temperature boundaries, using the 90% acceptability limits as defined in the California High Performance Schools (CHPS) Best

Practices Manual, Appendix C - A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.

Required Submittal

LEED® Letter and table and summary identifying each thermally controlled zone.

7.2 Permanent Monitoring System: Install a permanent temperature and humidity monitoring system configured to provide control over thermal comfort performance and the effectiveness of humidification and/or dehumidification systems in the building.

Required Submittal

LEED® Letter and document name and section number with the commissioning work is listed.

Referenced Standard

ASHRAE 55

The Collaborative for High Performance Schools (CHPS) Best Practices Manual, Appendix C-A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.

Strategies

- Establish temperature and humidity comfort ranges and design the building envelope and HVAC system to maintain comfort ranges.
- Control human thermal comfort thru air temperature, air velocity and humidity levels.
- Control air infiltration of building.
- Use of shading devices, insulation and thermal mass to manage interior surface temperatures.

Definitions

1. Occupied Zone is the region in an occupied space from 3 inches above the floor to 72 inches above the floor and greater than 2 feet from walls for fixed air conditioning equipment.
2. Relative Humidity is the ratio of partial density of water vapor in the air to the saturation density of water vapor at the same temperature.
3. Thermal Comfort is a condition of mind experience by building occupants expressing satisfaction with the thermal environment.

EQ 8 Daylight and Views

Intent

Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Requirement

8.1 Daylight 75% of Spaces: Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Other exceptions include those spaces where tasks would be hindered by the use of daylight will be considered on their merits.

Required Submittal

LEED® Letter and calculations.

8.2 Views for 90% of Spaces: Achieve a direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces. Examples of exceptions include copy rooms, storage areas, mechanical, laundry and other low occupancy support areas. Other exceptions will be considered on their merits.

Required Submittal

LEED® Letter, calculations and drawings showing the direct line of sight zones.

Referenced Standard

None

Strategies

- Determine if a direct line of site to the outdoors is feasible.
- Orient Building to maximize daylighting.
- Consider ways to control glare.
- Predict daylighting thru calculations or model daylighting strategies with physical or computer model to assess footcandle levels and daylight factors achieved.

Definitions

1. Daylight Factor is the ratio of interior luminance at a given point or a give plane (typically the work plane) to the exterior luminance under known overcast sky conditions.
2. Daylighting is the controlled admission of natural light into a space through glazing with the intent of reducing or eliminating electric lighting. By utilizing solar light, daylighting creates a stimulating productive environment for building occupants.
3. Visible Transmittance (T_{vis}) is the ratio of total transmitted light to total incident light in other words, it is the amount of light passing through a glazing surface divided by the amount of light striking the glazing surface A higher T_{vis} value indicates that a greater amount of incident light is passing though the glazing.

Calculations

- Variables used to determine daylight factor are floor area, window area, window geometry, visible transmittance (T_{vis}) and window height.
- Goal is to achieve 2% daylight factor at back of space.

Innovation and Design – 0 Prerequisites, 2 Credits, 5 Points

ID 1 Innovation in Design

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

Requirements:

- Identify the intent of the proposed innovation credit.
- The proposed requirements for compliance.
- Proposed submittals to demonstrate compliance.
- Design approach that might be used to meet the requirements.
- Evidence the project meets the proposed requirements.

Strategies:

- Doubling the credit requirements or the next incremental percentage threshold established by the existing LEED® credit.
- Show exemplary performance and provide outstanding, measurable benefits to the environment and/or building occupants.
- Credits not addressed in existing LEED® credits and have significant benefits for the environment and building occupants.

ID2 LEED® AP

Intent

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

Requirement

At least one principal participant of project team has successfully completed LEED® Accredited Professional Exam.

Referenced Standards

ASHRAE 90.1 – 1999 Building Energy Standards
ASHRAE 52.5 -1999 Building Ventilation Filters / Particulate Size
ASHRAE 55 -1992 Thermal and Humidification
ASHRAE 62 - 1999 Minimum Ventilation
ASHRAE 129 -1997 Air Change Effectiveness

Standard or Association related to individual LEED® Credits:

SS P1	Erosion and Sedimentation Control	EPA - Storm Water Management for Construction Activities
SS 1	Site Selection	None
SS2	Density Development	None
SS3	Brownfield Development	ASTM E1903-97 Phase II Environmental Site Assessment EPA Brownfields Definition
SS4	Alternative Transportation	None
SS5	Reduced Site Disturbance	None
SS6	Stormwater Management	Best Management Practices (BMP) - Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (Document No. EPA-840-B-92-002).
SS7	Heat Island Effect	ASTM E408-71(1996)e1 – Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection–Meter Techniques. ASTM E903-96 – Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
SS8	Light Pollution Reduction	IESNA Recommended Practice Manual: Lighting for Exterior Environments IESNA RP-33-99)
WE1	Water Efficient Landscaping	None
WE2	Innovative Wastewater Technologies	None
WE3	Water Use Reduction	EPAct Energy Policy Act of 1992
EAP1	Fundamental Commissioning	None
EAP2	Minimum Energy Performance	ASHRAE 90.1
EAP3	CFC Reduction in HVACR Equipment	None
EA1	Optimized Energy Performance	ASHRAE 90.1
EA2	Renewable Energy	ASHRAE 90.1
EA3	Additional Commissioning	None
EA4	Ozone Depletion	None
EA5	Measurement and Verification	IPMVP - International Performance Measurement and Verification Protocol Volume 1, 2001 Version.
EA6	Green Power	Center for Resource Solutions Green-e Certification Requirements.
MRP1	Collection and Storage of	None

	Recyclables	
MR1	Building Reuse	None
MR2	Construction Waste Management	None
MR3	Resource Reuse	None
MR4	Recycled Content	FTC Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7e.
MR5	Local / Regional Materials	None
MR6	Rapidly Renewable Materials	None
MR7	Certified Wood	FSC – Forest Stewardship Council’s Principles and Criteria.
EQP1	Minimum IAQ Performance	ASHRAE 62
EQP2	ETS Control	ASHRAE 129
EQ1	CO2 Monitoring	None, but ASHREA 62 is mentioned.
EQ2	Ventilation Effectiveness	ASHRAE 129 ASHREA Fundamentals Handbook 2001, Chapter 32: Space Air Diffusion.
EQ3	Construction IAQ Management	SMACNA - IAQ Guidelines for Occupies Building Under Construction. ASHRAE 52.5 EPA Protocol for Environmental Requirements, Testing for Indoor Air Quality, Baseline IAQ and Materials for Research Triangle Park Campus, Specification Section 01445
EQ4	Low Emitting Materials	SCAMD - South Coast Rule #1168 by the South Coast Air Quality Management District Bay Area Air Quality Management District - Regulation 8 , Rule 51 Carpet and Rug Institute Green Label Testing Program
EQ5	Indoor Chemical Pollutant Source Control	None
EQ6	Controllability of Systems	None
EQ7	Thermal Comfort	ASHRAE 55 The Collaborative for High Performance Schools (CHPS) Best Practices Manual, Appendix C-A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.
EQ8	Daylight and Views.	None
ID1	Innovation in Design	None
ID2	LEED® Accredited Professional	None

Green publications:

- Environmental Building News (EBN), EBN’s Green Spec Product Directory, & EBN’s Green Building Advisor
- Environmental Resource Guide (by the AIA) (guide for materials life cycle)
- EPA Comprehensive Procurement Guideline (for recycled/recovered content materials)
- Sweets Catalogue (product directory)

Environmental Building News

Environmental Design + Construction

GreenSpec – Directory of environmentally preferred products.

Oikos offers information on energy efficiency and environmentally responsible construction.

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