

GREEN BUILDING DESIGN AND CONSTRUCTION

WITH ALTERNATIVE COMPLIANCE PATHS FOR
EUROPE

LEED Reference Guide for Green Building Design and Construction
For the Design, Construction and Major Renovations of Commercial and
Institutional Buildings Including Core & Shell and K-12 School Projects
2009 Edition



PREFACE FROM USGBC

The built environment has a profound impact on our natural environment, economy, health, and productivity. Breakthroughs in building science, technology, and operations are now available to designers, builders, operators, and owners who want to build green and maximize both economic and environmental performance.

Through the LEED® green building certification program, the U.S. Green Building Council (USGBC) is transforming the built environment. The green building movement offers an unprecedented opportunity to respond to the most important challenges of our time, including global climate change, dependence on non sustainable and expensive sources of energy, and threats to human health. The work of innovative building professionals is a fundamental driving force in the green building moment. Such leadership is a critical component to achieving USGBC's mission of a sustainable built environment for all within a generation.

USGBC MEMBERSHIP

USGBC's greatest strength is the diversity of our membership. USGBC is a balanced, consensus-based nonprofit with more than 18,000 member companies and organizations representing the entire building industry. Since its inception in 1993, USGBC has played a vital role in providing a leadership forum and a unique, integrating force for the building industry. USGBC's programs have three distinguishing characteristics:

Committee-based

The heart of this effective coalition is our committee structure, in which volunteer members design strategies that are implemented by staff and expert consultants. Our committees provide a forum for members to resolve differences, build alliances, and forge cooperative solutions for influencing change in all sectors of the building industry.

Member-driven

Membership is open and balanced and provides a comprehensive platform for carrying out important programs and activities. We target the issues identified by our members as the highest priority. We conduct an annual review of achievements that allows us to set policy, revise strategies, and devise work plans based on members' needs.

Consensus-focused

We work together to promote green buildings, and in doing so, we help foster greater economic vitality and environmental health at lower costs. We work to bridge ideological gaps between industry segments and develop balanced policies that benefit the entire industry.

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IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Healthcare Supplement for complete credit information. For the omitted sections, refer to the main reference guide.

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INTRODUCTION

I. WHY MAKE YOUR BUILDING GREEN?

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

II. LEED® GREEN BUILDING RATING SYSTEM

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

III. OVERVIEW AND PROCESS

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for additional guidance related to the Overview and Process section.

When to Use LEED 2009 Global Alternative Compliance Paths

Alternative Compliance Paths (ACPs) to LEED credits provide additional options or approaches that address unique circumstances and accommodate advancements in science and technology. ACPs allow LEED to be more flexible and applicable to a wider range of projects. The LEED 2009 Building Design and Construction (BD&C) Global ACPs were developed for new construction and major renovations of commercial and institutional buildings, core and shell developments, schools, healthcare facilities, and retail projects. These Global ACPs can be applied at the discretion of the project team, based on applicability; they are not mandatory for any project. Some Global ACPs are available only for projects outside the U.S., and others are available for all LEED projects regardless of location, as indicated in the credit language.

Projects may use none, some, or all of the LEED 2009 Global ACPs and do not need to apply them consistently across credits unless noted in the credit language. Each credit category's Overview section includes a table identifying which credits have Global ACPs.

For specific guidance on which rating system to use, see the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement.

IV. LEED ONLINE DOCUMENTATION REQUIREMENTS

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

V. CERTIFICATION APPLICATION

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

VI. CERTIFICATION STRATEGY

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

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VII. EXEMPLARY PERFORMANCE STRATEGIES

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

VIII. REGIONAL PRIORITY

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

IX. TOOLS FOR REGISTERED PROJECTS

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for this section of the Introduction.

X. HOW TO USE THIS REFERENCE GUIDE

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for additional guidance.

The LEED 2009 BD&C Global Alternative Compliance Path Reference Guide Supplement is a supporting document to the LEED Global ACPs. This guide helps project teams understand the criteria, the reasons behind them, strategies for implementation, and documentation requirements. It includes examples of strategies that can be used in each category and additional resources. It does not provide an exhaustive list of strategies for meeting the criteria or all the information that a project team needs to determine the applicability of a credit to the project.

The LEED 2009 BD&C Global Alternative Compliance Path Reference Guide Supplement should be consulted in conjunction with the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement. Information in the reference guide is not repeated in this supplement, which focuses instead on the following:

- information specific to considerations for projects outside the U.S.
- new information for existing credits with new Alternative Compliance Paths

XI. CREDIT SUBSTITUTION

Project teams wishing to use LEED v4 credits in lieu of LEED 2009 credits may now do so. To substitute a LEED v4 credit for a LEED 2009 credit, project teams must consult the list of approved credit substitutions available on USGBC.org and download the LEED v4 sample credit form. Project teams must then complete and upload the sample form into LEED Online within the LEED 2009 credit they are substituting.

Credit substitutions are available for all projects, regardless of location. However, projects outside the U.S. may find credit substitutions particularly helpful for LEED v4 credits that address circumstances for projects outside the U.S.

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OVERVIEW

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for additional guidance.

Project teams outside the U.S. face many of the same challenges as their American counterparts when determining where to locate a new project. However, American codes and regulations often prove difficult to apply abroad. The Global Alternative Compliance Paths for Sustainable Sites allow project teams outside the U.S. to select local equivalents to the prescribed U.S. codes and regulations for select credits. In many cases this will lower overall project costs by reducing the required documentation.

Global ACPs

Local equivalent standards can be used in place of U.S. government regulations for SS Prerequisite 2 (Environmental Site Assessment), and SS Credit 1 (Site Selection). Project teams outside the U.S. can use a local code or regulation if it meets the intent of the prerequisite or credit.






A new option for SS Credit 4.1 (Alternative Transportation—Public Transportation Access) allows project teams to include additional vehicle types when calculating alternative transportation use for building occupants. The new option for SS Credit 6.1 (Stormwater Design—Quantity Control) allows project teams to calculate stormwater runoff reduction using a method that may be more appropriate in areas where it is difficult to calculate the 1- and 2-year 24-hour design storm.

Europe ACPs

The guidance for SS Credit 1 (Site Selection) has been expanded to provide European equivalents to the sensitive habitat definitions listed in the credit. This includes use of Directive 2007/60/EC for flood hazard areas, Natura 2000 for species and wetlands, and the European Red List for species.

Projects may use the Euro 6 standard to identify eligible vehicles for preferred parking in SS Credit 4.3 (Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles). This standard is mandatory for new vehicles in the European Union as of September 2015.

 **Table 1.** SS Credits with Global Alternative Compliance Paths

CREDIT	TITLE	HEALTHCARE
SS Prerequisite 1	Construction Activity Pollution Prevention	
SS Prerequisite 2	Environmental Site Assessment	
SS Credit 1	Site Selection	 
SS Credit 2	Development Density and Community Connectivity	
SS Credit 3	Brownfield Redevelopment	
SS Credit 4.1	Alternative Transportation—Public Transportation Access	
SS Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	
SS Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	

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SS Credit 4.4	Alternative Transportation—Parking Capacity	
SS Credit 5.1	Site Development—Protect or Restore Habitat	
SS Credit 5.2	Site Development—Maximize Open Space	
SS Credit 6.1	Stormwater Design—Quantity Control	
SS Credit 6.2	Stormwater Design—Quality Control	
SS Credit 7.1	Heat Island Effect—Nonroof	
SS Credit 7.2	Heat Island Effect—Roof	
SS Credit 8	Light Pollution Reduction	
SS Credit 9.1	Connection to the Natural World—Places of Respite	
SS Credit 9.2	Connection to the Natural World—Direct Exterior Access for Patients	

ENVIRONMENTAL SITE ASSESSMENT

HEALTHCARE: NC	
Prerequisite	SS Prerequisite 2
Points	Required

Intent

To ensure that the site is assessed for environmental contamination and, if contaminated, that the environmental contamination has been remediated to protect occupant health.

Requirements

Conduct a Phase I Environmental Site Assessment (as described in ASTM E1527-05) to determine if environmental contamination exists at the site. If contamination is suspected, conduct a Phase II Environmental Site Assessment [as described in ASTM E1903-97, (2002)]. Projects outside the U.S. may use a local equivalent to ASTM E1527-05 Phase I Environmental Site Assessment and ASTM E 1903-97 Phase II Environmental Site Assessment.

AND

Sites that are contaminated due to the past existence of a landfill on the site are prohibited. If the site is otherwise contaminated, then it must be remediated to meet local, state or federal EPA region residential (unrestricted) standards, whichever is the most stringent. Documentation from the authority must be provided, such as EPA's Ready for Reuse document, to prove "safe" levels of contamination have been achieved. As the remediation process leads to significant environmental benefit, one point (in SS Credit 3, Brownfield Redevelopment) will be given for successful documented remediation of the site.

SS PREREQUISITE 2

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SSHEALTHCARE:
NCPrerequisite
2**1. Benefits and Issues to Consider**

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for information on environmental and economic issues related to this prerequisite.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this prerequisite.

3. Summary of Referenced Standards

No new standards are referenced; see the LEED 2009 Green Building Design and Construction Reference Guide for summaries of the ASTM E1527-05, Phase I Environmental Site Assessment, and ASTM E1903-97, Phase II Environmental Site Assessment. If a local equivalent to the ASTM Phase I or Phase II site assessment has been selected, substitute that standard for the listed standards.

4. Implementation

If a local equivalent to the ASTM Phase I or Phase II Environmental Site Assessment has been selected, ensure that it is the most widely used and accepted by remediation experts in the project country. It should, at a minimum, test for the presence of any hazardous substances on the property, as indicated through present release, past release, or threat of release into the ground, ground water, surface water, or any structures on the property. If the local equivalent assessment determines that critical levels of contaminants are present at the project site, the site must be remediated to unrestricted use standards. Equivalency means meeting the criteria of the ASTM Phase I or Phase II Environmental Site Assessment listed in the Implementation section of the LEED 2009 Green Building Design and Construction Reference Guide.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this prerequisite.

6. Calculations

There are no calculations associated with this prerequisite.

7. Documentation Guidance

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

- Retain copies of the executive summaries from all local equivalent environmental site assessments performed.
- If remediation efforts were necessary, prepare a description of the efforts.
- Acquire documentation from the local governing authority showing that remediation to unrestricted use standards has been completed. The remediation efforts undertaken must at least match the stringency of the U.S. Environmental Protection Agency (EPA) requirements for residential (unrestricted) use. Residential land use is considered the most restrictive land use by EPA; it assumes that no contaminants are left on site to which children could be exposed.
- Provide documentation from the remediation expert or local authority stating that there are no contaminants remaining at the project site.

8. Examples

There are no examples for this prerequisite.

9. Exemplary Performance

This prerequisite is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

Preliminary screening levels and remediation criteria may differ by region or country. Please ensure that local equivalents to ASTM assessments meet the intent of the prerequisite and ensure that local or regional criteria at least match the stringency of the EPA and ASTM requirements.

11. Operations and Maintenance Considerations

For project sites that use a local equivalent in place of an ASTM Phase I and Phase II assessment process and require ongoing remediation, the project team and owner should keep careful records of remediation activities and develop a plan for ongoing compliance with local regulators' monitoring and reporting requirements.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for resources related to this prerequisite.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for definitions of terms used in this prerequisite.

SS	
HEALTHCARE: NC	Prerequisite 2

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SITE SELECTION

HEALTHCARE: NC	
Credit	SS Credit 1
Points	1 point

Intent

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

Requirements

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

- Prime farmland as defined by the U.S. Department of Agriculture in the United States Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 (citation 7CFR657.5). Projects outside the U.S. may use a local equivalent.
- Previously undeveloped land whose elevation is lower than five feet (1.5 meters) above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency (FEMA), an equivalent local regulatory agency, or a professional hydrologist. Projects in Europe may use the Directive 2007/60/EC definition of floods with a medium probability (likely return period ≥ 100 years).
- Land specifically identified as habitat for any species on federal or state threatened or endangered lists. Projects outside the U.S. may use a local equivalent. Projects in Europe may use Natura 2000 network of protected areas and the European Red List.
- Land within 100 feet (30 meters) of any wetlands as defined by the U.S. Code of Federal Regulations 40 CFR, Parts 230-233 and Part 22, or a local equivalent definition outside the U.S., and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent.
- Previously undeveloped land that is within 50 feet (15 meters) of a water body, defined as seas, lakes, rivers, streams and tributaries that support or could support aquatic life, recreation or industrial use, consistent with the terminology of the Clean Water Act.
- Land that prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (park authority projects and projects which are operated by and support the function of the park are exempt).

SS CREDIT 1

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1. Benefits and Issues to Consider

Several existing EU directives contain similar definitions for federal flood plains, habitat and wetlands listed in the credit and may be used by European project teams. EU Directive 2000/60/EC requires member states to assess, delineate and manage flood risks for all water courses and coast lines, and requires the preparation of flood hazard maps according to three different probability scenarios. Natura 2000 was established as a network of nature protection areas designated by EU member states and serves as a way for project teams to identify sensitive habitat, including habitat for threatened and endangered species, as well as wetlands. The European Red List identifies threatened and endangered species at the European level according to IUCN guidelines.

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards

Directive 2000/60/EC establishing a framework for the community action in the field of water policy (The Water Framework Directive)

http://ec.europa.eu/environment/water/water-framework/index_en.html

The Water Framework Directive has a number of objectives, such as preventing and reducing pollution, promoting sustainable water usage, environmental protection, improving aquatic ecosystems and mitigating the effects of floods and droughts. Its ultimate objective is to achieve “good ecological and chemical status” for all Community waters by 2015. Among the elements of this directive is to require EU member states to assess, delineate and manage flood risks for all water courses and coast lines.

European Red List

<http://ec.europa.eu/environment/nature/conservation/species/redlist/>

The European Red List enumerates the conservation status of over 6000 European animal and vascular plant species according to IUCN regional Red Listing guidelines. It identifies species that are threatened with extinction at the European level as identified through status assessments and compiled in IUCN Red List Reports by type of species.

Natura 2000

<http://ec.europa.eu/environment/nature/natura2000/>

Natura 2000 is the centerpiece of EU nature & biodiversity policy. It is an EU-wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe’s most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation designated by EU member countries under the Habitats Directive, and also incorporates Special Protection Areas which they designate under the Birds Directive. The establishment of this network of protected areas also fulfills a Community obligation under the UN Convention on Biological Diversity.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional referenced standards related to this credit.

4. Implementation

Avoid the sensitive land areas described in the credit requirements when selecting a site. Project

teams in Europe may use the following local equivalents for credit requirements:

- The EU Directive 2007/60/EC definition of floods with a medium probability (likely return period ≥ 100 years) may be used by projects in Europe as an alternative to the 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA).
- Natura 2000 and the European Red List may be used by projects in Europe to identify threatened and endangered species habitat.
- Natura 2000 may be used by projects in Europe to identify wetlands as an alternative to the definition in the U.S. Code of Federal Regulations 40 CFR, Parts 230-233 and Part 22.

To identify flood-prone areas within a site, project teams should consult the relevant local agency or agencies responsible for flood management to access a flood hazard map for the project location. A directory of country-specific flood map information can be found at http://ec.europa.eu/environment/water/flood_risk/flood_atlas/. Scenario (b), floods with medium probability (likely return period ≥ 100 years) is considered an acceptable alternative to credit requirements.

Project teams in Europe should also refer to the local administrative body for Natura 2000 sites when evaluating the location for threatened and endangered species habitat and for wetlands. A full listing of national agencies can be found through the European Commission's website: http://ec.europa.eu/environment/nature/natura2000/db_gis/index_en.htm#sites.

If the level of the 100-year flood is not defined in the project region or country, engage a professional hydrologist to determine the flood risk of the project site. The professional hydrologist should use the U.S. Federal Emergency Management Agency (FEMA) definition of the 100-year flood (the flood elevation that has a 1% chance of being reached or exceeded each year) to determine flood risk. If the professional hydrologist determines that the project site is less than 5 feet above the level of the 100-year flood, the project is not eligible to earn this credit.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional implementation guidance.

5. Timeline and Team

If the level of the 100-year flood is not defined in the project region or country, use a professional hydrologist to determine the flood risk of the project site. See the LEED 2009 Green Building Design and Construction Reference Guide for additional guidance on the timeline and team.

6. Calculations

There are no calculations associated with this credit.

7. Documentation Guidance

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

- Record any special circumstances regarding compliance with the site selection criteria.
- If the level of the 100-year flood is defined by a local equivalent to FEMA, include the definition used and the name of the local authority.
- Projects in Europe with access to local flood hazard maps pursuant to Directive 2007/60/EC should list "Directive 2007/60/EC definition of floods with a medium probability" in the local equivalent field.
- If the level of the 100-year flood is not defined in the project region or country, engage a

SS	
HEALTHCARE: NC	Credit 1

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professional hydrologist to determine the flood risk of the project site. The professional hydrologist should produce a report or an executive summary of findings and supporting documentation, such as site elevations and/or topographic maps and sections identifying the flood risk of the project site.

8. Examples

A project outside the U.S. is located in an area where no definition of the 100-year flood exists. The project team has hired a professional hydrologist to identify the flood risk of the project site and produce topographical maps and sections for the area surrounding the project site. The resulting site elevation map identifies the elevation of the project in meters above sea level. A topographic section identifies the water surface height of a nearby river during normal levels and during a 100-year storm event in relation to the elevation of the project site. This documentation is accompanied by a separate report from the professional hydrologist.

Figure 1. Topographic map identifying level of 100-year flood event and project site.

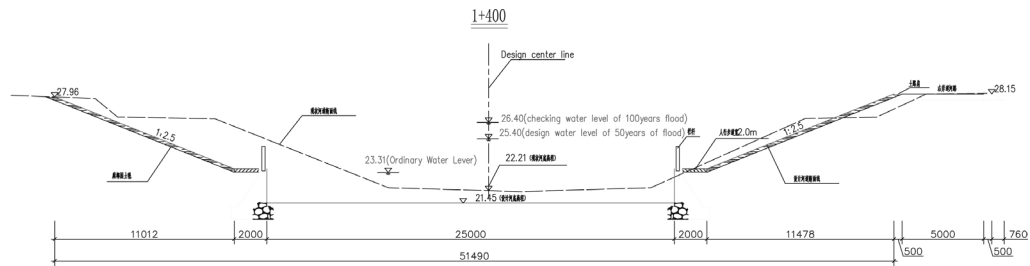
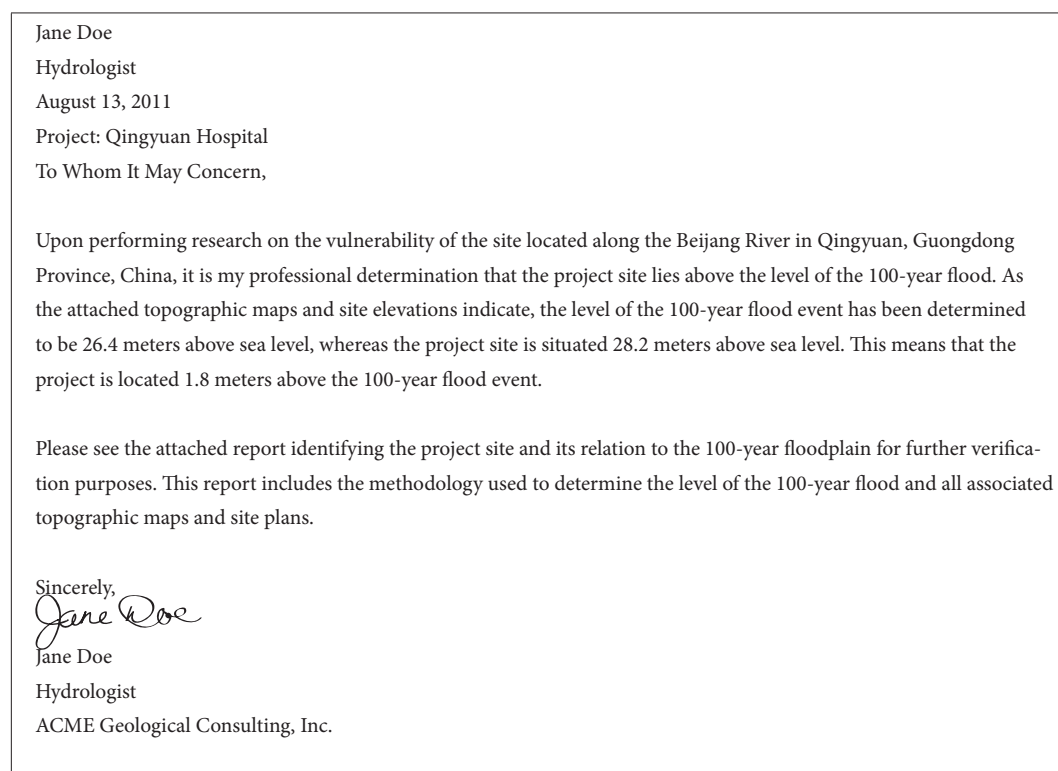


Figure 2. Letter from professional hydrologist explaining topographic map and level of 100-year flood.



SS	
HEALTHCARE: NC	Credit 1

Europe Example

A project team in the Netherlands is considering the acquisition and redevelopment of one of two project sites. Neither sites is currently owned or managed a public entity as park land. The project team conducts a simple visual survey to determine that there are no apparent water bodies or wetlands on either site, and consults a flood hazard map for the area to determine that both sites fall within an area for floods with a low probability, or extreme event scenarios.

The project team proceeds by consulting the local administrative body for Natura 2000 and determines that one of the candidate sites includes a Special Area of Conservation (SAC) for a threatened animal species. The project team thereby excludes this site.

As part of a planned ecological survey following site ownership, the project team confirms that the selected site includes no wetlands and no additional species present on the European Red List.

9. Exemplary Performance

This credit is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

There are no regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

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12. Resources

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ebsites

Directive 2009/147/EC on the conservation of wild birds (The Birds Directive)

http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

The Birds Directive works in tandem with the Habitat Directive to form the cornerstone of Europe's nature conservation policy. It establishes a system of protection for wild bird species and focuses on the protection of habitat for endangered and migratory species. The Birds Directive also establishes Special Protection Areas (SPAs) that are incorporated in the Natura 2000 network.

Directive 2000/60/EC establishing a framework for the community action in the field of water policy (The Water Framework Directive)

http://ec.europa.eu/environment/water/water-framework/index_en.html

The Water Framework Directive has a number of objectives, such as preventing and reducing pollution, promoting sustainable water usage, environmental protection, improving aquatic ecosystems and mitigating the effects of floods and droughts. Its ultimate objective is to achieve "good ecological and chemical status" for all Community waters by 2015. Among the elements of this directive is to require EU member states to assess, delineate and manage flood risks for all water courses and coast lines.

Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (The Habitat Directive)

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

The Habitat Directive is considered the cornerstone of Europe's nature conservation policy along with the Birds Directive. It includes language that "Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV", with Annex IV listing animal and plant species of community interest in need of strict protection. The Habitat Directive establishes the Natura 2000 network.

European Red List

<http://ec.europa.eu/environment/nature/conservation/species/redlist/>

The European Red List enumerates the conservation status of over 6000 European animal and vascular plant species according to IUCN regional Red Listing guidelines. It identifies species that are threatened with extinction at the European level as identified through status assessments and compiled in IUCN Red List Reports by type of species.

EXCIMAP Handbook of good practices in flood mapping

http://ec.europa.eu/environment/water/flood_risk/flood_atlas/

The European Exchange Circle on Flood Mapping (EXCIMAP) was established through a mandate by the Water Directors to review flood mapping practices in Europe and to facilitate exchanges between European experts. The handbook produced by EXCIMAP includes an Atlas of Flood Maps, with examples from 19 European countries as well as the U.S. and Japan.

Guidance Document No. 12: Common Implementation Strategy for the Water Framework Directive (2000/60/EC)

<http://www.apambiente.pt/dqa/assets/guidance-12---the-role-of-wetlands-in-the-water-framework-directive.pdf>

This document provides non-legally binding, practical guidance for stakeholders implementing the Water Framework Directive (2000/60/EC). Protected areas addressed by the Water Framework Directive, such as wetlands, are identified through the Natura 2000 network per this Guidance Document.

Natura 2000

<http://ec.europa.eu/environment/nature/natura2000/>

Natura 2000 is the centerpiece of EU nature & biodiversity policy. It is an EU-wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation designated by EU member countries under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the Birds Directive. The establishment of this network of protected areas also fulfills a Community obligation under the UN Convention on Biological Diversity.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

SS	
HEALTHCARE: NC	Credit 1

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ALTERNATIVE TRANSPORTATION—PUBLIC TRANSPORTATION ACCESS

SS CREDIT 4.1



HEALTHCARE: NC	
Credit	SS Credit 4.1
Points	3 points

Intent

To reduce pollution and land development impacts from automobile use.

Requirements

OPTION 1. Rail Station, Bus Rapid Transit Station & Ferry Terminal Proximity

Locate the project within 1/2-mile (800 meters) walking distance (measured from a main building entrance) of an existing or planned and funded commuter rail, light rail, subway station, bus rapid transit¹ station or commuter ferry terminal.

For stations located greater than 1/8-mile (200 meters) from building entrance, provide an on-demand shuttle service with a documented service plan.

OR

OPTION 2. Bus Stop Proximity

Locate the project within 1/8-mile (200 meters) walking distance (measured from a main building entrance) of one or more stops for two or more public, campus, or private bus lines usable by building occupants.

OR

OPTION 3. Rideshare Proximity

Projects outside the U.S. may locate the project within 1/4-mile (400-meter) walking distance (measured from a main building entrance) of 1 or more stops for 2 or more existing rideshare options² that meet the definition of public transportation³ and are authorized by the local transit authority if one exists.

¹ Bus rapid transit an enhanced bus system that operates on exclusive bus lanes or other transit rights-of-way; it is designed to combine the flexibility of buses with the efficiency of rail.

² Rideshare is a transit service that involves sharing a single vehicle with multiple people, excluding large-scale vehicles such as buses and trains. The rideshare transit facility must include a signed stop and a clearly defined waiting area. Additionally, the rideshare must include an enclosed passenger seating area, fixed route service, fixed fare structure, continuous daily operation, and the ability to pick up and drop off multiple riders. Rideshare options must hold 4 or more passengers, except for human-powered conveyances which must hold 2 or more passengers.

³ Public transportation consists of bus, rail, or other transit services for the general public that operate on a regular, continual basis.

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1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

There are no standards referenced for this credit.

4. Implementation

If Option 1, Rail Station, Bus Rapid Transit Station & Ferry Terminal Proximity, is selected, see the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for implementation guidance.

If Option 3, Rideshare Proximity, is selected, ensure that the vehicles that serve the project site meet the definition of rideshare provided in the Definitions section. See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for additional implementation guidance.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations

If Option 3, Rideshare Proximity, is selected, please follow the calculations instructions for Options 1 and 2 in the LEED 2009 Green Building Design and Construction Reference Guide.

7. Documentation Guidance

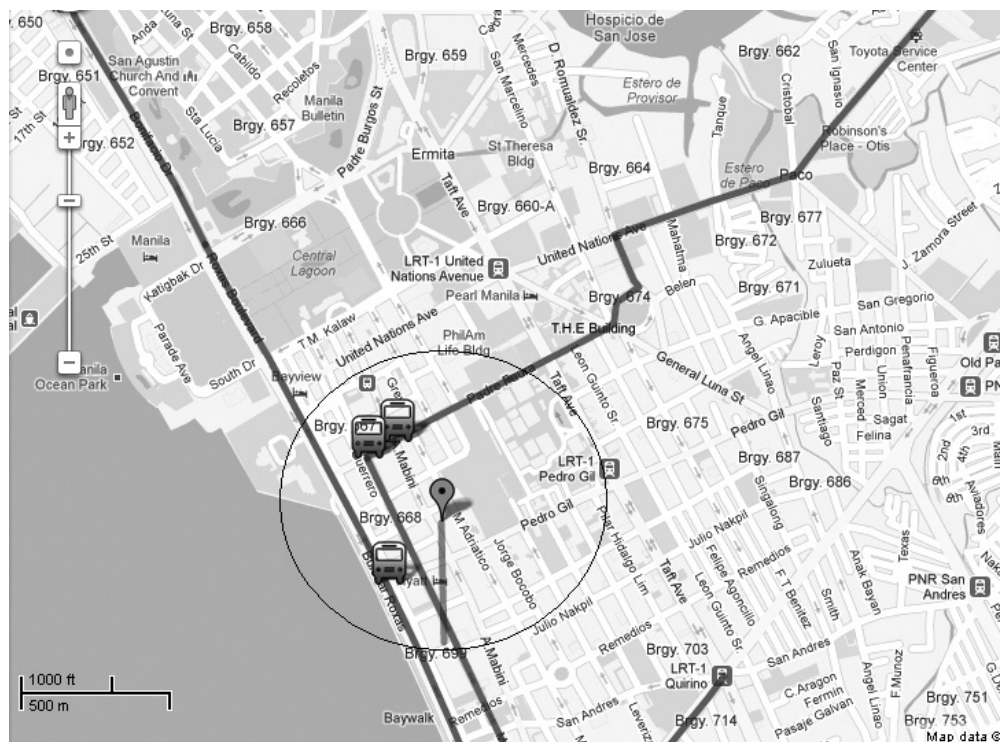
As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.








- Identify local rail stations, bus rapid transit stations, commuter ferry terminals, and bus or rideshare routes serving the project building.
- Develop a site vicinity plan, to scale, and label walking paths between the project building's main entrance and rail stations, bus rapid transit stations, commuter ferry terminals, and bus or rideshare stops.
- If the team anticipates rail service, obtain verification of funding for the rail project.

8. Examples

A hospital in Manila is within walking distance of multiple public rideshare lines. Figure 1 shows all rideshare routes within a 1/4-mile (400-meter) walking distance from the building's main entrance. Rideshare stop locations are clearly identified on the vicinity map. The rideshare routes also connect to additional public transportation lines that traverse the city.

Figure 1. Sample area drawing: Vicinity map identifying rideshare stop locations and route destination information





-  Project Location
-  1/4 Mile (400 Meters)
-  Waterfront Route
4.7 mi - about 13 mins
-  Padre Faura & A. Mabini
Serves the East West Route and the Waterfront Route
-  Padre Faura & M.H. del Pilar
-  East West Route
3.1 mi - about 15 mins
-  FX Stop - Roxas

Additionally, the project team has identified the type of vehicle, rideshare stop location, and route information for each route identified in a separate table, as shown in Figure 2

SS	
HEALTHCARE: NC	Credit 4.1

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Figure 2. Rideshare transportation table

TRANSPORTATION TABULATION			
	SERVICE IDENTIFICATION (CORRESPONDS TO THE UPDATED VISION MAP)	LOCATION	ROUTE
1		Padre Faura corner M.H. del Pilar	Sta. Cruz - Baclaran
2		Padre Faura corner A. Mabini	Divisoria - F.B. Harrison
3	FX ROUTE	Roxas Boulevard	Lawton - Baclaran/Sucat

9. Exemplary Performance

Project teams may earn an Innovation in Design credit for exemplary performance by complying with the requirements of 1 of the 2 options described in the Exemplary Performance section of the LEED 2009 Green Building Design and Construction Healthcare Supplement.

Projects located within 1/2 mile (800 meters) of bus rapid transit or commuter ferries are eligible for exemplary performance through Option 2, Double Transit Ridership.

Project teams that select Option 3, Rideshare Proximity, are not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations

There are no regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for resources related to this credit.

13. Definitions

Bus rapid transit is an enhanced bus system that operates on exclusive bus lanes or other transit rights-of-way; it is designed to combine the flexibility of buses with the efficiency of rail.

Rideshare is a transit service that involves sharing a single vehicle with multiple people, excluding large-scale vehicles such as buses and trains. The rideshare transit facility must include a signed stop and a clearly defined waiting area. Additionally, the rideshare must include an enclosed passenger seating area, fixed route service, fixed fare structure, continuous daily operation, and the ability to pick up and drop off multiple riders. Rideshare vehicles must hold 4 or more passengers, except for human-powered conveyances, which must hold 2 or more passengers.

Public transportation consists of bus, rail, or other transit services for the general public that operate on a regular, continual basis.

ALTERNATIVE TRANSPORTATION—LOW-EMITTING AND FUEL-EFFICIENT VEHICLES

SS CREDIT 4.3

HEALTHCARE: NC	
Prerequisite	SS Credit 4.3
Points	1 point

Intent

Reduce pollution and land development impacts from automobile use.

Requirements

OPTION 1

Provide preferred parking¹ for low-emitting and fuel-efficient vehicles² for 5% of the total vehicle parking capacity of the site.

OR

OPTION 2

Install alternative-fuel fueling stations for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

OR

OPTION 3

Provide low-emitting and fuel-efficient vehicles for 3% of Full Time Equivalent (FTE) staff measured at peak periods.

Provide preferred parking¹ for these vehicles.

OR

OPTION 4

Provide staff access to a low-emitting or fuel-efficient vehicle²-sharing program. The following requirements must be met:

- One low-emitting or fuel-efficient vehicle must be provided per 3% of FTE staff measured at peak periods, assuming that one shared vehicle can carry eight persons (i.e., 1 vehicle per 267 FTE occupants). For buildings with fewer than 267 FTE staff, at least one low emitting or fuel-efficient vehicle must be provided.
- A vehicle-sharing contract must be provided that has an agreement of at least two years.
- The estimated number of customers served per vehicle must be supported by documentation

1 For the purposes of this credit “preferred parking” refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped persons) or parking passes provided at a discounted price. To establish a meaningful incentive in all potential markets, the parking rate must be discounted at least 20%. The discounted rate must be available to all eligible customers (i.e. not limited to the number of customers equal to 5% of the vehicle parking capacity), publicly posted at the entrance of the parking area, and available for a minimum of 2 years.

2 For the purposes of this credit, low-emitting vehicles are defined as vehicles that are classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board. Fuel-efficient vehicles are defined as vehicles that have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide. Projects in Europe may use vehicles meeting the Euro 6 limit values of Regulation (EC) No. 715/2007.

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SS CREDIT 4.3

- A narrative explaining the vehicle-sharing program and its administration must be submitted.
- Parking for low-emitting and fuel-efficient vehicles must be located in the nearest available spaces in the nearest available parking area. Provide a site plan or area map clearly highlighting the walking path from the parking area to the project site and noting the distance.

SS	
HEALTHCARE: NC	Credit 4.3

1. Benefits and Issues to Consider

The ACEEE Green Book and CARB Zero Emissions Vehicle classifications include only vehicles sold within the US. While several low-emitting and fuel-efficient vehicle models are sold in both the U.S. and the EU, and are thus eligible for preferred parking, most project teams will find this definition does not by itself provide adequate vehicle options for European consumers.

Various EU directives and their amending acts have vehicle standards for emissions and fuel economy for both diesel and petrol vehicles. These standards have come into force in stages, beginning with Euro 1 and most recently with Euro 6. The Euro 6 standard is now mandatory for all new vehicles sold in the EU and requires vehicle manufacturers to meet advanced tailpipe emissions and fuel economy targets. These targets exceed U.S. regulations and are considered equivalent to the average low-emitting and fuel-efficient vehicle in the U.S.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

Regulation (EC) No. 715/2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information

<http://eur-lex.europa.eu/>

Regulation (EC) No 715/2007 is an amendment to Directive 70/220/EEC that establishes the Euro 5 and Euro 6 limit values for vehicles sold in the EU. Compliance with the Euro 6 emissions standards is determined by a standardized test cycle measuring emissions of nitrogen oxides (NO_x), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and hydrocarbons and nitrogen oxides (HC+N, for diesel vehicles only).

4. Implementation

Projects in Europe may use the Euro 6 limit values listed in Regulation (EC) No. 715/2007 to meet the definition of low-emitting and fuel-efficient vehicles in this credit. Only vehicles classified as M1 category (vehicles with at least four wheels designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat) are eligible.

When providing resources to building users regarding designated preferred parking, project teams should note that all new vehicles first registered in Europe after September 1, 2015 will be required to comply with the Euro 6 vehicle standard. Several manufacturers have voluntarily incorporated Euro 6 limit values prior to this date, however enforcement of Euro 6 vehicle standard will not retroactively apply to vehicles on the road but sold prior to this date. Manufacturer websites may include information on compliant vehicles prior to enforcement.

See the LEED 2009 Green Building Design and Construction Reference Guide for implementation guidance related to this credit.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

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6. Calculations

There are no additional calculations associated with this credit. See LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples

A project team in France is contacted by a building user requesting further information on the preferred parking spaces for low-emitting and fuel-efficient vehicles provided by the project as part of Option 1. The user indicates that she is purchasing a Citroen C4 Cactus (MY 2014) which has voluntarily met the Euro 6 standard in advance of the enforcement date. The parking attendant confirms with the user that she may use the preferred parking space with this vehicle.

See the LEED 2009 Green Building Design and Construction Reference Guide for an example detailing a plan for preferred parking spaces.

9. Exemplary Performance

See the LEED 2009 Green Building Design and Construction Reference Guide for information about Exemplary Performance related to this credit.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

Websites

Directive 2001/116/EC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers

<http://eur-lex.europa.eu/>

Directive 2001/116/EC establishes the vehicle category classes (M, N, O and G) which are used to classify emissions limits in many European vehicle regulations. It adapts EU Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.

Directive 70/220/EEC on measures to be taken against air pollution by emissions from motor vehicles

<http://eur-lex.europa.eu/>

Directive 70/220/EEC established mandatory technical standards for vehicle emissions and serves as the basis for subsequent amendments and directives regarding vehicle emissions and the Euro vehicle standards.

European Union Directives and Regulations for Motor Vehicles

http://ec.europa.eu/enterprise/sectors/automotive/documents/directives/motor-vehicles/index_en.htm

A directory of EU vehicle directives and regulations for motor vehicles, trailers, systems and components, organized by year. This directory includes several amending acts to EU Framework Directive 2007/46/EC related to the Euro 6 standard.

European Vehicle Market Statistics Pocketbook

<http://eupocketbook.theicct.org/>

The European Vehicle Market Statistics Pocketbook offers a statistical portrait of passenger car and light commercial vehicles in the EU, including vehicle sales, fuel consumption and CO₂ emissions by brand and model. The pocketbook dates back to 2001 and is updated annually. Statistics are drawn from data maintained by the International Council on Clean Transportation.

Regulation (EC) No 715/2007 on type approval of motor vehicles with respect to emissions from **light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information**

<http://eur-lex.europa.eu/>

Regulation (EC) No 715/2007 is an amendment to Directive 70/220/EEC that establishes the Euro 5 and Euro 6 limit values for vehicles sold in the EU. Compliance with the Euro 6 emissions standards is determined by a standardized test cycle measuring emissions of nitrogen oxides (NO_x), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and hydrocarbons and nitrogen oxides (HC+N , for diesel vehicles only).

Regulation (EC) No. 443/2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO₂ emissions from light-duty vehicles

<http://eur-lex.europa.eu/>

Regulation 443/2009/EC requires mandatory reductions of CO₂ emissions for new passenger vehicles in order to reach an objective of 130 g CO₂/km for the average new car fleet.

Regulation (EC) No. 692/2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information

<http://eur-lex.europa.eu/>

Regulation 692/2008/EC describes the procedures for implementation and manufacturer obligations. It also explains member state non-compliance penalties and guidance on financial incentives.

13. Definitions

See LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms identified in this credit.

SS

HEALTHCARE:
NC

Credit 4.3

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STORMWATER DESIGN—QUANTITY CONTROL

HEALTHCARE: NC	
Credit	SS Credit 6.1
Points	1 point

Intent

To limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff and eliminating contaminants.

Requirements

OPTION 1. Design Storms

CASE 1. Sites with Existing Imperviousness 50% or Less

PATH 1

Implement a stormwater management plan that prevents the post-development peak discharge rate and quantity from exceeding the predevelopment peak discharge rate and quantity for the 1- and 2-year 24-hour design storms.

OR

PATH 2

Implement a stormwater management plan that protects receiving stream channels from excessive erosion. The stormwater management plan must include stream channel protection and quantity control strategies.

CASE 2. Sites with Existing Imperviousness Greater Than 50%

Implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year 24-hour design storm.

OR

OPTION 2. Percentile Rainfall Events

CASE 1. Non-Zero Lot Line Projects

In a manner best replicating natural site hydrology¹ processes, manage onsite² the runoff from the developed site for the 95th percentile of regional or local rainfall events using Low Impact Development³ (LID) and green infrastructure⁴.

Use daily rainfall data and the methodology in the United States Environmental Protection Agency's Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act to determine the 95th percentile amount.

¹ Natural Site Hydrology is defined as the natural land cover function of water occurrence, distribution, movement, and balance.

² Manage Onsite refers to capturing and retaining the specified volume of rainfall to mimic natural hydrologic function. This includes, but is not limited to, strategies that manage volume through evapotranspiration, infiltration, or capture and reuse.

³ Low Impact Development (LID) is defined as an approach to managing stormwater runoff that emphasizes on-site natural features to protect water quality by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles such as minimizing land disturbance, preserving vegetation, minimizing impervious cover, and design practices like rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments. These are engineered practices that may require specialized design assistance.

⁴ Green Infrastructure is a soil and vegetation-based approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture and reuse stormwater to maintain or restore natural hydrologies (US EPA).

SS CREDIT 6.1



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SS CREDIT 6.1

OR

CASE 2: Zero Lot Line Projects

For zero lot line projects located in urban areas with a minimum density of 1.5 FAR (13,800 square meters per hectare net), in a manner best replicating natural site hydrology processes, manage onsite the runoff from the developed site for the 85th percentile of regional or local rainfall events using LID and green infrastructure.

1. Benefits and Issues to Consider

Projects outside the U.S. often use different size design storms than those identified in Option 1 of this credit. This doubles the effort required for project teams to demonstrate compliance, as they need to recalculate design storms based on the parameters outlined in the requirements. This can add time and cost, while not achieving the actual intent of the credit to limit disruption of natural hydrology cycles through stormwater best management practices. However, projects using infiltration strategies to mitigate stormwater runoff may not need to recalculate design storms to demonstrate compliance with this credit.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards

Stormwater Management for Federal Facilities under Section 438 of the Energy Independence and Security Act (USA)

<http://www.epa.gov/owow/NPS/lid/section438/>

Stormwater runoff in urban areas is one of the leading sources of water pollution. Section 438 of the U.S. Energy Independence and Security Act sets guidelines for restoring project sites to their predevelopment hydrology. U.S. EPA's technical guidance for Section 438 provides background information, definitions, and case studies. See the website for additional information and resources.

4. Implementation

Option 1. Design Storms

LEED Interpretations #5214 and #2615 rule that projects using onsite infiltration practices to mitigate 100% of stormwater runoff meet the requirements of both this credit and SS6.2: Stormwater Management – Quality Control. Therefore, projects can achieve this credit when using and documenting alternative storm events (i.e. 5-and-10 year storm events) through infiltrating 100% of stormwater onsite.

Option 2. Percentile Rainfall Events

Projects that fall under Case 1, Non-Zero Lot Line Projects, should obtain local rainfall data for at least the past 5 years, if available. This information may be obtained from various sources:

- Aquastat
- the local governing authority
- local airports
- universities
- water treatment plants
- other facilities whose monitoring stations record time and total precipitation depth during each time interval

With the rainfall data, calculate the 95th percentile of regional or local storm events using the methodology in Section E of the Technical Guidance on Implementing Stormwater Runoff Requirements from the referenced standard. Determine the volume of rainwater runoff for the project site. Based on the developed project site conditions, identify areas with potential to produce runoff (areas where rainwater will not infiltrate completely into the ground). For

SS	
HEALTHCARE: NC	Credit 6.1

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these developed site conditions, manage the runoff by using Low-Impact Development (LID) strategies and green infrastructure on site.

If rainfall data are not available for the project's region, natural land cover maps may be used. Determine the natural land cover conditions of the project site and use these conditions to assign runoff curve numbers. Calculate the volume of rainfall using the method described in the LEED 2009 Green Building Design and Construction Reference Guide.

Design the site to manage the volume of runoff for the 95th percentile of regional or local events. There may be multiple low-impact development or green infrastructure rainwater management facilities on the site. Consult U.S. EPA for a list of potential LIDs. Consider the following:

- A project site can utilize one or multiple facilities
- Locate facilities strategically to best mimic natural site hydrology (direction of flow, etc)
- Facilities may have different infiltration rates and storage capacity.
- The contaminant removal potential of the facilities

Projects that fall under Case 2, Zero Lot Line Projects, should confirm the zero lot line designation. This means that the building limits align with the site limits and the LEED project boundary. Calculate the density of the area surrounding the project. If the density is 1.5 FAR (13,800 square meters per hectare net) or greater, the project is eligible to use this case.

Follow the steps in Option 2, Case 1, above but calculate the 85th percentile rather than the 95th percentile.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations

Option 1. Design Storms

There are no additional calculations associated with this option. See the LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

Option 2. Percentile Rainfall Events

Instructions for calculating percentile storm events can be found in Section E of the Technical Guidance on Implementing Stormwater Runoff Requirements from the referenced standard. of the referenced standard.

Calculate the runoff volume based on the project's developed conditions; refer to the LEED 2009 Green Building Design and Construction Reference Guide. Size the LID facility based on the projected volume of runoff water for the percentile storm event. All calculated runoff from the percentile storm events must be managed.

Alternatively, if using natural land cover condition maps, refer to the LEED 2009 Green Building Design and Construction Reference Guide and manage the runoff for the developed site conditions.

7. Documentation Guidance

Option 1. Design Storms

When documenting alternative storm events, identify the project's predevelopment and postdevelopment discharge rates in the standard section of the LEED Online form. Be sure to indicate that an alternative storm event (other than the standard 1-and-2 year storm event) was used for this calculation in the "Special Circumstances" section. Also indicate that 100% of stormwater is infiltrated onsite.

Option 2. Percentile Rainfall Events

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

- Gather rainfall event data over at least 5 years and document the source of that information.
- Show the calculations for the 85th or 95th percentile and for volume of runoff based on the developed site area.
- Describe the proposed stormwater management practices used on site, explain what qualifies them as LID or green infrastructure, and show how the design replicates natural site hydrology.

8. Examples

Option 1. Design Storms

A project in Temuco, Chile is attempting to achieve this credit using a 5 year design storm rather than the 1-and-2-year design storm. The project is situated in an area with a requirement to mitigate 100% of stormwater on-site through infiltration.

First, the project team documented the predevelopment conditions of the building site.

Figure 1. Example documentation identifying predevelopment site conditions.

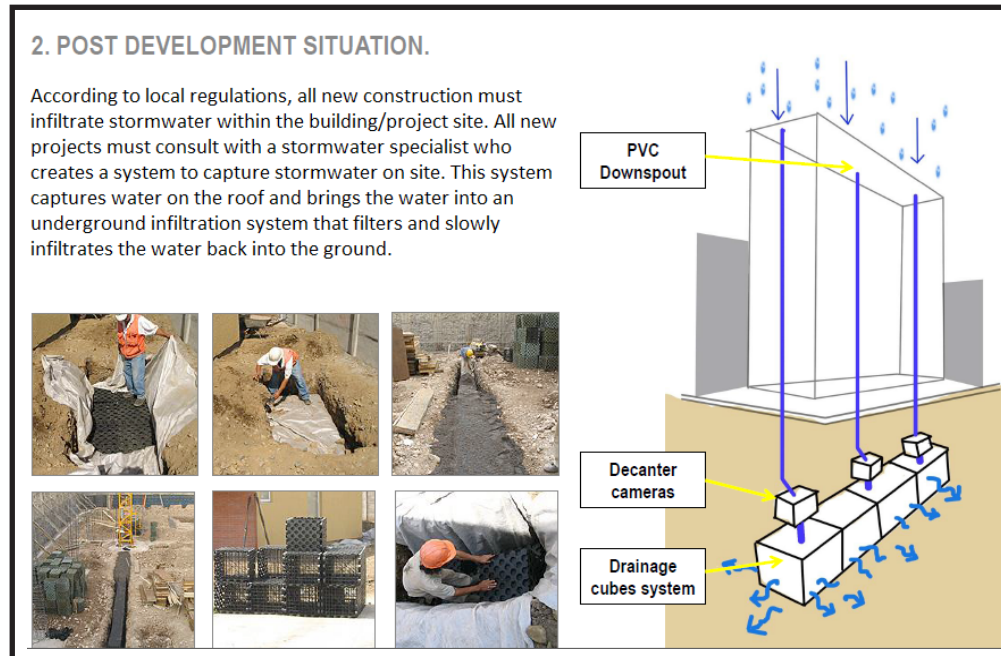


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SS	
HEALTHCARE: NC	Credit 6.1

Then, the project team demonstrated how stormwater is mitigated at the project site.

Figure 2. Example documentation identifying stormwater management strategies.



Because 100% of stormwater is collected onsite and infiltrated into the ground, the project qualifies for both this credit and SSc6.2: Stormwater Design – Quality Control.

Option 2. Percentile Rainfall Events

See the Technical Guidance on Implementing Stormwater Runoff Requirements from the referenced standard for examples of how to implement LID and green infrastructure practices to manage runoff for the percentile storm event.

9. Exemplary Performance

Option 1. Design Storms

LEED Interpretation #10108 identifies exemplary performance strategies available for this credit.

To demonstrate a comprehensive approach and performance above and beyond the credit requirements, the stormwater management strategies must:

1. Address runoff from the entire development footprint of the site using Low Impact Development (LID) practices.
2. Achieve the following stormwater quantity performance:
 - a. Option 1, Case 1, Path 1: Achieve a post-development peak discharge rate and quantity that is equivalent to those calculated for the pre-development site conditions.
 - b. Option 1, Case 1, Path 2: No Exemplary Performance is available for this compliance path.
 - c. Option 1, Case 2: Achieve a 50% reduction in the volume of runoff during the 2-year 24-hour design storm.

Projects may achieve exemplary performance in this credit by infiltrating 100% of stormwater onsite.

Option 2. Percentile Rainfall Events

Projects using this option are not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

SS	
HEALTHCARE: NC	Credit 6.1

10. Regional Variations

There are no regional variations associated with Option 2, Percentile Rainfall Events.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

Websites

Aquastat

<http://www.fao.org/nr/water/aquastat/main/index.stm>

This international resource for precipitation data is maintained by the Food and Agriculture Organization of the United Nations.

U.S. EPA, Low-Impact Development, Stormwater Management, Section 438

<http://www.epa.gov/owow/NPS/lid/section438/>

This website provides valuable information, including technical guidance and fact sheets, on low-impact development strategies that can be used to mitigate stormwater runoff.

USGBC LEED Interpretations Database

<http://www.usgbc.org/node/1731618?view=interpretations>

Several LEED Interpretations have been issued clarifying how projects using infiltration practices can approach this credit and establishing exemplary performance strategies.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for additional resources related to this credit.

13. Definitions

Natural site hydrology is the natural land cover function of water occurrence, distribution, movement, and balance.

Manage onsite refers to capturing and retaining the specified volume of rainfall to mimic natural hydrologic function. Strategies may include evapotranspiration, infiltration, and capture and reuse.

Low-Impact Development (LID) is an approach to managing stormwater runoff that emphasizes onsite natural features to protect water quality by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles, such as minimizing land disturbance, preserving vegetation, and minimizing impervious cover, and design practices like rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments. These engineered practices may require specialized design assistance.

Green infrastructure is a soil- and vegetation-based approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture and reuse stormwater to maintain or restore natural hydrologies (U.S. EPA).

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WATER EFFICIENCY

WE OVERVIEW

OVERVIEW

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for additional guidance.

Global ACPs

Clean water is a precious resource that is in constant demand. As human development spreads and the world's population continues to increase, it is imperative that water resources be preserved. Project teams outside the U.S. encounter seasonal differences when trying to limit the water use of a new building.




Because evaporative condensers are more common than cooling towers in some areas outside the U.S., WE Credit 4.2 (Water Use Reduction—Cooling Towers) has been revised to allow project teams whose healthcare facilities are equipped with evaporative condensers to take credit for their water management strategies.

Europe ACPs

WE Prerequisite 1 (Water Use Reduction) has been modified to align flow and flush rates, as well as pressure differences, to European standard values derived from European Union Policy.

WE Credit 3 (Water Use Reduction) has been updated to reflect European standard values in WE Prerequisite 1 (Water Use Reduction).

 **Table 1. WE Credits with Global Alternative Compliance Paths**

CREDIT	TITLE	HEALTHCARE
WE Prerequisite 1	Water Use Reduction	
WE Prerequisite 2	Minimize Potable Water Use for Medical Equipment Cooling	
WE Credit 1	Water Efficient Landscaping—No Potable Water Use or No Irrigation	
WE Credit 2	Water Use Reduction—Measurement and Verification	
WE Credit 3	Water Use Reduction	
WE Credit 4.1	Water Use Reduction—Building Equipment	
WE Credit 4.2	Water Use Reduction—Cooling Towers	
WE Credit 4.3	Water Use Reduction—Food Waste Systems	

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WE PREREQUISITE 1

HEALTHCARE: NC	
Prerequisite	WE Prerequisite 1
Points	NA

Intent

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

Requirements

Building Water Use

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation). The baseline shall meet the requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.¹ Projects in Europe may use the values defined by European standards.

Calculations are based on estimated occupant usage and must include only the following fixtures and fixture fittings (as applicable to the project scope): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves. Fixtures used for clinical use, such as surgical scrub sinks and exam room sinks are exempt from this calculation.

Table 1: National Efficiency Baselines for Commercial and Residential Water-Using Fixtures, Fittings and Appliances (adapted from information developed and summarized by the U.S. Environmental Protection Agency Office of Water).

Fixtures, Fittings, and Appliances	Current Baseline (Imperial Units)	Current Baseline (Metric Units)
Toilets	1.6 gallons per flush (gpf)*	6 liters per flush (lpf)
Urinals	1.0 (gpf)	4.0 lpf
Lavatory (restroom) faucets	2.2 gallons per minute (gpm) at 60 pounds per square inch (psi), private applications only (e.g., hospital patient rooms) 0.5 (gpm) at 60 (psi)** all others except private applications 0.25 gallons per cycle for metering faucets	8.5 liters per minute (lpm) at 4 bar (58 psi), private applications only (e.g., hospital patient rooms) 2.0 lpm at 4 bar (58 psi), all others except private applications 1 liter per cycle for metering faucets
Pre-rinse spray valves (for food service applications)	Flow rate ≤ 1.6 (gpm)	Flow rate ≤ 6 liters per minute (lpm)
Showerheads	2.5 gpm at 80 psi per shower stall***	9.5 lpm at 5.5 bar (80 psi) per shower stall

¹ Tables adapted from information developed and summarized by the U.S. Environmental Protection Agency (EPA) Office of Water based on requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.

WE PREREQUISITE 1

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WE PREREQUISITE 1

Fixtures, Fittings, and Appliances	Current Baseline (Imperial Units)	Current Baseline (Metric Units)
<p>* EPAAct 1992 standard for toilets applies to both commercial and residential models.</p> <p>** In addition to EPAAct requirements, the American Society of Mechanical Engineers standard for public lavatory faucets is 0.5 gpm at 60 psi (2.0 lpm at 4 bar (58 psi)) (ASME A112.18.1-2005). This maximum has been incorporated into the national Uniform Plumbing Code and the International Plumbing Code.</p> <p>*** Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas and jets, must be limited to the allowable showerhead flow rate as specified above (2.5 gpm/9.5 lpm) per shower compartment, where the floor area of the shower compartment is less than 2,500 square inches (1.5 square meters). For each increment of 2,500 square inches (1.5 square meters) of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above must be allowed. Exception: Showers that emit recirculated nonpotable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.</p>		

AND

Process Water Use

Employ strategies that in aggregate use 20% less water than the process water use baseline calculated for equipment performance requirements as listed in Table 2. Calculations are based on estimated occupant usage and shall include only the following fixtures (as applicable to the project scope): clothes washers, dishwashers, ice machines, food steamers and combination ovens.

Exemptions from calculations:

- Appliances and equipment for which water is used toward human consumption may be excluded. For example, bread misters, soda machines, coffee making machines, misters for produce and fixtures used to fill sinks for washing produce.
- Fixtures whose flow rates are regulated by health codes may be excluded from the calculation. For example, regulated medical equipment is excluded. See WE Prerequisite 2: Minimize Potable Water Use for Medical Equipment Cooling for requirements applicable to heat rejecting medical equipment.

For applicable equipment not addressed in Tables 1 or 2, additional equipment performance baseline requirements may be proposed, provided that documentation supporting the proposed benchmark or industry standard is provided.

Table 2: Equipment Performance Requirements Table

Equipment	Baseline (Imperial Units)	Baseline (Metric Units)
Commercial Clothes Washer – less than 80 lbs (36.3 kg)	9 gallon/CF/cycle	1,200 liters/m3/cycle
Commercial Dishwashers		
Undercounter – high temp	1.98 gallon/rack	7.50 liters/rack
Undercounter – low temp	1.95 gallon/rack	7.38 liters/rack
Door type – high temp	1.44 gallon/rack	5.45 liters/rack
Door type – low temp	1.85 gallon/rack	7.00 liters/rack
Single tank rack conveyor – high temp	1.13 gallon/rack	4.28 liters/rack
Single tank rack conveyor – low temp	1.23 gallon/rack	4.66 liters/rack
Multi-tank rack conveyor – high temp	1.1 gallon/rack	4.16 liters/rack
Multi-tank rack conveyor – low temp	0.99 gallon/rack	3.75 liters/rack
Flight type	180 gallon/hour	681 liters/hour
Commercial Ice Machines		
Water-cooled ice machine capacity < 450 lb/day (<204.11 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine capacity > 450 lb/day (>204.11 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (w/o remote compressor) capacity < 1000 lb/day (<453.59 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (w/o remote compressor) capacity > 1000 lb/day (>453.59 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (with remote compressor) capacity < 934 lb/day (<423.66 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (with remote compressor) capacity > 934 lb/day (>423.66 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine Self Contained Unit (SCU)	<25 gal/100 lb ice	<95 liters/46 kg ice
Water-cooled ice machines	Must be on closed cooling loop	
Water-cooled ice machines once through cooling	Not allowed	
Food Steamers		
Boiler type steam cooker – batch cooking	8 gallon/hour/pan	30.28 liters/hour/pan
Boilerless type steam cooker – high production/cook to order	8 gallon/hour/pan	30.28 liters/hour/pan
Combination Oven	40 gph	151.42 lph
Countertop or stand mounted	40 gph	151.42 lph
Roll-in	60 gph	227.12 lph
Other equipment	Performance baseline based on industry standards	

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1. Benefits and Issues to Consider

Project teams in Europe may encounter difficulty using the baseline and reference values in global language. These baseline values are based upon U.S. policies such as the EPA 1992 and do not take into account differences in water pressure in Europe. As a result, flush and flow rate values based upon relevant Comité Européen de Normalisation (CEN) standards for water closets, urinals, showerheads, lavatory faucets, kitchen sink faucets and valves have been provided for use by project teams in Europe. These project teams may also use high-performance values from the Well system for prerequisite compliance.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional information on environmental and economic issues related to this prerequisite.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this prerequisite.

3. Summary of Referenced Standards

EN 200:2008 Sanitary Tapware—Single Taps and Combination Taps for Water Supply Systems of Type 1 and Type 2- General Technical Specification

<http://www.cen.eu/CEN>

European Standard EN 200:2008 specifies the field of application for pillar taps, bib taps, single and multi-hole combination taps; and the dimensional, leak tightness, pressure resistance, hydraulic performance, mechanical strength, endurance, and acoustic characteristics of various types of taps and provides test methods to verify these characteristics. This standard applies to draw-off taps for use with sanitary appliances installed in rooms used for bodily hygiene and in kitchens.

EN 246:2003 Sanitary Tapware—General specifications for Flow Rate Regulators

<http://www.cen.eu/CEN>

European Standard EN 246:2003 specifies the performance criteria related to the health and environmental protection of people for sanitary taps and their related accessories used for the water supply. The performance requirements are expressed in terms of mechanical endurance, flow rate, effectiveness and level of acoustic pressure. This standard includes and makes reference to the corresponding test methods and the evaluation of conformity of the product to this standard.

EN 817:2008 Sanitary Tapware— Mechanical Mixing Valves (PN 10) – General Technical Specifications.

<http://www.cen.eu/CEN>

European Standard EN 817:2008 specifies the dimensional, leak-tightness, pressure resistance, hydraulic performance, mechanical strength, endurance, and acoustic characteristics with which mechanical mixing valves need to comply and the test methods to verify these characteristics. This standard applies to mechanical mixing valves for use with sanitary appliances installed in rooms used for bodily hygiene and in kitchens.

EN 997:2012– WC Pans and WC Suites with Integrated Tap

<http://www.cen.eu/CEN>

European Standard EN 997:2012 specifies constructional and performance requirements together with test methods for close-coupled suites, one-piece, and independent WC pans with integral trap used for personal hygiene manufactured from glazed ceramics or stainless steel.

EN 1112:2008 for Sanitary Tapware– Shower Outlets for Sanitary Tapware for Water Supply Systems Type 1 and Type 2 – General Technical Specifications

<http://www.cen.eu/CEN>

European Standard EN 1112:2008 specifies the dimensional, leak-tightness, mechanical, hydraulic, and acoustic characteristics with which shower outlets shall comply and the procedures for testing these characteristics. This standard applies to shower heads and hand showers of any material used for the ablutionary purpose intended for equipping and supplementing sanitary tapware for baths and showers.

See the LEED 2009 Green Building Design and Construction Reference Guide for a summary of additional standards referenced in this prerequisite.

4. Implementation

Projects in Europe may establish a baseline for building water use for the prerequisite by using either the values listed in credit language or values from the Europe standards listed in Table 1.

The Well standards values in Table 1 typically exceed the Europe standards values. Well is a European labeling system that helps consumers identify water efficient products. The Well website also lists products that meet European Standards, at <http://www.well-online.eu/>. Well and other low-flow plumbing fixtures, fittings, and appliances can be installed in the same manner as conventional plumbing fixtures, fittings, and appliances.

In addition to Well, national or regional labeling programs are acceptable if they meet or exceed the amounts listed in Table 1.

Project teams may choose to select fixtures that are recognized by a water fixture labeling program. This is not a requirement but an optional strategy to ensure a high level of performance in addition to the specified water efficiency. In the U.S., the WaterSense label has been recommended. In Europe, the European Water Label is more widely available. An up to date list of International Water Labeling Programs equivalent to WaterSense has been compiled for LEED v4 and can be found at <http://www.usgbc.org/resources/international-water-labeling-programs>.

Commercial Fixtures, Fittings, and Appliances	Europe Standards Baseline	Well Standards Baseline
Commercial toilets	6 liters per flush (lpf)**	4 to 5 lpf**
Commercial urinals	4 lpf	1 lpf
Commercial lavatory (restroom) faucets	9 liters per minute (lpm)* private applications only (hotel or motel guest rooms, hospital patient rooms) 1.9 lpm* all others except private applications 9 lpm* for metering faucets	4 to 6 lpm* private applications only (hotel or motel guest rooms, hospital patient rooms)
For projects with commercial pre-rinse spray valves, the flow rate must comply with the asME a112.18.1 standard of 6 lpm or less.		

WE	
HEALTHCARE: NC	Prerequisite 1

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WEHEALTHCARE:
NC

Prerequisite 1

Residential Fixtures, Fittings, and Appliances	Europe Standards Baseline	Well Standards Baseline
Residential toilets	6 lpf**	4 to 5 lpf**
Residential lavatory (bathroom) faucets	9 lpm*	
Residential kitchen faucet		
Residential showerheads	10 lpm* per shower stall***	
<p>* When measured at a flowing water pressure of 3 bar</p> <p>** Bidets must meet the baseline for private lavatory faucets</p> <p>***Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas and jets, must be limited to the allowable showerhead flow rate as specified above 10 lpm per shower compartment, where the floor area of the shower compartment is less than 1.5 square meters. For each increment of 1.5 square meters of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above must be allowed. Exception: Showers that emit recirculated non-potable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.</p> <p>The water use requirements listed in this table are based on the following standards: EN 997:2012; EN 1112:1998; EN 246:2003; EN 200:2008; and EN 817:2008</p>		

See the LEED 2009 Green Building Design and Construction Reference Guide for additional implementation guidance related to this prerequisite.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this prerequisite.

6. Calculations

There are no additional calculations associated with this credit. See LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this prerequisite.

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this prerequisite.

8. Examples

See the LEED 2009 Green Building Design and Construction Reference Guide for an example detailing the treatment of different fixture groups by occupancy type.

9. Exemplary Performance

This prerequisite is not eligible for exemplary performance under the Innovation in Design Section of the LEED 2009 Green Building Design and Construction rating system.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this prerequisite.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this prerequisite.

Websites

European Commission, Drinking Water

http://ec.europa.eu/environment/water/water-drink/index_en.html

The European Commission offers an overview on drinking water legislation and implementation.

European Commission, Study of Water Efficiency Standards

http://ec.europa.eu/environment/water/quantity/pdf/Water%20efficiency%20standards_Study2009.pdf

The European Commission's Study of Water Efficiency Standards advocates for water standards and efficiency devices in Europe.

European Commission, Water Blueprint

http://ec.europa.eu/environment/water/blueprint/index_en.htm

The European Commission's Water Blueprint outlines actions that concentrate on implementation of water legislation and provides recommendations for water conservation in Europe.

European Federation of National Associations of Water and Wastewater Services (EUREAU)

www.eureau.org

EUREAU provides relevant water policy and water standard information for Europe.

European Union

<http://europa.eu>

The European Union's webpage provides a directory and information related to European standards within this prerequisite.

Water Label

<http://www.europeanwaterlabel.eu>

The water label scheme is a resource for project teams to find and compare water efficient products.

Well

<http://www.well-online.eu/>

Well is a product classification and labeling system of the European sanitary valve industry, which informs and provides customers with information to make conscious purchasing decisions, thus promoting responsible water usage.

12. Definitions

Graywater is untreated household waste water which has not come into contact with toilet waste. Graywater typically includes used water from bathtubs, showers, bathroom wash basins, and water from clothes-washer and laundry tubs, though definitions may vary. Some states and local authorities also allow kitchen sink wastewater to be included in graywater. Project teams should comply with the graywater definition established by the authority having jurisdiction in the project area.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional definitions of terms identified in this prerequisite.

WE	
HEALTHCARE: NC	Prerequisite 1

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WATER USE REDUCTION

WE CREDIT 1

HEALTHCARE: NC	
Prerequisite	WE Credit 1
Points	1-3 points

Intent

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

Requirements

Project teams earn points by achieving the following percent reductions for both building water use and process water use. The minimum water savings percentage for each point threshold is as follows:

Percentage Reduction	Points
30%	1
35%	2
40%	3

Building Water Use

Employ strategies that in aggregate use less water than the water use baseline calculated for the building (not including irrigation). The baseline shall meet the requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.¹

Calculations are based on estimated occupant usage and must include only the following fixtures and fixture fittings (as applicable to the project scope): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves. Fixtures used for clinical use, such as surgical scrub sinks and exam room sinks are exempt from this calculation.

Table 1: National Efficiency Baselines for Commercial and Residential Water-Using Fixtures, Fittings and Appliances

Fixtures, Fittings, and Appliances	Current Baseline (Imperial Units)	Current Baseline (Metric Units)
Toilets	1.6 gallons per flush (gpf)*	6 liters per flush (lpf)
Urinals	1.0 (gpf)	4.0 lpf
Lavatory (restroom) faucets	2.2 gallons per minute (gpm) at 60 pounds per square inch (psi), private applications only (e.g., hospital patient rooms) 0.5 (gpm) at 60 (psi)** all others except private applications 0.25 gallons per cycle for metering faucets	8.5 liters per minute (lpm) at 4 bar (58 psi), private applications only (e.g., hospital patient rooms) 2.0 lpm at 4 bar (58 psi), all others except private applications 1 liter per cycle for metering faucets
Pre-rinse spray valves (for food service applications)	Flow rate ≤ 1.6 (gpm)	Flow rate ≤ 6 liters per minute (lpm)

¹ Tables adapted from information developed and summarized by the U.S. Environmental Protection Agency (EPA) Office of Water based on requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.

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WE CREDIT 1

Showerheads	2.5 gpm at 80 psi per shower stall****	9.5 lpm at 5.5 bar (80 psi) per shower stall
<p>* EPAAct 1992 standard for toilets applies to both commercial and residential models.</p> <p>** In addition to EPAAct requirements, the American Society of Mechanical Engineers standard for public lavatory faucets is 0.5 gpm at 60 psi (2.0 lpm at 4 bar (58 psi)) (ASME A112.18.1-2005). This maximum has been incorporated into the national Uniform Plumbing Code and the International Plumbing Code.</p> <p>*** EPAAct 1992 standard for toilets applies to both commercial and residential models.</p> <p>**** Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas and jets, must be limited to the allowable showerhead flow rate as specified above (2.5 gpm/9.5 lpm) per shower compartment, where the floor area of the shower compartment is less than 2,500 square inches (1.5 square meters). For each increment of 2,500 square inches (1.5 square meters) of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above must be allowed. Exception: Showers that emit recirculated nonpotable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.</p>		

AND

Process Water Use

Employ strategies that in aggregate use less water than the process water use baseline calculated for equipment performance requirements as listed in Table 2. Calculations are based on estimated occupant usage and shall include only the following fixtures (as applicable to the project scope): clothes washers, dishwashers, ice machines, food steamers and combination ovens.

Exemptions from calculations:

- Appliances and equipment for which water is used toward human consumption may be excluded. For example, bread misters, soda machines, coffee making machines, misters for produce and fixtures used to fill sinks for washing produce.
- Fixtures whose flow rates are regulated by health codes may be excluded from the calculation. For example, regulated medical equipment is excluded. See WE Prerequisite 2 for requirements applicable to heat rejecting medical equipment.

For applicable equipment not addressed in Tables 1 or 2, additional equipment performance baseline requirements may be proposed, provided that documentation supporting the proposed benchmark or industry standard is provided.

Table 2: Equipment Performance Requirements Table

Equipment	Baseline (Imperial Units)	Baseline (Metric Units)
Commercial Clothes Washer – less than 80 lbs (36.3 kg)	9 gallon/CF/cycle	1,200 liters/m3/cycle
Commercial Dishwashers		
Undercounter – high temp	1.98 gallon/rack	7.50 liters/rack
Undercounter – low temp	1.95 gallon/rack	7.38 liters/rack
Door type – high temp	1.44 gallon/rack	5.45 liters/rack
Door type – low temp	1.85 gallon/rack	7.00 liters/rack
Single tank rack conveyor – high temp	1.13 gallon/rack	4.28 liters/rack
Single tank rack conveyor – low temp	1.23 gallon/rack	4.66 liters/rack
Multi-tank rack conveyor – high temp	1.1 gallon/rack	4.16 liters/rack
Multi-tank rack conveyor – low temp	0.99 gallon/rack	3.75 liters/rack
Flight type	180 gallon/hour	681 liters/hour
Commercial Ice Machines		
Water-cooled ice machine capacity < 450 lb/day (<204.11 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine capacity > 450 lb/day (>204.11 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (w/o remote compressor) capacity < 1000 lb/day (<453.59 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (w/o remote compressor) capacity > 1000 lb/day (>453.59 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (with remote compressor) capacity < 934 lb/day (<423.66 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine with remote condensing unit (with remote compressor) capacity > 934 lb/day (>423.66 kg/day)	<25 gal/100 lb ice	<95 liters/46 kg ice
Air-cooled ice machine Self Contained Unit (SCU)	<25 gal/100 lb ice	<95 liters/46 kg ice
Water-cooled ice machines	Must be on closed cooling loop	
Water-cooled ice machines once through cooling	Not allowed	
Food Steamers		
Boiler type steam cooker – batch cooking	8 gallon/hour/pan	30.28 liters/hour/pan
Boilerless type steam cooker – high production/cook to order	8 gallon/hour/pan	30.28 liters/hour/pan
Combination Oven	40 gph	151.42 lph
Countertop or stand mounted	40 gph	151.42 lph
Roll-in	60 gph	227.12 lph
Other equipment	Performance baseline based on industry standards	

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1. Benefits and Issues to Consider

Refer to the Benefits and Issues section of WE Prerequisite 1 in this supplement.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

Refer to the Referenced Standards section of WE Prerequisite 1 in this supplement.

4. Implementation

Refer to the Implementation section of WE Prerequisite 1 in this supplement.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations

There are no additional calculations associated with this credit. See LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this prerequisite. s:

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples

See the LEED 2009 Green Building Design and Construction Reference Guide for an example detailing the treatment of different fixture groups by occupancy type.

9. Exemplary Performance

See the LEED 2009 Green Building Design and Construction Reference Guide for information about Exemplary Performance related to this credit.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources

Refer to the Benefits and Issues section of WE Prerequisite 1 in this supplement.

13. Definitions

Refer to the Definitions section of WE Prerequisite 1 in this supplement.

WATER USE REDUCTION—COOLING TOWERS

WE CREDIT 4.2

HEALTHCARE: NC	
Credit	WE Credit 4.2
Points	1 point

Intent

To reduce or eliminate the use of potable water for non-potable process use in building system equipment.

Requirements

- Cooling towers and evaporative condensers for air conditioning systems, such as chilled water systems, shall achieve a minimum of five cycles of concentration based on a ratio of the conductivity of the water being discharged (blowdown) divided by the conductivity of the feed (makeup) water(s), or four cycles of concentration, if the makeup water hardness exceeds 200 mg/l expressed as calcium carbonate, or shall achieve a minimum discharge (blowdown) concentration of 1500 mg/L (1500 ppm) expressed as calcium carbonate, or 175 mg/L (175 ppm) of silica measured as silicon dioxide, whichever is met first.
- Cooling towers and evaporative condensers shall be equipped with makeup and blowdown meters, conductivity controllers and overflow alarms and efficient drift eliminators that reduce drift loss to less than, or equal to, 0.001% of recirculating water in a counter-flow tower or 0.005% in a cross-flow tower.
- Use no more potable water than 2.3 gallons per ton hour (2.5 liters per kilowatt hour) for cooling tower or evaporative condenser make-up.
- Projects without cooling towers or evaporative condensers are ineligible for this credit.

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1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards

There are no standards referenced for this credit.

4. Implementation

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for implementation guidance related to this credit.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance related to this credit.

6. Calculations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance related to this credit.

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for documentation guidance related to this credit.

8. Examples

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance related to this credit.

9. Exemplary Performance

This credit is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

There are no regional variations for this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance Considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for definitions of terms used in this credit.

ENERGY AND ATMOSPHERE

EA OVERVIEW

OVERVIEW

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for additional guidance.

Buildings are a major consumer of energy and electricity across the globe, and predicting and lowering energy consumption in buildings are significant components of LEED. **The ACPs in the Energy and Atmosphere credit category allow for the use of local equivalents to make energy reduction and renewable energy consumption attainable goals for Europe.**

Global ACPs





Because energy modeling is a very complex process that involves the use of computer-generated models and stringent energy standards, project teams outside the U.S. seeking to use an alternative to ANSI/ASHRAE/IESNA Standard 90.1–2007 in EA Prerequisite 2 (Minimum Energy Performance) and EA Credit 1 (Optimize Energy Performance) must first submit to a review process, as outlined later in this document.

Project teams seeking to achieve EA Credit 6 (Green Power) may now purchase renewable power from local sources as long as it meets the major Green-e Energy program criteria.

Europe ACPs

EA Credit 6 (Green Power) is expanded to define acceptable equivalents to the Green-e equivalent electricity program in Europe.

 **Table 1.** EA Credits with Global Alternative Compliance Paths

CREDIT	TITLE	HEALTHCARE
EA Prerequisite 1	Fundamental Commissioning of Building Energy Systems	
EA Prerequisite 2	Minimum Energy Performance	
EA Prerequisite 3	Fundamental Refrigerant Management	
EA Credit 1	Optimize Energy Performance	
EA Credit 2	On-site Renewable Energy	
EA Credit 3	Enhanced Commissioning	
EA Credit 4	Enhanced Refrigerant Management	
EA Credit 5	Measurement and Verification	
EA Credit 6	Green Power	 
EA Credit 7	Community Contaminant Prevention—Airborne Releases	

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MINIMUM ENERGY PERFORMANCE

HEALTHCARE: NC	
Prerequisite	EA Prerequisite 2
Points	Required

Intent

To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

Requirements

OPTION 1. Whole Building Energy Simulation

Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations to existing buildings, compared with the baseline building performance rating.

Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard¹.

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda) or USGBC approved equivalent.
- Include all energy costs associated with the building project.
- Compare against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda¹) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.
- Obtain an energy performance rating for estimated energy use of both the baseline and proposed design from EPA's ENERGY STAR Target Finder design tool and submit the Statement of Energy Design Intent document, generated by Target Finder, as part of the project's design submittal.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

¹ Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

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EA PREREQUISITE 2

Regulated (non-process) energy includes lighting (for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilation and air conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes. heating for domestic or space heating purposes.

Process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

OR

OPTION 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide (AEDG) for Small Hospitals and Healthcare Facilities.

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Hospitals and Healthcare Facilities. The following restrictions apply:

- Buildings must be 90,000 square feet (8,360 square meters) or less.
- Project teams must fully comply with all applicable criteria as established in the AEDG for the climate zone in which the building is located. Projects outside the U.S. may use ANSI/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

OR

OPTION 3. Prescriptive Compliance Path: Prescriptive Path for Energy Improvements in Hospitals

- Buildings must be over 90,000 square feet (8,360 square meters).
 1. Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in ASHRAE Standard 90.1-2007
 2. Incorporate all Energy Efficiency Measures (EEMs) listed below:
 - High Performance Windows and Glazing
 - Thermally broken metal window frames
 - U value at the center of glass < 0.29
 - Solar heat gain coefficient at the center of glass < 0.38
 - U value of the window including framing effects < 0.40
 3. Lighting Power Density (LPD)
 - Reduce interior LPD a minimum of 10% below IESNA/ASHRAE Standard 90.1-2007.
 - Reduce exterior lighting power density to 20% below IESNA/ASHRAE 90.1-2007 requirements.

4. Lighting Controls

Install occupancy sensor lighting controls, at a minimum, in all offices, storage areas and mechanical spaces to achieve the following lighting energy reduction:

- Offices: 15% during the day
- Storage: 60% during the day; 30% at night
- Mechanical Spaces: 50% for 23 hours/day

5. The HVAC system serving all areas shall include Variable Air Volume (VAV) air handling units supplied by a central chilled water and boiler plant. In addition, provide zoning controls to maintain pressure relationships as specified in the 2010 FGI Guidelines for Design and Construction of Health Care Facilities. Zoning controls shall be used on both supply air and return/exhaust air systems.
6. Reduce fan power a minimum of 10% less than the limit under ASHRAE 90.1-2007.
7. Reduce turndown ratio on VAV boxes in accordance with ASHRAE 90.1-2007 Prescriptive Requirement 6.5.2.1.
8. Design the heating plant, including boilers and auxiliary equipment, to achieve a minimum system efficiency (BTUH output/ BTUH input) of 90%
9. Design hot and chilled water pumps (3 hp [2.24 kW] or greater) with variable speed drives and a minimum part load ratio of 30%.
10. For fans and pumps, use only motors that meet National Electrical Manufacturers' Association (NEMA) standards for premium efficiency.
11. Chillers shall operate at a maximum of 0.52 kW/ton (0.15 kW/ kW) at full load and an Integrated Part Load Value (IPLV) of 0.399 kW/ton (0.11kW/ kW).

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1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this prerequisite.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this prerequisite.

3. Summary of Referenced Standards

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a summary of standards referenced in this prerequisite.

4. Implementation

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for implementation guidance related to this prerequisite.

5. Timeline and Team

See the the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this prerequisite.

6. Calculations

See the LEED 2009 Green Building Design and Construction Reference Guide for calculations relating to this prerequisite.

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this prerequisite.

8. Examples

See the LEED 2009 Green Building Design and Construction Reference Guide for an example relating to this prerequisite.

9. Exemplary Performance

This prerequisite is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information regarding regional variations for this prerequisite.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations relating to this prerequisite.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for resources related to this prerequisite.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

EA	
HEALTHCARE: NC	Prerequisite 2

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OPTIMIZE ENERGY PERFORMANCE

HEALTHCARE: NC	
Credit	EA Credit 1
Points	1-24 points

Intent

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements

Whole Building Energy Simulation (1–24 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	5
20%	16%	7
22%	18%	9
24%	20%	11
26%	22%	13
28%	24%	14
30%	26%	15
32%	28%	16
34%	30%	17
36%	32%	18
38%	34%	19
40%	36%	20
42%	38%	21
44%	40%	22
46%	42%	23
48%	44%	24

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda¹) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.

¹ Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

EA CREDIT 1



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EA CREDIT 1

- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda²) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (e.g., for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilating, and air conditioning (HVAC) (e.g., for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For this credit, process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007, G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

1. Benefits and Issues to Consider

Refer to the Benefits and Issues to Consider section of EA Prerequisite 2 of the LEED 2009 Green Building Design and Construction Healthcare Supplement for environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

Refer to the Summary of Referenced Standards section of EA Prerequisite 2 of the LEED 2009 Green Building Design and Construction Healthcare Supplement for a summary of ANSI/ASHRAE/IESNA Standard 90.1–2007, referenced in this credit.

Any local alternative to ANSI/ASHRAE/IESNA Standard 90.1–2007 must be approved by USGBC as an equivalent standard, using the process described in the Implementation section.

ASHRAE/ASHRAE/IESNA Standard 90.1–2007, Appendixes B and D

American National Standards Institute

American Society of Heating, Refrigerating and Air-Conditioning Engineers

Illuminating Engineering Society of North America

www.ashrae.org

Appendix B of the standard identifies U.S. and global climate zones. Appendix D provides U.S. and global climatic data that can be used to determine the climate zone for the project location.

4. Implementation

The following process is used to determine the equivalency of a local standard to ANSI/ASHRAE/IESNA Standard 90.1–2007.

1. A group interested in determining equivalency of a particular standard should email a request to USGBC through commonlanguage@usgbc.org.
2. USGBC will collaborate with the group to establish a method for creating an equivalency study and a timeline for completion.
3. The group will conduct the study.
4. USGBC will review the study and bring its recommendation to the LEED International Roundtable with approval by the LEED Steering Committee.
5. Typically, the group putting forward the standard will cover the cost of the study and USGBC review.
6. Priority of USGBC review will be determined based on market transformation potential and representation of the country on the LEED International Roundtable.
7. Approval of equivalency will be determined by the LEED Steering Committee and communicated to the group.
8. Upon approval by the LEED Steering Committee, the equivalency will be made available to projects through a USGBC-administered LEED Interpretation.

Additional information on the LEED International Roundtable can be found at www.usgbc.org

EA	
HEALTHCARE: NC	Credit 1

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5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit. Project teams wishing to use a local equivalent should contact USGBC early in the design phase to ensure that the alternative standard is acceptable.

6. Calculations

See the LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

7. Documentation Guidance

Any local alternative to ANSI/ASHRAE/IESNA Standard 90.1–2007 is desired must be determined equivalent to the U.S. standard, as described in the Implementation section.

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples

A project team in Beijing consults ANSI/ASHRAE/IESNA Standard 90.1–2007, Appendix B, to determine the appropriate climate zone for compliance with Option 3 of the credit.

Table B-3 does not give a climate zone for Beijing. The project team finds Beijing in Table D-2, which lists the values for heating degree-days to base 65°F (HDD65) as 5252, and cooling degree-days to base 50°F (CDD50) as 4115. The team uses these values to determine Beijing's climate zone as defined in Appendix B, Section B2 and Table B-4.

The project team finds that Beijing is in a “moist climate” because its warmest month has a mean temperature higher than 72°F (22.2°C) and is therefore too warm to be a “marine climate,” and annual rainfall data indicate that the city is not in a “dry climate.”

Finally, the project team uses the values found in Table D-2 for HDD65 (5252) and CDD50 (4115) in Table B-4 and determines that Beijing is in Zone 4A (“mixed-humid”) because the CDD50 value is 4500 or less, and the HDD65 value is between 3600 and 5400.

9. Exemplary Performance

Refer to the Exemplary Performance section of EA Prerequisite 2 of the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance on exemplary performance for this credit.

10. Regional Variations

Refer to the Regional Variations section of EA Prerequisite 2 of the LEED 2009 Green Building Design and Construction Healthcare Supplement regional variations associated with this credit.

11. Operations and Maintenance Considerations

Refer to the Operations and Maintenance Considerations section of EA Prerequisite 2 of the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

EA	
HEALTHCARE: NC	Credit 1

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GREEN POWER

HEALTHCARE: NC	
Credit	EA Credit 6
Points	1 point

Intent

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

Requirements

Engage in at least a 2-year renewable energy contract to provide at least 35% of the building's electricity from renewable sources, as defined by the Center for Resource Solutions' Green-e Energy product certification requirements or an equivalent.

All purchases of green power shall be based on the quantity of energy consumed, not the cost.

If the green power is not Green-e Energy certified, equivalence must exist for both major Green-e Energy program criteria: 1) current green power performance standards, and 2) independent, third-party verification that those standards are being met by the green power supplier over time. Projects in Europe may use EKO Energy or Guarantees of Origin (GOs) with additional parameters.

OPTION 1. Determine Baseline Electricity Use

Use the annual electricity consumption from the results of EA Credit 1: Optimize Energy Performance.

OR

OPTION 2. Estimate Baseline Electricity Use

Use the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey database to determine the estimated electricity use.

EA CREDIT 6



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1. Benefits and Issues to Consider

While acknowledging the difficulty of identifying the exact source of green energy in every region, this credit requires that the off-site-generated renewable energy used for the building and its site be certified by the Green-e program or its equivalent for electricity, and Green-e Climate or its equivalent for other energy consumption.

Within Europe, EKOenergy is considered an acceptable equivalent to the Green-e program for electricity. EKOenergy is a network of European environmental NGOs promoting the consumption and production of renewable electricity. The EKOenergy electricity certification scheme represents the best available pan-European option for the sustainable and additional consumption of renewable electricity within Europe. EKOenergy certifies renewable electricity that goes beyond the regulations of European directives and national governments of Europe.

Guarantees of Origin (GOs) are an acceptable equivalent to the Green-e program for electricity if additional requirements are met with regards to location of power generation, hydropower and biomass in Europe. GOs are energy purchasing mechanisms which provide a means of transparent purchasing and tracking of energy generation that build awareness and demand for energy products. GOs are the tracking certificate regulated in Article 15 of EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources. This directive mandates that all European Union member countries allow for the issuance of GOs in order to prove to end-consumers that a given share or quantity of energy was produced from renewable sources. The directive also ensures that (1) the energy source for a renewable GO must meet certain requirements to be defined as renewable and (2) the renewable energy producer must undergo application and verification process by member countries. The designated national GO issuing bodies shall put in place appropriate mechanisms to ensure that GOs are issued, transferred, and cancelled electronically and are accurate, reliable, and fraud-resistant. Information included on the GO includes but may not be limited to:

The energy source from which the energy was produced and the start and end dates of production.

- Whether it relates to: Electricity, Heating, or Cooling
- The identity, location, type and capacity of the installation where the energy was produced.
- Whether and to what extent the installation has benefited from investment support, whether and to what extent the unit of energy has benefited in any other way from a national support scheme, and the type of support scheme.
- The date on which the installation became operational.
- The date and country of issue and a unique identification number.

GOs are further standardized via the European Energy Certificate System (EECS) provided by the Association of Issuing Bodies (AIB.) The EECS makes trade, cancelation, and use of GOs standardized across Europe. GOs have no inherent price except for the price given to GOs by the supply and demand market and are the carrier of electricity attributes.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

EU Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in

the internal energy market

http://europa.eu/legislation_summaries/energy/energy_efficiency/l27021_en.htm

EU Directive 2004/8/EC facilitates the installation and operation of electrical cogeneration plants (a technology allowing the production in one process of heat and electricity) in order to save energy and combat climate change.

EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources

http://europa.eu/legislation_summaries/energy/renewable_energy/en0009_en.htm

EU Directive 2009/28/EC establishes a common framework for the production and promotion of energy from renewable sources. The Directive is part of a package of energy and climate change legislation which provides a legislative framework for community targets for greenhouse gas emission savings. It encourages energy efficiency, energy consumption from renewable sources, the improvement of energy supply, and the economic stimulation of a dynamic sector in Europe.

RECs International

www.recs.org

RECs International is a non-profit organization that strives for a transparent pan-European renewable energy market, facilitated by commonly accepted and harmonized tracking systems. A list of major European providers and members of the organization, as well as information on GOs is available on RECs International's website.

The Association of Issuing Bodies

<http://www.aib-net.org>

The Association of Issuing Bodies (AIB) is an independent body focused on facilitating the international exchange of energy certificates, based upon the European Energy Certificate System (EECS). The AIB can be a good source for information related to GOs and trading renewable energy certificates in Europe. The AIB lists national regulators whom issue standardized European GOs on their website.

4. Implementation

Project teams in Europe may purchase a quantity of GOs equal to 35% of the predicted annual electricity consumption over a 2-year period either all at once or in contracted installments. If the GOs are purchased all at once, this will be equivalent to 70% of predicted annual electricity consumption.

See the LEED 2009 Green Building Design and Construction Reference Guide Implementation section for more information on establishing Green-e equivalency and for more information on other approaches to achieving this credit.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations

Default Electricity Consumption

Project teams using Option 2 that wish to use a local benchmark based on source energy from their country's national or regional energy agency must submit proof that the local benchmark represents a statistically significant sample of the building type being referenced and that the

EA

HEALTHCARE:
NC

Credit 6

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benchmarking process is repeatable. The benchmark should include at least 30 buildings of the project's building type, and the data should be weather normalized and account for internal and external loads. To determine whether a local baseline is equivalent to CBECS, review the regressions and models used in CBECS, at http://www.eia.gov/emeu/cbecs/tech_end_use.html.

The local benchmarking tool should be managed by a reputable source, such as a local government agency or regulatory body. Additional information on the technical background of the CBECS baseline for project teams using an alternative baseline can be found at http://www.eia.gov/emeu/cbecs/technical_information.html.

Projects are encouraged to submit a Credit Interpretation Request (CIR) prior to referencing a local benchmarking tool in place of CBECS to ensure acceptability of the local baseline. If no local benchmarking tool is available, project teams may continue to use CBECS to establish a baseline for this option.

See the LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

7. Documentation Guidance

Upload GO documentation, including as applicable:

- Narrative explaining that renewable energy installation is not in a nature reserve area.
- Rating of hydropower facility under the Water Framework Directive or proof of certification under a sustainable hydropower label.
- Country of EU biomass origin.
- Proof of GO cancellation

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples

A project team decides to purchase off-site renewable energy through a provider certified by EKOenergy. The team visits the EKOenergy website and references the How to Buy EKOenergy page at <http://www.ekoenergy.org/where-can-i-buy-it>. The team contacts EKOenergy Secretariat for purchasing options.

9. Exemplary Performance

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance on exemplary performance for this credit.

10. Regional Variations

Renewable energy certificates (RECs) make it possible to substitute green energy even if the project does not have access to green power through the local utility or a competitive electricity marketer. RECs are now widely available in nearly all U.S. states but less prevalent in other countries. Projects outside the U.S. have the option of meeting this credit either by establishing Green-e equivalency, as detailed in the Implementation section of the LEED 2009 Green Building Design and Construction Reference Guide, or by purchasing U.S.-based Green-e certified RECs.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

Websites

EU Directive 2000/60/EC establishing a framework for the community action in the field of water policy (The Water Framework Directive)

http://europa.eu/legislation_summaries/environment/water_protection_management/l28002b_en.htm

This Framework-Directive has a number of objectives, such as preventing and reducing pollution, promoting sustainable water usage, environmental protection, improving aquatic ecosystems and mitigating the effects of floods and droughts. Its ultimate objective is to achieve “good ecological and chemical status” for all Community waters by 2015.

EU Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market

http://europa.eu/legislation_summaries/energy/energy_efficiency/l27021_en.htm

EU Directive 2004/8/EC facilitates the installation and operation of electrical cogeneration plants (a technology allowing the production in one process of heat and electricity) in order to save energy and combat climate change.

EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources

http://europa.eu/legislation_summaries/energy/renewable_energy/en0009_en.htm

EU Directive 2009/28/EC establishes a common framework for the production and promotion of energy from renewable sources. The Directive is part of a package of energy and climate change legislation which provides a legislative framework for community targets for greenhouse gas emission savings. It encourages energy efficiency, energy consumption from renewable sources, the improvement of energy supply, and the economic stimulation of a dynamic sector in Europe.

Natura 2000

<http://ec.europa.eu/environment/nature/natura2000/>

Natura 2000 is the centerpiece of EU nature & biodiversity policy. It is an EU-wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation designated by EU member countries under the Habitats Directive, and also incorporates Special Protection Areas which they designate under the 1979 Birds Directive. The establishment of this network of protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity.

RECs International

www.recs.org

RECs International is a non-profit organization that strives for a transparent pan-European renewable energy market, facilitated by commonly accepted and harmonized tracking systems. A list of major European providers and members of the organization, as well as information on GOs is available on RECs International's website.

The Association of Issuing Bodies

<http://www.aib-net.org>

EA

HEALTHCARE:
NC

Credit 6

IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Healthcare Supplement for complete credit information. For the omitted sections, refer to the main reference guide.

The Association of Issuing Bodies (AIB) is an independent body focused on facilitating the international exchange of energy certificates, based upon the European Energy Certificate System (EECS.). The AIB can be a good source for information related to GOs and trading renewable energy certificates in Europe. The AIB lists national regulators whom issue standardized European GOs on their website.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

MATERIALS AND RESOURCES

MR OVERVIEW

OVERVIEW

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for additional guidance.

The responsible harvest or extraction of materials used in building products is of universal importance, as is the way they are transported to the project site.

Global ACPs


Because some transportation methods cause significantly less environmental harm than others, a new compliance path has been added to MR Credit 3 (Sustainably Sourced Materials and Products) to allow for items that are shipped long distances via rail and water. The option involves calculating a weighted total distance rather than using a simple 500-mile (800-kilometer) radius.

Project teams in areas lacking formal recycling infrastructure often struggle to achieve the requirements of the Construction Waste Management credit (MR Credit 2). While no requirements have changed for this credit, additional guidance has been included to help project teams in these areas.

Europe ACPs

There are currently no Europe ACPs available in the MR Category.

 **Table 1.** MR Credits with Global Alternative Compliance Paths

CREDIT	TITLE	HEALTHCARE
MR Prerequisite 1	Storage and Collection of Recyclables	
MR Prerequisite 2	PBT Source Reduction—Mercury	
MR Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	
MR Credit 1.2	Building Reuse—Maintain Existing Interior Nonstructural Elements	
MR Credit 2	Construction Waste Management	
MR Credit 3	Sustainably Sourced Materials and Products	
MR Credit 4.1	PBT Source Reduction—Mercury in Lamps	
MR Credit 4.2	PBT Source Reduction—Lead, Cadmium, and Copper	
MR Credit 5	Furniture and Medical Furnishings	
MR Credit 6	Resource Use—Design for Flexibility	

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CONSTRUCTION WASTE MANAGEMENT

MR CREDIT 2

HEALTHCARE: NC	
Prerequisite	MR Credit 2
Points	1-2 points

Intent

To divert construction and demolition debris from disposal in landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites.

Requirements

Recycle and/or salvage nonhazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or comingled. Excavated soil and land-clearing debris do not contribute to 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 point threshold is as follows:

Recycled or Salvaged	Points
50%	1
75%	2

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1. Benefits and Issues to Consider

Projects in areas lacking formalized construction waste recycling infrastructure often struggle to achieve this credit because it can be difficult to find waste haulers who can document that construction debris has been successfully diverted from a landfill. For projects in these areas, it is particularly important to have a construction waste management plan that clearly defines how construction and demolition waste is to be handled.

Projects in locations without formalized construction waste recycling infrastructure can achieve this credit by implementing alternative diversion strategies such as donation to local non-profit organizations and sale of excess materials to the local community.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards

There are no standards referenced for this credit.

4. Implementation

When developing a construction waste management plan, identify strategies to divert waste from the landfill. Waste does not have to be brought to a formal recycling facility, but can be diverted through informal means including donation or reuse. Determine the method for measuring the amount of waste both generated and diverted from the project site (by weight or volume).

Prior to construction, indicate in the bid documents that the main contractor should separate recyclable waste from non-recyclable waste in order to more easily track diverted waste. Recyclable waste can also be separated by type on-site in areas where local recyclers do not have the capacity or ability to sort waste once it has been removed from the site. By sorting waste on-site, project teams may find it easier to donate or reuse materials.

When waste is collected from the site, document the amount removed and the method of landfill diversion; verify that waste haulers certify that waste is being diverted.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional implementation guidance related to this credit.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations

There are no additional calculations associated with this credit. See the LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

7. Documentation Guidance

When documenting waste removal from a project site located in an area without formal infrastructure, be sure that the waste hauler issues a receipt with a detailed breakdown of the waste to be diverted. It is recommended that the receipt contain at least the following information:

- Name of the entity removing the waste
- Address
- Phone number
- Email
- The date when the waste was collected
- The person responsible for collecting the waste
- A statement mentioning how the waste is going to be treated (donated, sold, recycled or reused)


If the waste hauler has no formal receipt, the contractor can provide a letter signed by the waste hauler with the above mentioned information.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional documentation guidance related to this credit.

8. Examples

A project in rural Argentina donated a portion of the waste generated during construction to a local non-profit foundation so it could be re-sold to help fund that organization's mission. The waste was collected by a hauling company, which verified the amount of waste collected and how it will be diverted.

Figure 1. Construction waste documentation for donated waste

Cristina Fernandez 13 September, 2014	
A quién corresponda,	
Por medio de la presente confirmamos que hemos recibido la cantidad de 4,5 metros cúbicos de madera, según Rto. 137542, que serán venta a granel en nombre de la Fundación de la Familia Salinas para financiar su misión.	
Saluda atentamente,	<div style="border: 1px solid black; padding: 5px;">Translation: September 13, 2014 To whom it may concern: We hereby confirm that we have received 4.5 cubic meters of wood, per receipt 137542, that shall be sold on behalf of the Salinas family foundation to fund their mission.</div>
Cristina Fernandez	
	
ACME Hauling, Inc. 642 Calle Verde info@acmehauling.net.ar	

See the LEED 2009 Green Building Design and Construction Reference Guide for an example detailing a construction waste management plan developed by a contractor prior to the construction process.

MR	
HEALTHCARE: NC	Credit 2

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9. Exemplary Performance

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance on exemplary performance for this credit.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11 Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for definitions of terms identified in this credit.

SUSTAINABLY SOURCED MATERIALS AND PRODUCTS

HEALTHCARE: NC	
Credit	MR Credit 3
Points	1–4 points

Intent

Reduce the environmental burdens of materials and products acquired to construct building and to upgrade building services.

Requirements

One point and up to a maximum of four will be awarded for each 10% of the total value of all building materials and products used in the project (based on cost) that meet the criteria below. If concrete or steel structural elements are applied toward this credit, the project must include at least two other materials or products from CSI MasterFormat Divisions (other than 03 and 05) to attain the first point. Of the total recycled content, no more than 75% may be steel or concrete.

1. The cost of any individual material or product may be added for each of the following sustainability criteria that the material or product meets:
 - Salvaged, refurbished or reused materials.

OR

- Recycled content. The recycled content value is determined by multiplying the recycled content fraction of the assembly (based on weight) by the cost of the assembly. The recycled content fraction is the sum of all post-consumer recycled content plus one-half of the pre-consumer content. Note: The same material cannot contribute to both salvaged and recycled content values.

OR

- Regionally sourced/manufactured materials and products that have been extracted, harvested or recovered, as well as manufactured within 500 miles (800 kilometers) of the project site

OR

- Building materials or products shipped by rail or water have been extracted, harvested or recovered, as well as manufactured within a 500 mile (800 kilometer) total travel distance of the project site using a weighted average determined through the following formula:
 - $(\text{Distance by rail}/3) + (\text{Distance by inland waterway}/2) + (\text{Distance by sea}/15) + (\text{Distance by all other means}) \leq 500 \text{ miles } [800 \text{ kilometers}]$

OR

- Rapidly renewable materials. The rapidly renewable content value is determined by multiplying the rapidly renewable content fraction of the assembly (based on weight) by the cost of the assembly.

MR CREDIT 3



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MR CREDIT 3

OR

- Wood certified, in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria. The certified wood content value is determined by multiplying the certified wood content fraction of the assembly (based on weight) by the cost of the assembly. Note: Only virgin wood stock shall contribute towards the certified wood criteria. Certified wood shall not contribute to the rapidly renewable criteria.

Note: All wood certification requirements will be updated to reflect the new criteria being put forth for member approval across all LEED rating systems.

AND

2. Wall, ceiling and flooring systems and finishes, composite wood, agrifiber and fiberglass products, both exterior and interior adhesives, sealants, coatings, roofing, and waterproofing products must meet the relevant IEQ Credit 4: Low-Emitting Materials requirements to contribute toward the credit.

AND

Mechanical, electrical and plumbing components and specialty items, such as elevators, shall not be included in this calculation. Only include materials permanently installed in the project. Furniture is not included (see Credit 5.1-5.3).

Recycled content shall be defined in accordance with the International Organization of Standards Document ISO 14021-1999—Environmental labels and declarations—Self-declared environmental claims (Type II environmental labeling).

Supplemental cementitious materials derived from coal fired power plant wastes shall not have mercury content $>5.5\text{ppb}$ (0.0055 mg/L). Flyash generated as a by-product of municipal solid waste incinerators does not qualify as a recycled-content material for this credit.

1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a summary of standards referenced in this credit.

4. Implementation

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for implementation guidance related to this credit.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance related to this credit.

6. Calculations

Follow the instructions in the LEED 2009 Green Building Design and Construction Healthcare Supplement for determining the total materials cost, the percentage of regional materials in assembly items, and the total percentage of local materials used in the project.

The new regional materials compliance path considers the total weighted distance that the project's materials have traveled by rail or water, from extraction or harvest through manufacturing to installation at the project site. The project team must determine the means of transportation for each leg of that journey.

Calculate the weighted average of materials transported to the project site according to the following equation:

$$\text{Total weighted distance} = (DR/3) + (DI/2) + (DS/15) + DO$$

where

DR= distance by rail

DI = distance by inland waterway

DS= distance by sea

DO= distance by other transportation modes

If the result is 500 miles (800 kilometers) or less, the material qualifies as a regional product.

7. Documentation Guidance

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

1. Compile a list of product purchases manufactured, extracted, or harvested regionally.
2. Record manufacturers' names and product costs for all applicable materials installed at the project site.

MR	
HEALTHCARE: NC	Credit 3

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- Record distances and transportation modes for each product, from extraction or harvest through fabrication and delivery to the project site.
- Where appropriate, retain cutsheets that document materials' origin and manufacture within a 500-mile (800-kilometer) total weighted distance of the project site.
- Where appropriate, maintain a list of materials costs, excluding labor and equipment, for CSI Divisions 03-10, 31 (Section 31.60.00 Foundations), and 32 (Sections 32.10.00 Paving, 32.30.00 Site Improvements, and 32.90.00 Planting); including Division 12 is optional.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for additional documentation guidance

8. Examples

A project in Berlin has imported wood from Norway. The wood was harvested in a forest outside Harestua and transported by truck to Oslo, where it was placed on a ship bound for Germany. Upon arriving at port in Kiel, Germany, the wood was loaded onto a train to Leipzig, where it was milled for use on the project. The finished wood product was transported by truck to the project site in Berlin.

First, the team determines the travel distances for each leg of the trip (Figure 1).

Figure 1. Example transport of wood from harvest to project site (generated using Google® Maps)



Then the team divides each distance by the divisors in the total weighted distance equation (see Calculations), as shown in Table 1. Transport by truck falls under “other” and thus has no divisor.

Table 1. Example determination of weighted distance for wood products

Mode	Leg	Actual distance	Calculation	Weighted distance
Truck	Harestua to Oslo	41 km (25 miles)	41 (25)	41 km (25 miles)
Ship	Oslo to Kiel	682 km (424 miles)	682/15 (424/15)	45 km (28 miles)
Rail	Kiel to Leipzig	454 km (285 miles)	454/3 (285/3)	151 km (95 miles)
Truck	Leipzig to Berlin (project)	190 km (118 miles)	190 (118)	190 km (118 miles)
Total		1367 km (852 miles)		427 km (266 miles)

Because the total weighted distance traveled is less than 500 miles (800 km), the wood qualifies as a regional material.

9. Exemplary Performance

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance on exemplary performance for this credit.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for resources related to this credit.

13. Definitions

An **inland waterway** is a navigable body of water, such as a river, canal, or lake, that is deep, wide, and slow enough for a vessel to pass.

MR	
HEALTHCARE: NC	Credit 3

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INDOOR ENVIRONMENTAL QUALITY

IEQ OVERVIEW

OVERVIEW

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for additional guidance.

Approaches to indoor environmental quality issues often vary by country. Because of differences in climate, ventilation systems, and environmental standards, many of the prescribed approaches to the credits in the Indoor Environmental Quality section have been difficult to apply outside the U.S. New language allows for local equivalents to many of the standards referenced in IEQ credits.

Global ACPs





Project teams outside the U.S. can now use local equivalent standards for air filtration during and after construction when seeking to achieve IEQ Credit 3.1 (Construction Indoor Air Quality Management Plan During Construction). IEQ Credit 4 (Low-Emitting Materials) accommodates products that meet widely used VOC testing requirements.

Finally, many project teams will be able to use CEN standards in place of ASHRAE 55-2004 and others may choose a local equivalent to ASHRAE in IEQ Credits 6.2 and 7 (Thermal Comfort).

Europe ACPs

Products in Europe are commonly tested for VOCs using an emissions-based rather than content-based approach. Projects in Europe may thus find it easier to follow the requirements of LEED v4 EQ Credit: Low-Emitting Materials in lieu of the Low-Emitting Materials credits in LEED 2009. This is made available via an approved global credit substitution.

 **Table 1.** IEQ Credits with Global Alternative Compliance Paths

CREDIT	TITLE	HEALTHCARE
IEQ Prerequisite 1	Minimum Indoor Air Quality Performance	
IEQ Prerequisite 2	Environmental Tobacco Smoke (ETS) Control	
IEQ Prerequisite 3	Hazardous Material Removal or Encapsulation (Renovations Only)	
IEQ Credit 1	Outdoor Air Delivery Monitoring	
IEQ Credit 2	Acoustic Environment	
IEQ Credit 3.1	Construction Indoor Air Quality Management Plan—During Construction	
IEQ Credit 3.2	Construction Indoor Air Quality Management Plan—Before Occupancy	
IEQ Credit 4	Low-Emitting Materials	
IEQ Credit 5	Indoor Chemical and Pollutant Source Control	
IEQ Credit 6.1	Controllability of Systems—Lighting	
IEQ Credit 6.2	Controllability of Systems—Thermal Comfort	
IEQ Credit 7	Thermal Comfort—Design and Verification	
IEQ Credit 8.1	Daylight and Views—Daylight	
IEQ Credit 8.2	Daylight and Views—Views	

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CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN— DURING CONSTRUCTION

IEQ CREDIT 3.1

HEALTHCARE: NC	
Credit	IEQ Credit 3.1
Points	1 point

Intent

To reduce indoor air quality (IAQ) problems and noise and vibration resulting from construction and/or renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirements

Develop and implement an Environmental Quality Management Plan (EQMP) for the construction and preoccupancy phases of the building. Minimize air and noise pollution during the construction process as prescribed below.

For renovations, additions adjacent to occupied facilities or phased occupancy in new construction:

- Follow the 2010 FGI Guidelines for Design and Construction of Health Care Facilities and the Joint Commission on standards to establish an integrated infection control team comprised of the owner, designer and contractor to evaluate infection control risk and document the required precautions in a project-specific plan.
- Use the Infection Control Risk Assessment (ICRA) standard published by the American Society of Healthcare Engineering (ASHE) and the U.S. Centers for Disease Control and Prevention (CDC), as a guideline for construction activities to assess risk and to select mitigation procedures.

For all projects:

- Develop and implement a moisture control plan to address measures that will maintain dry conditions to protect stored on-site and installed absorptive materials from moisture damage. Immediately remove from site and properly dispose of any materials susceptible to microbial growth and replace with new, undamaged materials. Also include strategies for protecting the building from moisture intrusion and occupant exposures to dangerous mold spores.
- If permanently installed air handlers are used during construction:
 - Filtration media must be used at each return air grille that meets one of the following criteria below.
 - Filtration media with a minimum efficiency reporting value (MERV) of 8 as determined by ASHRAE Standard 52.2-1999 (with errata but without addenda)
 - Filtration media is Class F5 or higher, as defined by CEN Standard EN 779-2002, Particulate air filters for general ventilation, Determination of the filtration performance
 - Filtration media with a minimum dust spot efficiency of 30% or higher and greater than 90% arrestance on a particle size of 3–10 µg

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IEQ CREDIT 3.1

- Protect active outdoor air intakes and return air grilles with filtration media.
- Temporary filter media must be evaluated and replaced as necessary.
- Replace all filtration media immediately prior to occupancy.
- Volatile Organic Compound (VOC) Absorption – Schedule construction procedures to minimize exposure of absorbent materials to VOC emissions. Complete “wet” construction procedures such as painting and sealing before storing or installing “dry” absorbent materials such as carpet or ceiling tiles. These materials accumulate pollutants and release them over time. Store fuels, solvents and other sources of VOCs separately from absorbent materials.
- Tobacco Products – Prohibit the use of tobacco products inside the building and within 50 feet (16 meters) (or greater, if local jurisdiction requires) of the building entrance during construction.
- Noise and Vibration Exposure to Occupants and Construction Crews – Develop a plan based upon the British Standard (BS 5228) to reduce noise emissions and vibrations from construction equipment and other non-road engines by specifying low-noise emission design or the lowest decibel level available that meets performance requirements in the British Standard to insure it is within acceptable limits to the occupants. Construction crews must wear ear protection in areas where sound levels exceed 85 dB for extended periods of time.

1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

CEN Standard EN 779: 2002, Particulate air filters for general ventilation, Determination of the filtration performance

Comité Européen de Normalisation

<http://www.cen.eu>

This standard outlines the parameters used in many EU countries for determining filter class for all filtration media.

4. Implementation

HVAC Protection

Protect all HVAC equipment from both dust and odors and seal all duct and equipment openings with plastic. If the system must be operated to maintain service to occupied portions of the building or to protect finished work, protect the return (negative pressure) side of the system. If the returns cannot be closed, install and maintain temporary filters over the grilles and openings. All filtration media must be Class F5 or higher or have a minimum dust spot efficiency of 30% and at least 90% arrestance on a particle size of 3–10 µg. If an unducted plenum over the construction zone must be used, isolate it by having all ceiling tiles in place. Check for leaks in the return ducts and air handlers and make needed repairs promptly. The contractor should avoid using the mechanical rooms for construction storage.

See the 2009 Green Building Design and Construction Healthcare Supplement for additional implementation guidance.

5. Timeline and Team

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance related to this credit.

6. Calculations

There are no calculations required for this credit.

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for documentation guidance related to this credit.

8. Examples

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for an example relating to this credit.

9. Exemplary Performance

See the LEED 2009 Green Building Design and Construction Reference Guide for guidance on exemplary performance for this credit.

IEQ	
HEALTHCARE: NC	Credit 3.1

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10. Regional Variations

There are no regional variations applicable to this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for definitions of terms used in this credit.

LOW-EMITTING MATERIALS

HEALTHCARE: NC	
Credit	IEQ Credit 4
Points	1-4 points

Intent

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements

One point (maximum four) can be achieved for each group of materials that comply with the requirements.

GROUP 1: Interior Adhesives and Sealants

All adhesives and sealants used on the interior of the building (i.e., inside of the weatherproofing system and applied on-site) must comply with the following requirements as applicable to the project scope¹:

- Adhesives, Sealants and Sealant Primers must comply with South Coast Air Quality Management District (SCAQMD) Rule #1168. Volatile organic compound (VOC) limits listed in the table below correspond to an effective date of July 1, 2005 and rule amendment date of January 7, 2005.
- Aerosol Adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.

Adhesives and sealants shall contain no carcinogen or reproductive toxicant components present at more than 1% of total mass of the product as defined in the California Office of Environmental Health Hazard Assessment's (OEHHA) list entitled "Chemicals Known to the State to Cause Cancer" or the Reproductive Toxicity, Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

GROUP 2: Wall and Ceiling Finishes

Paints and coatings used on the interior of the building—defined as inside of the weatherproofing system and applied on-site—shall not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings. (Rules in effect on July 1, 2008.)

Ceiling tiles, including suspended acoustical tiles, and wall coverings shall comply with the testing and product requirements of the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers version 1.1 (CDPH/EHLB Standard Method v1.1) modeled using the standard office building protocol parameters and certified as compliant by an independent third party.

GROUP 3: Flooring

Carpet and all hard surface flooring installed in the building interior shall comply with the testing and product requirements of the California Department of Public Health

¹ The use of a VOC budget is permissible for compliance with this credit.

IEQ CREDIT 4



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IEQ CREDIT 4

Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers version 1.1 (CDPH/EHLB Standard Method v1.1), modeled using the standard office building protocol parameters and certified as compliant by an independent third party. Mineral-based finish flooring products, such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring, qualify for credit without any IAQ testing requirements. However, associated, site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.

All carpet cushion installed in the building interior shall comply with the requirements of the Carpet and Rug Institute Green Label program.

All flooring related adhesives shall comply with the requirements of Group 1. Grout shall comply with requirements for ceramic tile adhesive.

- For carpet adhesive, concrete, wood, bamboo and cork floor finishes, and tile setting adhesives, compliance can be demonstrated with test results of:
 - Total volatiles fraction, based on one of the following, provided that water and exempt compounds are subtracted from total volatiles test results and the mass VOC content is calculated consistent with SCAQMD Rule 1113 and Rule 1168:
 - ASTM D2369
 - EPA method 24
 - ISO 11890 part 1
 - Total volatile organic compounds fraction, based on one of the following, provided that all VOCs with a boiling point up to 280°C (536°F) are included, and exempt compounds are subtracted from total volatiles test results and the mass VOC content is calculated consistent with SCAQMD Rule 1113 and Rule 1168.
 - ASTM D6886
 - ISO 11890 part 2

Concrete, wood, bamboo, cork and other floor finishes, such as sealer, stain and finish, shall not exceed the VOC limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on July 1, 2008.

GROUP 4: Composite Wood, Agrifiber Products and Batt Insulation Products

Composite wood and agrifiber products used on the interior of the building—defined as inside of the weatherproofing system—shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

Composite wood and agrifiber products are defined as particleboard, medium density fiberboard (MDF), plywood, wheat board, strawboard, panel substrates and door cores. Materials considered furniture, fixtures, and equipment (FF&E) are not considered base building elements and are not included.

Batt insulation products shall contain no added formaldehyde, including urea formaldehyde, phenol formaldehyde, and urea-extended phenol formaldehyde.

IEQ CREDIT 4

GROUP 5: Exterior Applied Products

Adhesives, sealants, coatings, roofing and waterproofing materials—defined as from the weatherproofing system out and applied on-site—shall comply with the VOC limits of California Air Resources Board (ARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings and South Coast Air Quality Management District (SCAQMD) Rule 1168 effective July 1, 2005.

Roofing installations shall not use hot-mopped asphalt installation techniques.

Parking lots and other paved surfaces shall not use coal tar sealants.

For any waterproofing, asphalt roofing needing repair, parking lot sealing or other high VOC emissions outdoor construction process, create a plan to manage fumes and avoid infiltration to occupied spaces. Comply with procedures established by NIOSH's Asphalt Fume Exposures During the Application of Hot Asphalt to Roofs (Publication No. 2003-112).

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IEQ CREDIT 4

Reference Table for all IEQ Credit 4 Groups			
Architectural Adhesives (SCAQMD 1168)	VOC Limit [g/L less water]	Specialty Adhesives (SCAQMD 1168)	VOC Limit [g/L less water]
Indoor Carpet Adhesives	50	PVC Welding	510
Carpet Pad Adhesives	50	CPVC Welding	490
Wood Flooring Adhesives	100	ABS Welding	325
Rubber Floor Adhesives	60	Plastic Cement Welding	250
Subfloor Adhesives	50	Adhesive Primer for Plastic	550
Ceramic Tile Adhesives	65	Contact Adhesive	80
VCT & Asphalt Adhesives	50	Special Purpose Contact Adhesive	250
Drywall & Panel Adhesives	50	Structural Wood Member Adhesive	140
Cove Base Adhesives	50	Sheet Applied Rubber Lining Operations	850
Multipurpose Construction Adhesives	70	Top & Trim Adhesive	250
Structural Glazing Adhesives	100		
Interior Sealants (SCAQMD 1168)		Sealant Primers (SCAQMD 1168)	250
Architectural	250	Architectural Non Porous	775
Other	420	Architectural Porous	750
		Other	750
Exterior Coatings (CARB SCM)		Substrate Specific Applications (SCAQMD 1168)	
Aluminum Roof Coatings	400	Metal to Metal	30
Basement Specialty Coatings	400	Plastic Foams	50
Concrete Curing Compounds	350	Porous Material (except wood)	50
Concrete/Masonry Sealers	100	Wood	30
Driveway Sealers	50	Fiberglass	80
Driveway Sealers	50	Interior Coatings (SCAQMD 1113)	
Floor Coatings	100	Paints (flat & non-flat, except anti-rust)	50
Industrial Maintenance Coatings	250	Clear wood finishes (varnish, lacquer or sanding sealers)	275
Non flat coatings	100	Floor coatings	50
Non flat high gloss	150	Primers and undercoaters	100
Primers, Sealants, and Undercoaters	100	Swimming pool coatings	340
Quick Dry Enamels	150	Sealers: Waterproofing & all others	100
Reactive Penetrating Sealer	350	Shellacs: Clear	730
Rust Preventative Coatings	250	Shellacs: Pigmented	550
Stains	250	Stains	100
Stone Consolidant	450	Aerosol Adhesives (GS-36)	
Traffic Coatings	100	General purpose mist spray	65% VOCs by weight
Waterproofing Membranes	250	General purpose web spray	55% VOCs by weight
Wood Coatings	275	Special purpose aerosol adhesives (all types)	70% VOCs by weight

1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards

ASTM D2369: Standard Test Method for Volatile Content of Coatings

<http://www.astm.org/>

According to the ASTM website, “This test method is the procedure of choice for determining volatiles in coatings for the purpose of calculating the volatile organic content in coatings under specified test conditions. The weight percent solids content (nonvolatile matter) may be determined by difference. This information is useful to the paint producer and user and to environmental interests for determining the volatiles emitted by coatings.”

ASTM D6886: Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography

<http://www.astm.org/>

According to the ASTM website, “This test method is for the determination of the weight percent of individual volatile organic compounds in low VOC content waterborne latex air-dry coatings. The method is intended primarily for analysis of waterborne coatings in which the material VOC content is below 5 weight percent. The method has been used successfully with higher VOC content waterborne coatings.”

EPA Test Method 24, Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings

<http://www.epa.gov/>

EPA Test Method 24 provides testing parameters for identifying volatile content in coatings. This testing method references several ASTM sampling methods.

ISO 11890-1: 2007, Paints and varnishes, Determination of volatile organic compound (VOC) content, Part 1, Difference method

<http://www.iso.org/>

According to the ISO website, “ISO 11890-1:2007 specifies a method for the determination of the volatile organic compound (VOC) content of paints, varnishes and their raw materials. This part may be used where the expected VOC content is greater than 15 % by mass. When the expected VOC content is greater than 0,1 % by mass and less than 15 % by mass, ISO 11890-2 should be employed.”

ISO 11890-2: 2006, Paints and varnishes, Determination of volatile organic compound (VOC) content, Part 2, Gas-chromatographic method

<http://www.iso.org/>

According to the ISO website, “ISO 11890-2:2006 specifies a method for the determination of the volatile organic compound (VOC) content of paints, varnishes and their raw materials. ISO 11890-2 is preferred if the expected VOC content is greater than 0,1 % by mass and less than about 15 % by mass. When the VOC content is greater than about 15 % by mass, the less complicated method given in ISO 11890-1 may be used.”

IEQ	
HEALTHCARE: NC	Credit 4

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4. Implementation

Credit Substitution

Project teams may use LEED v4 EQ Credit: Low-Emitting Materials, Option 2. Budget Calculation Method in place of the full LEED 2009 Low-Emitting Materials credit suite (IEQ Credit 4.1-4.4 for New Construction and Core & Shell, IEQc4.1-4.6 for Schools). The LEED v4 credit includes emissions-based material testing requirements that are more widely used in Europe and may thus be easier to obtain.

All credits in the LEED 2009 credit suite must be substituted to be eligible. Projects taking this approach should consult the LEED v4 for Building Design and Construction Reference Guide for implementation guidance related to this credit. See <http://www.usgbc.org/articles/use-v4-credits-your-v2009-project> for further information on credit substitution.

See the Implementation section of IEQ Credit 4.1 in the LEED 2009 Green Building Design and Construction Healthcare Supplement for complete implementation guidance related to this credit.

5. Timeline and Team

See the Timeline and Team section of IEQc4.1 in the LEED 2009 Green Building Design and Construction Healthcare Supplement for guidance related to this credit.

6. Calculations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for calculations relating to this credit.

7. Documentation Guidance

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

- Maintain a list of each carpet, carpet cushion, and carpet adhesive installed in the building interior. Record the VOC content for each adhesive. If a European testing method has been selected, ensure that it meets the testing requirements outlined in the rating system.
- Maintain a list of each hard surface flooring product, tile setting adhesive, finishes, and grout installed in the building interior. Record the VOC content for each tile setting adhesive and grout.

8. Examples

See the LEED 2009 Green Building Design and Construction Reference Guide for an example relating to this credit.

9. Exemplary Performance

This credit is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

European VOC testing methods often vary from those used in the United States. If a European testing method has been selected, ensure that it follows the parameters of the referenced California testing methods. If the European testing methods and calculations differ, multiply the European test results for carpets or floorings by 0.7.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

IEQ	
HEALTHCARE: NC	Credit 4

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

Websites

ASTM International

<http://www.astm.org>

International Organization for Standardization (ISO)

<http://www.iso.org>

U.S. Environmental Protection Agency (EPA)

<http://www.epa.gov>

13. Definitions

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for definitions of terms identified in this credit.

IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Healthcare Supplement for complete credit information. For the omitted sections, refer to the main reference guide.

CONTROLLABILITY OF SYSTEMS—THERMAL COMFORT

HEALTHCARE: NC	
Credit	IEQ Credit 6.2
Points	1 point

Intent

To provide a high level of thermal comfort system control¹ by individual occupants or specific groups in multi-occupant spaces and promote their productivity, comfort and well-being.

Requirements

Provide individual thermal comfort controls for every single occupant patient room.

AND

Provide individual thermal comfort controls for 50% (minimum) of the remaining building occupants to enable adjustments to meet individual needs and preferences. Operable windows may be used in lieu of controls for occupants located 20 feet (6 meters) inside and 10 feet (3 meters) to either side of the operable part of a window. The areas of operable window must meet the requirements of ASHRAE Standard 62.1-2007 paragraph 5.1 Natural Ventilation (with errata but without addenda)¹.

AND

Provide comfort system controls for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences.

Conditions for thermal comfort are described in IEQ credit 7: Thermal Comfort—Design and Verification, and include the primary factors of air temperature, radiant temperature, air speed and humidity.

Comfort system control² for the purposes of this credit is defined as the provision of control over at least one of these primary factors in the occupant's local environment.

1. Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.
2. For the purposes of this credit, comfort system control is defined as control over at least 1 of the following primary factors in the occupant's vicinity: air temperature, radiant temperature, air speed and humidity.

IEQ CREDIT 6.2



IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Healthcare Supplement for complete credit information. For the omitted sections, refer to the main reference guide.

1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

CEN Standard EN15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics

Comité Européen de Normalisation

<http://www.cen.eu>

This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Used in conjunction with ISO Standard 7730: 2005, it is considered equivalent to ASHRAE 55–2004 for the purposes of this credit.

ISO Standard 7730: 2005, Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria

International Organization for Standardization

<http://www.iso.org>

This standard “presents methods for predicting the general thermal sensation and degree of discomfort (thermal dissatisfaction) of people exposed to moderate thermal environments” and should be used in conjunction with CEN Standard EN 15251: 2007.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional standards referenced in this credit.

4. Implementation

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for implementation guidance related to this credit.

5. Timeline and Team

During schematic design, building designers should evaluate the building’s orientation and consider how heat gain or loss will affect the occupants. Designers should also consider whether site-specific conditions, such as wind, sound, and odors, may affect the location of operable windows. During design development, locate the thermal comfort controls with the help of electrical and mechanical engineers and the construction or development manager. Consider thermal comfort needs as they pertain to ISO 7730: 2005 and CEN Standard EN 15251: 2007 requirements; survey future occupants’ preferences. Evaluate the controls for each space, considering the specific tools and equipment that occupants will use on a daily basis. When evaluating shared occupant spaces, consider the occupancy schedule.

Post installation commissioning of all thermal comfort systems will ensure proper operation. During building operation, the owner should provide training for building maintenance staff in using the controls. Property management and building engineers should periodically review of comfort control systems to ensure that occupants’ needs are met and that controls are working according to design.

6. Calculations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for calculations relating to this credit.

7. Documentation Guidance

See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples

See the LEED 2009 Green Building Design and Construction Reference Guide for an example detailing an underfloor air distribution system.

9. Exemplary Performance

This credit is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

IEQ	
HEALTHCARE: NC	Credit 6.2

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THERMAL COMFORT—DESIGN AND VERIFICATION

IEQ CREDIT 7

HEALTHCARE: NC	
Credit	IEQ Credit 7
Points	1 point

Intent

To provide a comfortable thermal environment that supports and promotes occupant productivity and well-being and provide for the assessment of building occupant's thermal comfort over time.

Requirements

Design heating, ventilating and air conditioning (HVAC) systems and the building envelope to meet the requirements of one of the options below, and local codes or current 2010 FGI Guidelines for Design and Construction of Health Care Facilities (Table 2.1-2: Ventilation Requirements for Areas Affecting Patient Care in Hospitals and Outpatient Facilities), where local codes do not apply. Demonstrate design compliance in accordance with the Section 6.1.1 documentation.

OPTION 1. ASHRAE Standard 55-2004 or Non-U.S. Equivalent

Meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy (with errata but without addenda¹). Demonstrate design compliance in accordance with the Section 6.1.1 documentation. Projects outside the U.S. may use a local equivalent to ASHRAE Standard 55-2004 Thermal Comfort Conditions for Human Occupancy Section 6.1.1.

OPTION 2. ISO 7730: 2005 & CEN Standard EN 15251: 2007

Projects outside the U.S. may earn this credit by designing heating, ventilating and air conditioning (HVAC) systems and the building envelope to meet the requirements of International Organization for Standardization (ISO) 7730: 2005 Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria; and CEN Standard EN 15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics.

AND

Provide a permanent monitoring system to ensure that the building performs to the desired comfort criteria as determined above.

Agree to implement a thermal comfort survey of building occupants², within a period of six to 18 months after occupancy. The survey shall collect anonymous responses about thermal comfort in the building, including an assessment of overall satisfaction with thermal performance and identification of thermal comfort-related problems. Agree to develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with thermal comfort in the building. The plan shall include measurement of relevant environmental

¹ Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

² In acute care hospitals and outpatient healthcare projects, occupants are defined as full-time staff. For residential health care occupancies, such as long term care or rehabilitation facilities, occupants include both full-time staff and residents.

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IEQ CREDIT 7

variables in problem areas in accordance with the standard selected above and 2010 FGI Guidelines for Design and Construction of Health Care Facilities.

1. Benefits and Issues to Consider

See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits

See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

CEN Standard EN15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics

Comité Européen de Normalisation

<http://www.cen.eu>

This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Used in conjunction with ISO Standard 7730: 2005, it is considered equivalent to ASHRAE 55–2004 for the purposes of this credit.

ISO Standard 7730: 2005, Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria

International Organization for Standardization

<http://www.iso.org>

This standard “presents methods for predicting the general thermal sensation and degree of discomfort (thermal dissatisfaction) of people exposed to moderate thermal environments” and should be used in conjunction with CEN Standard EN 15251: 2007.

4. Implementation

Local standards for projects outside the United States will be compared with ASHRAE 55–2004 in terms of scope, metrics, and thresholds. Project teams that wish to ensure acceptance of a proposed equivalent to ASHRAE 55–2004 prior to submission for review may choose to submit a Formal Inquiry for a Credit Interpretation Ruling for a single project, or a LEED Interpretation for multi-project use.

In order to demonstrate equivalency using a local standard, the local standard must address all of the critical requirements of ASHRAE 55–2004, identified below.

Factors Affecting Thermal Comfort (ASHRAE 55–2004, Section 5.1):

There are six primary factors for defining conditions for thermal comfort for occupants. The six factors are metabolic (MET) rate, clothing insulation, air temperature, radiant temperature, air speed, and humidity.

In order to demonstrate equivalency, the local standard shall:

- Define acceptable thermal comfort conditions.
- Include a well-defined procedure to determine thermal comfort conditions.
 - The procedure shall define an acceptable thermal comfort zone.
 - At least 80% of occupants must be satisfied within the zone.
 - The procedure shall include the following parameters in the calculation:
 - Operative Temperature or a combination of air temperature and radiant temperature.

IEQ	
HEALTHCARE: NC	Credit 7

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- Humidity
- Air Speed
 1. Require a maximum air speed threshold for supply air systems (40 fpm [0.203 meters per second] is recommended but variances are allowed up to 10%).
- Local Thermal Discomfort
 1. Address temperature variations due to draft, vertical temperature differences, and radiant asymmetry. Thresholds for these may differ from ASHRAE 55-2004 within an acceptable range

5. Timeline and Team

Refer to the Timeline and Team sections for IEQ Credit 7.1, Thermal Comfort–Design, and IEQ Credit 7.2, Thermal Comfort–Verification, in the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit. Project teams wishing to use a local equivalent should contact USGBC early in the design phase to ensure that the alternative standard is acceptable.

6. Calculations

Refer to the Calculations sections for IEQ Credit 7.1, Thermal Comfort–Design, and IEQ Credit 7.2, Thermal Comfort–Verification, in the LEED 2009 Green Building Design and Construction Reference Guide for calculations relating to this credit.

7. Documentation Guidance

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

- For projects using a local equivalent in Option 1, the local standard shall address all the issues identified under Implementation.

If the selected equivalent standard contains deviations or omissions for sections specified under Implementation, provide relevant data to justify the omissions or deviations.

Refer to the Documentation Guidance sections for IEQ Credit 7.1, Thermal Comfort–Design, and IEQ Credit 7.2, Thermal Comfort–Verification, in the LEED 2009 Green Building Design and Construction Reference Guide for additional documentation guidance related to this credit.

8. Examples

Refer to the Examples sections for IEQ Credit 7.1, Thermal Comfort–Design, and IEQ Credit 7.2, Thermal Comfort–Verification, in the LEED 2009 Green Building Design and Construction Reference Guide for examples relating to this credit.

9. Exemplary Performance

This credit is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.

10. Regional Variations

Refer to the Regional Variations sections for IEQ Credit 7.1, Thermal Comfort–Design, and IEQ Credit 7.2, Thermal Comfort–Verification, in the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for Operations and Maintenance considerations related to this credit.

12. Resources

See USGBC's LEED Resources & Tools (<http://www.usgbc.org/leed/tools>) for additional resources and technical information.

Refer to the Resources sections for IEQ Credit 7.1, Thermal Comfort–Design, and IEQ Credit 7.2, Thermal Comfort–Verification, in the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

IEQ	
HEALTHCARE: NC	Credit 7

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Bus rapid transit is an enhanced bus system that operates on exclusive bus lanes or other transit rights-of-way; it is designed to combine the flexibility of buses with the efficiency of rail.

Green infrastructure is a soil- and vegetation-based approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture and reuse stormwater to maintain or restore natural hydrologies (U.S. EPA).

An **inland waterway** is a navigable body of water, such as a river, canal, or lake, that is deep, wide, and slow enough for a vessel to pass.

Low- Impact Development (LID) is an approach to managing stormwater runoff that emphasizes onsite natural features to protect water quality by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles, such as minimizing land disturbance, preserving vegetation, and minimizing impervious cover, and design practices like rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments. These engineered practices may require specialized design assistance.

Manage onsite refers to capturing and retaining the specified volume of rainfall to mimic natural hydrologic function. Strategies may include evapotranspiration, infiltration, and capture and reuse.

Natural site hydrology is the natural land cover function of water occurrence, distribution, movement, and balance.

Public transportation consists of bus, rail, or other transit services for the general public that operate on a regular, continual basis.

Rideshare is a transit service that involves sharing a single vehicle with multiple people, excluding large-scale vehicles such as buses and trains. The rideshare transit facility must include a signed stop and a clearly defined waiting area. Additionally, the rideshare must include an enclosed passenger seating area, fixed route service, fixed fare structure, continuous daily operation, and the ability to pick up and drop off multiple riders. Rideshare vehicles must hold 4 or more passengers, except for human-powered conveyances, which must hold 2 or more passengers.