



LEED® Credit Guide

Concrete Masonry and Hardscape
Products and LEED (NC) for New
Construction v. 2.2

Concrete Products Group LLC

Table of Contents

Introduction	4
Sustainable Sites Credits	5
SS Prerequisite 1	5
SS Credit 1	6
SS Credit 2	6
SS Credit 5.1	7
SS Credit 5.2	7
SS Credit 6.1	8
SS Credit 6.2	8
SS Credit 7.1	9
SS Credit 7.2	9
Energy and Atmosphere Credits	10
EA Prerequisite 2	10
EA Credit 1	11
Materials and Resources Credits	14
MR Credit 1.1	14
MR Credit 1.2	14
MR Credit 1.3	15
MR Credit 2.1	15
MR Credit 2.2	15
MR Credit 3.1	16
MR Credit 3.2	16

Table of Contents

MR Credit 4.1	16
MR Credit 4.2	17
Innovation and Design Process Credits	18
ID Credit 1-1.4	18

Introduction

This manual is intended as a resource for designers seeking ways to increase the energy efficiency and environmental benefits of their building projects through the use of concrete masonry and hardscape products. In particular, this manual discusses how concrete products can contribute solutions that assist in earning LEED credits under LEED® (NC) for new construction v.2.2. A companion manual is also available for LEED® 2009 or v.3, which will become effective in September, 2009.

The LEED® ratings system is focused on the total project, not individual products. Nonetheless, individual products may be part of providing solutions that do qualify for credit under the rating system. Concrete products can contribute to earning LEED® credits in a variety of ways. This manual will discuss the LEED® credit requirements and explain how concrete products can assist in delivering a LEED® certified, green building. In many cases, this manual includes references to documents that provide greater detail regarding the solutions that are discussed.

LEED® NC for New Construction V 2.2.

LEED® Credits under LEED® NC v2.2 are distributed across six categories. The column listing “Relevant Points” lists the points where concrete masonry or hardscape products solutions may be helpful.

Category	Points Available	Relevant Points
Sustainable Sites	14	7
Water Efficiency	5	0
Energy & Atmosphere	17	10
Materials & Resources	13	8
Indoor Environmental Quality	15	0
Innovation in Design	5	4
Total possible points	69	

LEED (NC) V.2.2 Concrete Products Credits Guide

The ways in which concrete products can contribute LEED credits to your project are listed below. Where available, we have also provided additional references to helpful information.

Sustainable Sites Credits

<p><i>The Concrete Products Group can be your partner in providing solutions for sustainable sites.</i></p>	<p>CPG SPEC-GREEN® Solutions that Help Earn Sustainable Sites Credits</p>
<p><i>Use CPG SPEC-GREEN® products when you need to contribute to sustainable sites credits under the LEED rating system. CPG's permeable interlocking concrete pavers and concrete grid paving systems manage both storm water quantity and quality issues, and can add green spaces to parking areas. CPG paving solutions are available with recycled content and high reflectivity designs, which reduce heat-island effects. In addition, CPG offers roof paving solutions also designed to reduce heat-island effects. We can help you meet regulations, earn LEED credits, and achieve environmentally sound outcomes.</i></p>	<p>When used as part of a site landscaping, erosion control or storm water management plan, these CPG products help contribute to LEED Sustainable Sites Credits:</p>
<p>SS Prerequisite 1: Construction Activity Pollution Prevention</p>	<p>Required</p>
<p>Intent: Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation</p> <p>Requirements: Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project.</p>	<p>Segmental Retaining Walls for water detention or retention systems and terracing of erosion prone steep slopes. In addition, segmental retaining walls and internally reinforced masonry walls may be constructed in cut situations in ways that minimize excavation requirements behind the wall, reducing site disruption, soil erosion and preserving natural habitat.</p> <p>Articulated Concrete Blocks for erosion control along banks and channels in high water flow conditions.</p> <p>The small unit size of concrete products minimizes the need for staging areas and use of large equipment.</p> <p>References: <i>Concrete Masonry and the LEED® Program</i>, TEK 6-9B National Concrete Masonry Association, 2006 <i>Concrete Masonry & Hardscape Products in LEED® 2009</i>, TEK 6-9C National Concrete Masonry Association, 2009 <i>Articulated Concrete Block for Erosion Control</i>, TEK 11-9A. National Concrete Masonry Association, 2004.</p>

SS Credit 1: Site Selection	1 Point	
<p>Intent: Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.</p> <p>Requirements: Do not build on portions of sites that are prime farmland, critical to threatened wildlife habitat, wetlands, within a flood plain, within 50 feet of a body of water, or were previously public parkland.</p>		<p>Segmental Retaining Walls facilitate efficient development by minimizing the footprint of the developed portion of a site, and help allow preservation of wetlands and other sensitive areas on a site.</p> <p>References:</p> <p><i>Concrete Masonry & Hardscape Products in LEED® 2009, TEK 6-9C</i> National Concrete Masonry Association, 2009</p>

SS Credit 2: Development Density & Community Connectivity	1 Point	
<p>Intent: Channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.</p> <p>Requirements: OPTION 1 – DEVELOPMENT DENSITY Construct or renovate building on a previously developed site AND in a community with a minimum density of 60,000 square feet per acre net (Note: density calculation must include the area of the project being built and is based on a typical two-story downtown development). OR OPTION 2 – COMMUNITY CONNECTIVITY Construct or renovate building on a previously developed site AND within 1/2 mile of a residential zone or neighborhood with an average density of 10 units per acre net AND within 1/2 mile of at least 10 Basic Services AND with pedestrian access between the building and the services.</p>		<p>Segmental Retaining Walls can be used to increase the proportion of usable area in hilly terrain, which eases development in urban areas by providing maximum usable space. In addition, retaining walls can be used to allow maximum density lot placement, and to separate and minimize the developed portion of a site, protecting habitat and natural areas.</p> <p>Concrete masonry fences allow privacy and sound reduction in high density developments.</p> <p>References:</p> <p><i>Concrete Masonry & Hardscape Products in LEED® 2009, TEK 6-9C</i> National Concrete Masonry Association, 2009</p>

SS Credit 5.1: Site Development: Protect or Restore Habitat	1 Point	
<p>Intent: Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.</p> <p>Requirements:</p> <p>OPTION 1 On greenfield sites, limit all site disturbance to 40 feet beyond the building perimeter; 10 feet beyond surface walkways, patios, surface parking and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, storm water detention facilities and playing fields) that require additional staging areas in order to limit compaction in the constructed area.</p> <p>OR</p> <p>OPTION 2 On previously developed or graded sites, restore or protect a minimum of 50% of the site area (excluding the building footprint) with native or adapted vegetation. Native/adapted plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Projects earning SS Credit 2 and using vegetated roof surfaces may apply the vegetated roof surface to this calculation if the plants meet the definition of native/adapted.</p>		<p>Concrete Masonry requires minimal site disruption as it does not require large staging areas or intrusion of large equipment on the site.</p> <p>Reinforced masonry retaining walls can be constructed without the requirement of soil reinforcement, minimizing the need to disrupt the site by over-excavating behind the structure.</p> <p>Segmental retaining walls allow designers to minimize the footprint of the developed area, and to preserve larger portions of a site for natural areas</p> <p>References: <i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006</i> <i>Concrete Masonry & Hardscape Products in LEED® 2009, TEK 6-9C National Concrete Masonry Association, 2009</i></p>

SS Credit 5.2: Site Development: Maximize Open Space	1 Point	
<p>Intent: Provide a high ratio of open space to development footprint to promote biodiversity.</p> <p>Requirements</p> <p>OPTION 1 Reduce the development footprint (defined as the total area of the building footprint, hardscape, access roads and parking) and/or provide vegetated open space within the project boundary to exceed the local zoning's open space requirement for the site by 25%.</p> <p>OR OPTION 2 For areas with no local zoning requirements (e.g., some university campuses, military bases), provide vegetated open space area adjacent to the building that is equal to the building footprint.</p> <p>OR OPTION 3 Where a zoning ordinance exists, but there is no requirement for open space (zero), provide vegetated open space equal to 20% of the project's site area.</p> <p>ALL OPTIONS: <input type="checkbox"/> For projects located in urban areas that earn SS Credit 2, vegetated roof areas can contribute to credit compliance. <input type="checkbox"/> For projects located in urban areas that earn SS Credit 2, pedestrian oriented hardscape areas can contribute to credit compliance. For such projects, a minimum of 25% of the open space counted must be vegetated. <input type="checkbox"/> Wetlands or naturally designed ponds may count as open space if the side slope gradients average 1:4 (vertical:horizontal) or less and are vegetated.</p>		<p>Use Concrete Grid Pavers to add vegetated open space that can serve as pathways or light duty parking areas.</p> <p>Use Segmental Retaining Walls to maximize usable space within the developed area, or to provide additional planting areas on steep slopes (some retaining walls feature plantable designs, allowing vertical planting).</p> <p>Use roof paving systems, landscaping edgers and small retaining walls to provide walkways and elevated planting areas for vegetated rooftops.</p> <p>References: <i>Concrete Grid Pavements, TECH SPEC 8. Interlocking Concrete Pavement Institute, 2006.</i> <i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006</i></p>

SS Credit 6.1 Storm water Design: Quantity Control	1 Point	
<p>Intent: Limit disruption of natural water hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from storm water runoff, and eliminating contaminants.</p> <p>Requirements: CASE 1 — EXISTING IMPERVIOUSNESS IS LESS THAN OR EQUAL TO 50%: Implement a storm water management plan that prevents the post-development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity for the one- and two-year 24-hour design storms. OR Implement a storm water management plan that protects receiving stream channels from excessive erosion by implementing a stream channel protection strategy and quantity control strategies. OR CASE 2 — EXISTING IMPERVIOUSNESS IS GREATER THAN 50% Implement a storm water management plan that results in a 25% decrease in the volume of storm water runoff from the two-year 24-hour design storm.</p>		<p>Permeable Interlocking Concrete Pavers allow construction of parking areas, roadways, and sidewalks that allow rainwater to infiltrate the soil- addressing both storm water quantity and quality issues. Pavers with recycled content and high solar reflectance (to reduce heat-island effects) are available.</p> <p>Concrete Grid Pavers (“Grassy Pavers”) add the benefit of allowing such areas to be vegetated.</p> <p>Use Articulated Concrete Blocks for erosion control along stream channels in high water flow conditions.</p> <p>References: <i>Achieving LEED Credits with Segmental Concrete Pavements</i>, TECH SPEC 16. Interlocking Concrete Pavement Institute, 2005.</p> <p><i>Permeable Interlocking Concrete Pavement: A Comparison Guide to Porous Asphalt and Pervious Concrete</i>, Interlocking Concrete Pavement Institute, 2008.</p> <p><i>Concrete Grid Pavements</i>, TECH SPEC 8. Interlocking Concrete Pavement Institute, 2006.</p> <p><i>Articulated Concrete Block for Erosion Control</i>, TEK 11-9A. National Concrete Masonry Association, 2004.</p>

SS Credit 6.2 Storm water Design: Quality Control	1 Point	
<p>Intent: Limit disruption and pollution of natural water flows by managing storm water runoff.</p> <p>Requirements Implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).</p> <p>BMPs used to treat runoff must be capable of removing 80% of the average annual post development total suspended solids (TSS) load based on existing monitoring reports.</p>		<p>Permeable Interlocking Concrete Pavers allow construction of structurally sound parking areas, roadways, paths and sidewalks that remain pervious to rain so that rainwater can infiltrate the soil- addressing both storm water quantity and quality issues. Pavers with recycled content and high solar reflectivity (to reduce heat-island effects-see SS are available.</p> <p>Concrete Grid Pavers (“Grassy Pavers”) add the additional benefit of allowing plantings in the paved area for areas that are used for fire access or light traffic.</p> <p>References: (See SS Credit 6.1 above)</p>

SS Credit 7.1 Heat Island Effect: Non-Roof	1 Point	
<p>Intent Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.</p> <p>Requirements</p> <p>OPTION 1 Provide any combination of the following strategies for 50% of the site hardscape (including roads, sidewalks, courtyards and parking lots):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Shade (within 5 years of occupancy) <input type="checkbox"/> Paving materials with a Solar Reflectance Index (SRI) of at least 29 <input type="checkbox"/> Open grid pavement system <p>OR</p> <p>OPTION 2 Place a minimum of 50% of parking spaces under cover (defined as under ground, under deck, under roof, or under a building). Any roof used to shade or cover parking must have an SRI of at least 29.</p>		<p>Use Interlocking Concrete Pavers with a Solar Reflectance Index of at least 29.</p> <p>Use Concrete Grid Pavers (Grassy Pavers) to provide a vegetated open area that can accept traffic and parking use.</p> <p>References:</p> <p><i>Achieving LEED Credits with Segmental Concrete Pavements</i>, TECH SPEC 16. Interlocking Concrete Pavement Institute, 2005.</p> <p><i>Concrete Grid Pavements</i>, TECH SPEC 8. Interlocking Concrete Pavement Institute, 2006.</p>

SS Credit 7.2 Heat Island Effect: Roof	1 Point										
<p>Intent Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.</p> <p>Requirements</p> <p>OPTION 1 Use roofing materials having a Solar Reflectance Index (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface.</p> <p>OR</p> <p>OPTION 2 Install a vegetated roof for at least 50% of the roof area.</p> <p>OR</p> <p>OPTION 3 Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria: $(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) \geq \text{Total Roof Area}$</p>		<p>Use Interlocking Concrete Pavers and vegetated roof surfaces to provide an attractive and durable roofing surface suitable for pedestrian use. Pavers with a Solar Reflectance Index of at least 29 are</p> <p>References:</p> <p><i>Concrete Paving Units for Roof Decks</i>, TECH SPEC 14, Interlocking Concrete Pavement Institute, 2008.</p> <p><i>Achieving LEED Credits with Segmental Concrete Pavements</i>, TECH SPEC 16. Interlocking Concrete Pavement Institute, 2005.</p>									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Roof Type</th> <th style="text-align: left;">Slope</th> <th style="text-align: left;">SRI</th> </tr> </thead> <tbody> <tr> <td>Low-sloped roof</td> <td>≤ 2:12</td> <td>78</td> </tr> <tr> <td>Steep-sloped roof</td> <td>≥ 2:12</td> <td>29</td> </tr> </tbody> </table>	Roof Type	Slope	SRI	Low-sloped roof	≤ 2:12	78	Steep-sloped roof	≥ 2:12	29		
Roof Type	Slope	SRI									
Low-sloped roof	≤ 2:12	78									
Steep-sloped roof	≥ 2:12	29									

Energy and Atmosphere Credits

<p><i>The Concrete Products Group offers products that can contribute to energy efficiency</i></p> <p><i>Use CPG products to construct an energy efficient building envelope as part of delivering a building system that exceeds base energy efficiency standards</i></p>	<p>CPG SPEC-GREEN™ Solutions that Help Earn Materials & Resource Credits</p> <p><i>These CPG Products help contribute to LEED Energy and Atmosphere Credits:</i></p>
---	---

<p>EA Prerequisite 2: Minimum Energy Performance</p>	<p>Required</p>	
<p>Intent Establish the minimum level of energy efficiency for the proposed building and systems.</p> <p>Requirements Design the building project to comply with both—</p> <ul style="list-style-type: none"> <input type="checkbox"/> the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) of ASHRAE/IESNA Standard 90.1-2004 (without amendments); and <input type="checkbox"/> the prescriptive requirements (Sections 5.5, 6.5, 7.5 and 9.5) or performance requirements (Section 11) of ASHRAE/IESNA Standard 90.1-2004 (without amendments). 		<p>Use concrete masonry to construct an energy efficient building envelope. (See discussion under EA Credit 1 below).</p> <p>References:</p> <p><i>Concrete Masonry and the LEED® Program</i>, TEK 6-9B National Concrete Masonry Association, 2006.</p> <p><i>Achieving LEED Credits with Segmental Concrete Pavements</i>, TECH SPEC 16. Interlocking Concrete Pavement Institute, 2005.</p>

EA Credit 2:
Optimize Energy Performance

1-10 points
2 Mandatory

Intent

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

Requirements

Select one of the four compliance path options described below. Project teams documenting achievement using any of these options are assumed to be in compliance with EA Prerequisite 2.

NOTE: LEED for New Construction projects registered after June 26th, 2007 are required to achieve at least two (2) points under EA c1.

OPTION 1 — WHOLE BUILDING ENERGY SIMULATION (1–10 Points)

Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2004 by a whole building project simulation using the Building Performance Rating Method in Appendix G of the Standard. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
10.5%	3.5%	1
14%	7%	2
17.5%	10.5%	3
21%	14%	4
24.5%	17.5%	5
28%	21%	6
31.5%	24.5%	7
35%	28%	8
38.5%	31.5%	9
42%	35%	10

* Note: Only projects registered prior to June 26, 2007 may pursue 1 point under EA c1

Appendix G of Standard 90.1-2004 requires that the energy analysis done for the Building Performance Rating Method include ALL of the energy costs within and associated with the building project. To achieve points using this credit, the proposed design—

- must comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2004;
- must include all the energy costs within and associated with the building project; and

Use concrete masonry to construct an energy efficient building envelope. “Energy savings attributable to thermal mass inherent in concrete masonry construction contribute to this goal when used in conjunction with passive solar heating and/or ventilation cooling. Because concrete masonry has high thermal mass and specific heat, it provides very effective thermal storage. Masonry walls remain warm or cool long after the heat or air-conditioning has shut off. This, in turn, can effectively: reduce heating and cooling loads, improve occupant comfort by moderating indoor temperature swings; and shift peak heating and cooling loads to off-peak hours. In addition, the reflective properties of concrete pavers may allow designers to reduce energy requirements for lighting in parking areas.”*

References:

* *Concrete Masonry and the LEED® Program*, TEK 6-9B National Concrete Masonry Association, 2006

Achieving LEED Credits with Segmental Concrete Pavements, TECH SPEC 16. Interlocking Concrete Pavement Institute, 2005.

Energy Standard for Buildings Except Low-Rise Residential Buildings, ANSI/ASHRAE/IESNA Standard 90.1-2007. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 2007.

Advanced Energy Design Guides. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., download from: <http://www.ashrae.org/technology/page/938>.

Advanced Buildings Core Performance Guide. New Buildings Institute, 2007

EA Credit 1:

**Optimize Energy Performance
(Continued)**

**1-10 points
2 Mandatory**

must be compared against a baseline building that complies with Appendix G to Standard 90.1-2004.

The default process energy cost is 25% of the total energy cost for the baseline building. For buildings where the process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include supporting 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 (such as for the interior, parking garage, surface parking, façade, or building grounds, except as noted above), HVAC (such as 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 EA Credit 1, process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the Exceptional Calculation Method (ASHRAE 90.1-2004 G2.5) to document measures that reduce process loads. Documentation of process load energy savings shall include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

OR

OPTION 2 — PRESCRIPTIVE COMPLIANCE PATH: ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004 (4 Points)

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004. The following restrictions apply:

- Buildings must be under 20,000 square feet.
- Buildings must be office occupancy.
- Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located.

OR

OPTION 3 — PRESCRIPTIVE COMPLIANCE PATH: Advanced Buildings™ Core Performance™ Guide (2-5 Points)

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The following restrictions apply:

- Buildings must be under 100,000 square feet.
- Buildings may NOT be health care, warehouse or laboratory projects.
- Project teams must fully comply with Sections One, Design Process Strategies, and Two, Core Performance Requirements.

<p>EA Credit 1: Optimize Energy Performance (Continued)</p>	<p>1-10 points 2 Mandatory</p>	
<p>Minimum points achieved under Option 3 (2-3 points):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Three (3) points are available for all office, school, public assembly, and retail projects under 100,000 square feet that comply with Sections One and Two of the Core Performance Guide. <input type="checkbox"/> Two (2) points are available for all other project types under 100,000 square feet (except health care, warehouse, or laboratory projects) that implement the basic requirements of the Core Performance Guide <p>Additional points available under Option 3 (up to 2 additional points):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Up to two (2) additional points are available to projects that implement performance strategies listed in Section Three, Enhanced Performance. For every three strategies implemented from this section, one point is available. <input type="checkbox"/> Any strategies applicable to the project may be implemented except: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> 3.1-Cool Roofs <input checked="" type="checkbox"/> 3.8-Night Venting <input checked="" type="checkbox"/> 3.13-Additional Commissioning <p>These strategies are addressed by different aspects of the LEED program and are not eligible for additional points under EA Credit 1.</p> <p>OR</p> <p>OPTION 4 — PRESCRIPTIVE COMPLIANCE PATH: Advanced Buildings Benchmark™ Basic Criteria and Prescriptive Measures (1 Point)</p> <p>Note: projects registered after June 26, 2007 may not use this option Comply with the Basic Criteria and Prescriptive Measures of the Advanced Buildings Benchmark™ Version 1.1 with the exception of the following sections: 1.7 Monitoring and Trend-logging, 1.11 Indoor Air Quality, and 1.14 Networked Computer Monitor Control. The following restrictions apply:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Project teams must fully comply with all applicable criteria as established in Advanced Buildings Benchmark for the climate zone in which the building is located. 		

Materials and Resources Credits

<p><i>The Concrete Products Group offers products that use materials and resources in an environmentally responsible way.</i></p> <p><i>CPG offers numerous products that help when you need to contribute to materials and resources credits under the LEED rating system. Concrete products are typically locally sourced and manufactured. Many products have recycled content and are in turn recyclable themselves. They offer superior durability, and can be reused both as existing structures or put to other uses on the same site as clean fill or aggregates.</i></p>	<p>CPG SPEC-GREEN™ Solutions that Help Earn Materials & Resource Credits</p> <p><i>These CPG Products help contribute to LEED Materials & Resources Credits:</i></p>
--	---

<p>MR Credit 1.1: Building Reuse: Maintain 75% of Existing Walls, Floors & Roof</p>	<p>1 Point</p>	
<p>Intent Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.</p> <p>Requirements Maintain at least 75% (based on surface area) of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and non-structural roofing material).</p>		<p>While this credit is directed at using existing structures, Concrete Masonry's durability makes it a solid choice when building end of life cycle considerations are taken into account.</p> <p>References: <i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006.</i></p>

<p>MR Credit 1.2: Building Reuse: Maintain 95% of Existing Walls, Floors & Roof</p>	<p>1 Point</p>	
<p>Intent Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.</p> <p>Requirements Maintain an additional 20% (95% total, based on surface area) of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and non-structural roofing material).</p>		<p>While this credit is directed at using existing structures, Concrete Masonry's durability makes it a solid choice when end of building life cycle considerations are taken into account.</p> <p>References: <i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006.</i></p>

MR Credit 1.3: Building Reuse: Maintain 50% of Interior Non-Structural Elements	1 Point	
<p>Intent Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.</p> <p>Requirements Use existing interior non-structural elements (interior walls, doors, floor coverings and ceiling systems) in at least 50% (by area) of the completed building (including additions).</p>		<p>While this credit is directed at using existing structures, Concrete Masonry's durability makes it a solid choice when end of building life cycle considerations are taken into account.</p> <p>References:</p> <p><i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006.</i></p>

MR Credit 2.1: Construction Waste Management: Divert 50% From Disposal	1 Point	
<p>Intent Divert construction, demolition and land-clearing debris from disposal in landfills and incinerators. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.</p> <p>Requirements Recycle and/or salvage at least 50% of non-hazardous 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 co-mingled.</p>		<p>Unused concrete masonry products can be redirected to the manufacturing process either for reuse or recycling. Waste masonry or concrete products also can be used as clean fill at the construction site, or crushed into aggregates for use as backfill or base material.</p> <p>References:</p> <p><i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006.</i></p>

MR Credit 2.2: Construction Waste Management: Divert 75% From Disposal	1 Point	
<p>Intent Divert construction and demolition debris from disposal in landfills and incinerators. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.</p> <p>Requirements Recycle and/or salvage an additional 25% beyond MR Credit 2.1 (75% total) of non-hazardous construction and demolition debris.</p>		<p>Unused concrete masonry products can be redirected to the manufacturing process either for reuse or recycling. Waste masonry or concrete products also can be used as clean fill at the construction site, or crushed into aggregates for use as backfill or base material.</p> <p>References:</p> <p><i>Concrete Masonry and the LEED® Program, TEK 6-9B National Concrete Masonry Association, 2006.</i></p>

MR Credit 3.1: Materials Reuse: 5%	1 Point	
<p>Intent Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.</p> <p>Requirements Use salvaged, refurbished or reused materials such that the sum of these materials constitutes at least 5%, based on cost, of the total value of materials on the project.</p>		<p>Segmental retaining walls, interlocking concrete pavers, and articulated concrete blocks can be disassembled and reused.</p> <p>Concrete masonry can be crushed and reused as clean fill, base material or aggregate for use in recycled content concrete or concrete products.</p> <p>References: <i>Reinstatement of Interlocking Concrete Pavements</i>, Tech Spec 6, Interlocking Concrete Pavement Institute, 2005</p>
MR Credit 3.2: Materials Reuse: 10%	1 Point	
<p>Intent Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.</p> <p>Requirements Use salvaged, refurbished or reused materials for an additional 5% beyond MR Credit 3.1 (10% total, based on cost).</p>		<p>Segmental retaining walls, interlocking concrete pavers, and articulated concrete blocks can be disassembled and reused.</p> <p>Concrete masonry can be crushed and reused as clean fill, base material or aggregate for use in recycled content concrete or concrete products.</p> <p>References: <i>Reinstatement of Interlocking Concrete Pavements</i>, Tech Spec 6, Interlocking Concrete Pavement Institute, 2005</p>
MR Credit 4.1: Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	1 Point	
<p>Intent Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.</p> <p>Requirements Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project. The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.</p>		<p>All Concrete Products can be manufactured using post-industrial recycled materials, including substitute cementing materials such as fly ash, cement slag or flume silica which reduce the amount of cement in the concrete, and take materials that would otherwise be placed in landfills. In addition, post-consumer materials including waste concrete, glass and other materials, may be used as aggregates, to make concrete products.</p> <p>References: <i>Determining the Recycled Content of Concrete Masonry Products</i>, TEK 6-6A. National Concrete Masonry Association, 2008</p>

MR Credit 4.2: Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	1 Point	
<p>Intent Increase demand for building products that incorporate recycled content materials, thereby reducing the impacts resulting from extraction and processing of virgin materials.</p> <p>Requirements Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes an additional 10% beyond MR Credit 4.1 (total of 20%, based on cost) of the total value of the materials in the project.</p>	<p>All Concrete Products can be manufactured using post-industrial recycled materials, including substitute cementing materials such as fly ash, cement slag or flume silica which reduce the amount of cement in the concrete, and take materials that would otherwise be placed in landfills. In addition, post-consumer materials including waste concrete, glass and other materials, may be used as aggregates, to make concrete products.</p> <p>References:</p> <p><i>Determining the Recycled Content of Concrete Masonry Products</i>, TEK 6-6A. National Concrete Masonry Association, 2008</p>	

Innovation and Design Process Credits

<p><i>The Concrete Products Group offers innovative strategies to exceed LEED® Requirements</i></p> <p><i>CPG products can be used in a variety of ways that help deliver results that exceed LEED requirements and contribute to delivering superior building and site performance.</i></p>	<p>CPG Solutions that Help Earn Innovation and Design Process Credits</p> <p><i>These CPG Products help contribute to LEED Innovation and Design Process Credits:</i></p>
---	--

<p>ID Credit 1-1.4: Innovation in Design</p>	<p>Up to 4 Points</p>	
<p>Intent To provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED for New Construction Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED for New Construction Green Building Rating System.</p> <p>Requirements Credit 1.1 (1 point) In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the design approach (strategies) that might be used to meet the requirements. Credit 1.2 (1 point) Same as Credit 1.1 Credit 1.3 (1 point) Same as Credit 1.1 Credit 1.4 (1 point) Same as Credit 1.1</p>		<p>Concrete masonry has life cycle impact advantages over other building materials due to its low embodied energy, durability, and low maintenance requirements.</p> <p>Use architectural concrete masonry units for interior spaces to eliminate the use of paints or stains and potential VOC (volatile organic compound) emissions and improve indoor air quality. In addition, concrete masonry has low potential for mold growth, and is easily cleaned in the event of moisture penetration.</p> <p>Concrete masonry products typically uses less cement than pre-cast concrete and products made with supplemental cementitious materials such as fly ash or slag cement are available. Such products result in further reductions in carbon footprint. A 40% reduction in cement content has been awarded a credit under the Innovation and Design Process Credit</p> <p>Single wythe masonry products such as Spec-Brik® integrate a brick finish into a structural masonry unit, resulting both in installation efficiency and lower materials usage.</p>

ID Credit 1-1.4: Innovation in Design (Continued)	Up to 4 Points	
		References: <i>Concrete Masonry and the LEED® Program</i> , TEK 6-9B National Concrete Masonry Association, 2006. <i>Achieving LEED Credits with Segmental Concrete Pavements</i> , TECH SPEC 16. Interlocking Concrete Pavement Institute, 2005. <i>Innovation in Design Credit Catalog</i> . United States Green Building Council, available at www.usgbc.org

Endnote:

This manual is intended to supply ideas regarding how to use concrete masonry and hardscape products to earn credits under the LEED® ratings system. Ultimately, compliance with LEED® standards is governed by the United States Green Building Council. For further details, the user should consult the United States Green Building Council’s LEED® (NC) for New Construction V.2.2 and the resources that are available at the U.S.G.B.C.’s website, www.usgbc.org.