Sustainable Landscapes

Ellen Vincent
Environmental Landscape Specialist

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Sustainability

- Used in many ways to mean many things.
- Sustainable agriculture
- Sustainable architecture
- Sustainable communities
- Sustainable business
- Sustainable table (food)
- Sustainable style (lifestyle, fashion, home)

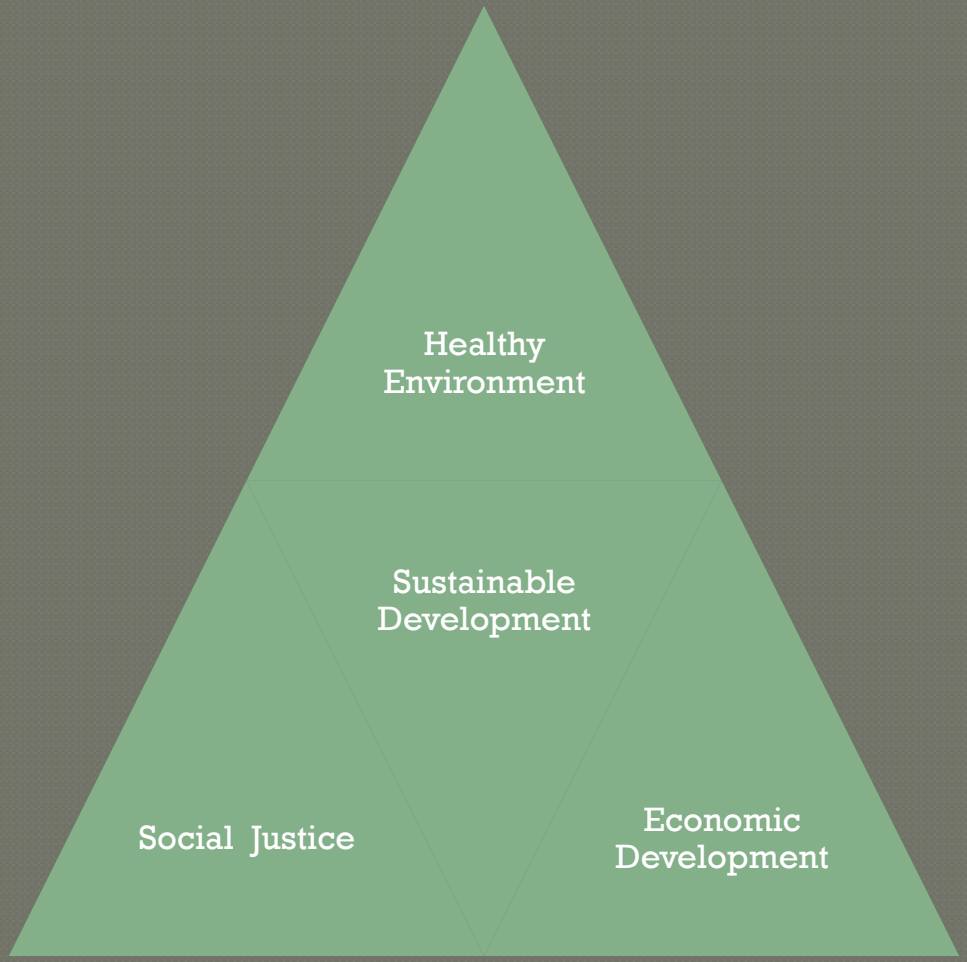
Sustainable defined

- *Sustainable development, according to the Brundtland Report, is development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (1987, p. 8).

Photo: images.google.com
kidsdreamgym.com

The World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press: Oxford

Issue triad


Healthy Environment
Sustainable Development
Social Justice
Economic Development

Sustainable development

- Design and planning
- Product development
- Procedures and maintenance

Photo by Ellen Vincent

Sustainable Landscapes

Design & planning

NASA: Apollo 17 view of Earth

Sustainable Sites Initiative™

- Certification program for commercial businesses
- Developmental stage
- Will become the landscape component of the U.S. Green Building Industry's LEED® (Leadership in Energy and Environmental Design) certification program.

http://www.sustainablesites.org/

Photo: Ellen Vincent

Sustainable Sites Initiative™

- The Sustainable Sites Initiative is a partnership of the
  - American Society of Landscape Architects
  - Lady Bird Johnson Wildflower Center at the University of Texas at Austin
  - United States Botanic Garden
  - Diverse group of stakeholder organizations

Sustainable Sites Initiative™

- Mission is to establish and encourage sustainable practices in:
  - landscape design
  - construction
  - operations
  - maintenance

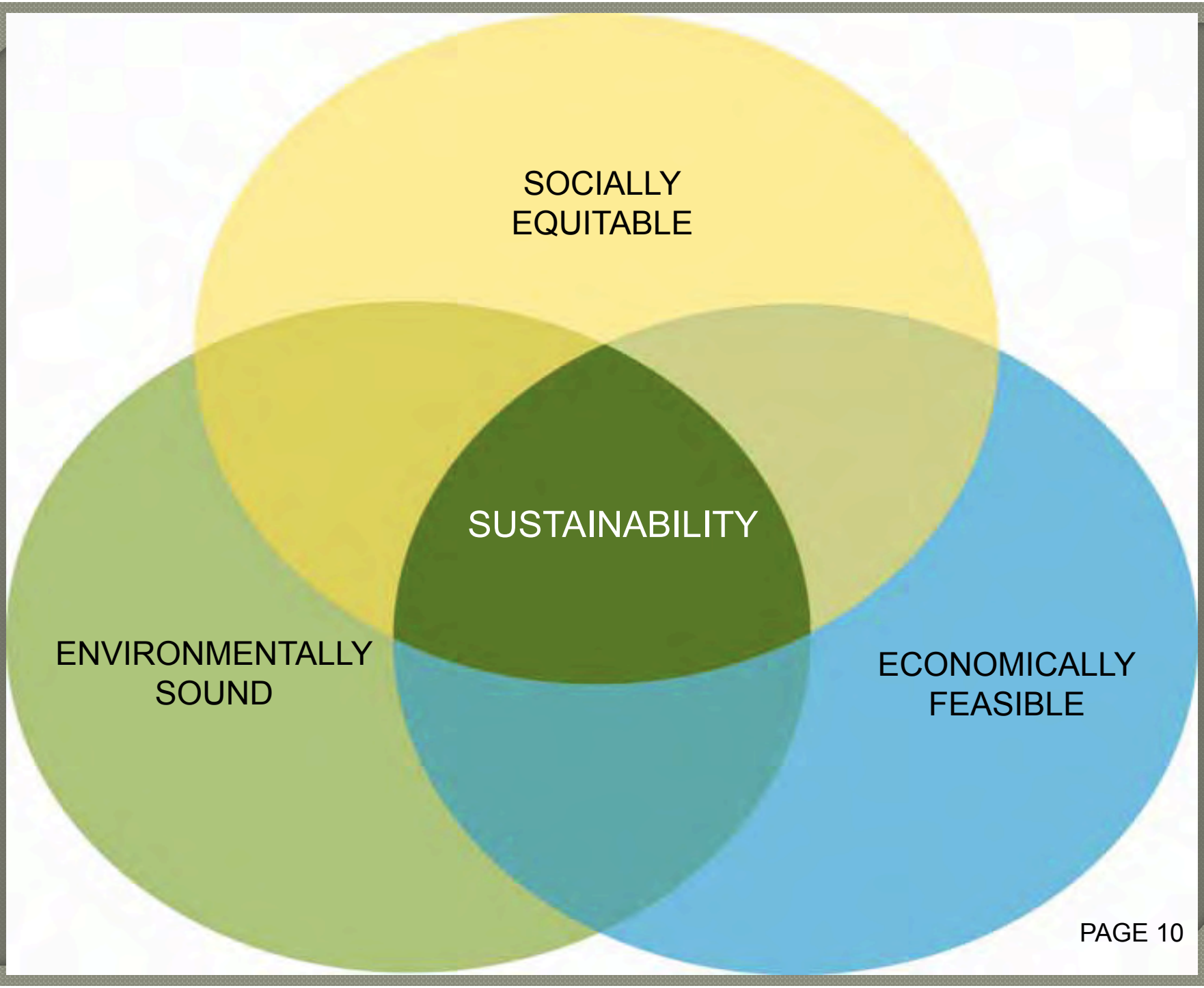
Photo by Ellen Vincent

Guiding Principles of a a Sustainable Site

- Do no harm
- Precautionary principle
- Design with nature and culture
- Use a decision-making hierarchy of preservation, conservation, and regeneration
- Provide regenerative systems as intergenerational equity

Guiding Principles of a a Sustainable Site (cont.)

- Support a living process
- Use a systems thinking approach
- Use a collaborative and ethical approach
- Maintain integrity in leadership and research
- Foster environmental stewardship


SOCIALLY
EQUITABLE
SUSTAINABILITY
ENVIRONMENTALLY
SOUND
ECONOMICALLY
FEASIBLE

Sustainable Sites Initiative™

(1) Site selection

(2) Pre-design assessment and planning

(3) Site design –ecological components

(4) Site design-human health components

(5) Site design materials selection

(6) Construction

(7) Operations and maintenance

(3) Site Design –Ecological Components

Protect and restore site processes and systems

3.1 Control and manage invasive species

3.2 Use appropriate, non-invasive plants

3.3 Preserve special status trees

3.4 Reduce potable water consumption for irrigation

http://www.sustainablesites.org/report/SSI_Guidelines_Draft_2008.pdf

Present day examples (pre certification implementation)

Freshkills, Staten Island, NY
High Line Project, NYC
SC Governor's mansion
Green roofs

http://www.greenthegrounds.org/south-carolina.html

Lifescape Project at Freshkills Reserve Staten Island, NY

- 2,200 acre former landfill reclamation
- Trash stays
- "Nature sprawl" habitat for plants, animals, people

Source: Field Operations, NYC

High Line Project NYC

- Former railway reclamation
- Integration for business, nature, and recreation

Design by James Corner Field Operations and Diller Scofidio + Renfro. Courtesy the City of New York

High Line Project NYC

Design by James Corner Field Operations and Diller Scofidio + Renfro.
Courtesy the City of New York

SC Governor's Mansion

- Green the Grounds: Bringing nature into the public realm
- SC Governor's mansion
- White House vegetable garden

http://www.greenthegrounds.org/south-carolina.html

Green roofs

- Reduce summer cooling and winter heating costs.
- Lengthen the life of the roof by 2 to 3 times.
- Reduce noise.
- Reduce stormwater runoff.
- Reduce carbon dioxide impacts.

Source: Penn State Center for Green Roof Research
http://horticulture.psu.edu/cms/greenroofcenter/history.html

Photo: Ellen Vincent

Green roofs

- Drought tolerant plants
- When soil medium is 1-3 inches low growing plants such as grasses, sedums, cacti are used.
- When soil medium is several feet shrubs and small trees are used.
- Low pitch and flat roofs can be planted
- Niche growers can supply plants for green roofs.

Photo: Ellen Vincent

Penn State Center for Green Roof Research

- To demonstrate and promote green roof research, education, and technology transfer in the Northeastern US.

Source: Penn State Center for Green Roof Research http://horticulture.psu.edu/cms/greenroofcenter/history.html

Sustainable Landscapes

Product development

NASA: Earth two views

Examples

- Cradle to cradle certification process
- Pots

Cradle to Cradle Certification

McDonough Braungart Design Chemistry, LLC,
Charlottesville, VA

1996, McDonough was given the Presidential Award for Sustainable Development, the nation's highest environmental honor, presented by President Clinton in a White House ceremony.

William McDonough
Architect & Professor of Architecture for University of VA & Cornell University

Michael Braungart
Ph.D. Chemistry
Professor of Process Engineering at the Technical University of Northeast Lower Saxony
1993 earned the Océ-van der Grinten Award for Environment and Sustainability research

http://www.c2ccertified.com/

Integration of nature and human development

- *"Industry can be so safe, effective, enriching and intelligent that it need not be fenced off from other human activity."*

  (McDonough and Braungart, 2002, p. 87).

- New product design results in "social goods" such as clean air, clean water, longer product life.

McDonough, William and Michael Braungart. 2002. *Cradle to Cradle*. North Point Press: New York.

Product development

Using environmentally safe and healthy materials

Design for material reutilization, such as recycling or composting

Energy efficiency and the use of renewable energy

Efficient use of water, and maximum water quality associated with production

Instituting strategies for social responsibility

Cradle to cradle certification & USGBC LEED innovation credit

Materials can earn Cradle to Cradle Certified^{CM} status in silver, gold, or platinum categories

http://www.mbdc.com/cert_innovation_credit.htm

Cradle to Cradle Certified^{CM}

- Eagle Bay permeable pavers Certified Silver

Expires
7-13-2010

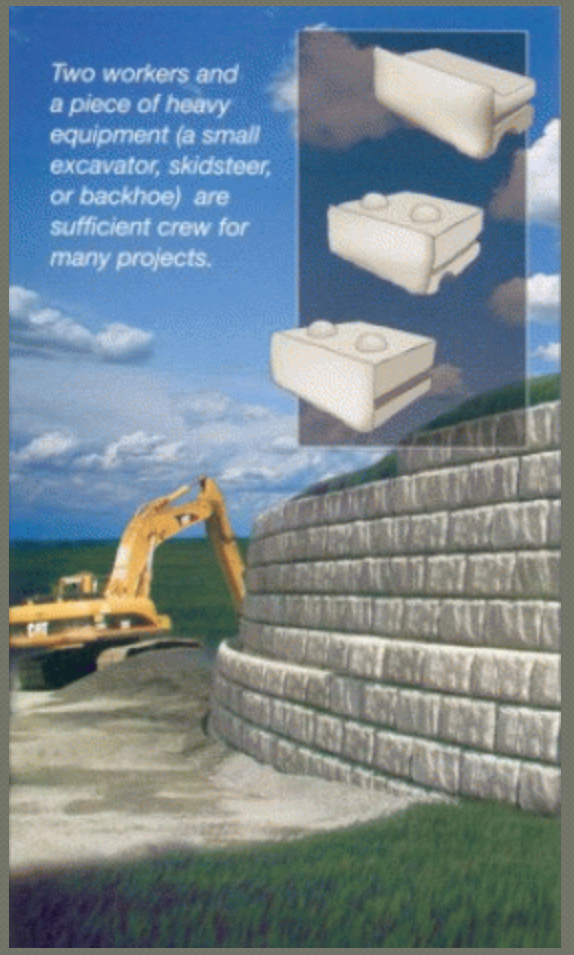
http://www.mbdc.com/c2c/itemDetails.php?item=189

http://www.eaglebayusa.com/products_sfrima.html

Cradle to Cradle Certified^{CM}

- Eagle Corporation H.T. Ferron Redi-Rock Retaining Wall System Certified Silver

Expires 07-13-2010



http://www.mbdc.com/c2c/itemDetails.php?item=192

http://www.htferron.com/redi_rock.html.

Cradle to Cradle Certified^{CM}

Certified Silver Expires 05-24-2010

- TimberSIL® wood for siding, roofing, structural framing, decking, tongue and groove flooring, windows, shingles, etc.
- Wood and glass product is stronger/longer lasting than wood alone (rot resistant)

http://www.mbdc.com/c2c/itemDetails.php?item=79

http://www.timbersilwood.com/

Cradle to Cradle Certified^{CM}

- Hycrete® concrete additive prevents rust and corrosion of rebar.

Certified Silver Expires 09-24-2009

http://www.mbdc.com/c2c/itemDetails.php?item=42

http://www.hycrete.com/

New product design: Minneapolis bridge concrete

Industrial waste product ingredients replaced a portion of Portland cement

http://www.nytimes.com/2009/03/31/science/earth/31conc.html?_r=1&scp=14&sq=Science&st=nyt

New product design: Biodegradable pots and trays

Bamboo pulp, sugar cane, and straw replaces plastic
EnviroArc (Australia)
http://www.enviroarc.net/potsmaterial.php

Sustainable pots

- Ball: bioplastic 'Soilwrap': biodegradable and compostable plant pot (wrap)
- Ball Circle of Life™ pots
  http://www.circleoflifeplants.com/default.aspx
- Wal-Mart: Earth Essentials (Ball's Circle of Life pots)
- Fred Meyer 3rd largest US supercenter: corn based plastic that gets removed and composted before planting

Sustainable Landscapes

Procedures & maintenance

NASA: Earth

EPA's GreenScapes Program

(www.epa.gov/greenspaces)

GreenScapes 5-step plan

(1)Build and maintain healthy soil

Photo: images.google.com www.thegreentheory.com

- Compost on site to reduce fuel usage
- Compost reduces need for fertilizers because it produces beneficial microorganisms
- Compost holds water in the soil
- Runoff is minimized

GreenScapes

(2) Plant right for your site

- Perform a site analysis for sun exposure and soil texture, and use
- Select right plant for your site and choose plant varieties that are pest-resistant, drought tolerant, and suited to your sun, soil, and water conditions
- Check mature sizes so pruning for size reduction isn't necessary.

Photo: Al Watson

GreenScapes

(3) Practice smart watering

- Water deeply but infrequently.
- Water only until plants are established (2-5 years for trees)
- Add compost to the soil
- Select drought tolerant plants
- Use drip system or soaker hoses instead of sprinklers to save water and $.
- Water in early a.m. to reduce evaporation and plant diseases.
- Install permeable pavement to allow water to soak into the ground.

1

2

1: www.rittenhouse.ca/asp/Product.asp?PG=1655
2: www.ne-design.net/

GreenScapes

(3) Practice smart watering (cont.)

- Connect rain barrels to downspouts

Photo: Ellen Vincent

GreenScapes

(4) Adopt a holistic approach to pest management

- Use IPM techniques and start with prevention.
- Prevention involves maintaining healthy soil with compost and mulch, selecting pest resistant plants, and planting them in the sun/shade and soil conditions they are best suited to.

Photo: Ellen Vincent

GreenScapes

(4) Adopt a holistic approach to pest management (cont.)

- Prevention involves mowing the grass high, removing diseased plants to prevent the spread of disease, and pulling weeds before they go to seed to prevent their spread.

GreenScapes

(4) Adopt a holistic approach to pest management (cont.)

- Prevention involves identifying problems before you "spray, squash, or stomp."
- Many insects are beneficial and some damage to landscape plants may be needed to encourage natural predators.
- Use traps and barriers and plant replacement before using pesticides.

Photo: images.google.com www.ent.iastate.edu

GreenScapes

- (5) Practice natural lawn care

- Mow higher (within appropriate range for turf type)
- Mow regularly
- Leave the clippings
- Use mulching mowers
- Use natural organic and slow release fertilizers to reduce nutrient run-off and leaching.
- Convert lawn, esp. slopes and in shade, and near water bodies to groundcovers or mulch beds
- Water deeply but infrequently

Photo: Ellen Vincent

Sustainable misc.

- Reduce gasoline powered equipment use and replace with electric or people-powered.
- Replace pressure treated wood with plastic lumber.
- Replace plastic silt fencing erosion control material with blankets, berms, and filtersocks made of compost

Photo:
imagesgoogel.com
toolmonger.com

Sustainable Sites Initiative ™

- Categories:
- (6) Construction
- (7) Operations and maintenance

(6) Construction

Minimize effects of construction-related activities

6.1 Create a soils management plan

6.2 Restore soils disturbed during construction

http://www.sustainablesites.org/report/SSI_Guidelines_Draft_2008.pdf

(7) Operations & Maintenance

Maintain the site for long-term sustainability

7.1 Plan for sustainable landscape maintenance

7.2 Minimize exposure to localized air pollutants

7.3 Recycle organic matter generated during site operations and maintenance

7.4 Provide storage and collection for recyclables

7.5 Use renewable sources for site outdoor electricity

http://www.sustainablesites.org/report/SSI_Guidelines_Draft_2008.pdf

(7) Operations & Maintenance

- Maintenance plan topics to be addressed by the integrated design team including the maintenance contractor or staff.

Photo: Ellen Vincent

(7) Operations & Maintenance

	10-year desired outcomes from maintenance practice	Specific maintenance activities	Skill level required to complete the task	Timeline/ schedule
		Plant Stewardship		
Plant maintenance				
Plant health				
Site safety				
Plant procurement				
Pest management				

Sustainability is not new

- "*The Commission has completed its work. We call for a common endeavor and for new norms of behavior at all levels and in the interests of all. The changes in attitudes, in social values, and in aspirations that the report urges will depend on vast campaigns of education, debate, and public participation*" (WCED 1987, p. xiv).

Resources

- Sustainable Sites Initiative
  - http://www.sustainablesites.org/
- Penn State Center for Green Roof Technology
  - http://horticulture.psu.edu/cms/greenroofcenter/
- Cradle to Cradle Certification
  - http://www.mbdc.com/c2c/index.php
- EPA GreenScapes program
  - http://www.epa.gov/epawaste/conserve/rrr/greenscapes/index.htm
- Green the Grounds
  - http://www.greenthegrounds.org/

Thank you

Ellen Vincent, Ph.D.
Environmental Landscape Specialist
Department of Environmental Horticulture
E-143 Poole Agriculture Center
Box 340319
Clemson, SC 29634-0319

864.656.1342 office
803.243.8888 cell
864.656.4960 FAX

ellenav@clemson.edu