



LEED BD&C Version 3.0 (2009) Certification & Accreditation

Session 3: Water Efficiency
+ Innovation in Design & Regional Priority
+ Multiple Building Application Guide

May 11, 2009

California Department of General Services

Today's Agenda

- Water efficient landscaping
- Waste water technologies
- Water use reduction
- Process water use reduction
- Innovation in Design
- Regional Priority Credits
- Multiple Building Application Guide

Session 3: May 11, 2009

DGS: LEED BD&C Certification & Accreditation

Water Efficiency		NC	Schools	CS
		10 Pts.	10 Pts.	10 Pts.
Prereq 1	Water Use Reduction, 20% Reduction	Req'd	Req'd	Req'd
Credit 1.1	Water Efficient Landscaping, Reduce by 50%	2	2	2
Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation*	2	2	2
Credit 2	Innovative Wastewater Technologies	2	2	2
Credit 3.1	Water Use Reduction, 30%	2	2	2
Credit 3.2	Water Use Reduction, 35%* (points cumulate)	1	1	1
Credit 3.3	Water Use Reduction, 40%* (points cumulate)	1	1	1
Credit 4	Process Water Use Reduction, 20%	NA	1	NA



Tours of LEED buildings May 26-29



Department of Education – East End Block 225
(LEED-NC v2.0 Gold, LEED-EB Platinum)



Department of Public Health – East End Blocks
171-174 (LEED-NC v2.1 Cert., LEED-EB Gold)



CalPers (LEED-NC v2.1 Gold)



Department of Rehab. (LEED-NC v2.1 Silver)



State Offices @ Butterfield Way (LEED-NC v2.1
Silver)

Water Efficient Landscaping

1. 2-4 points available for NC, Schools & CS
2. Design Phase Credit
3. Intent
 - Limit or eliminate the use of potable water, or other natural surface or subsurface water available on or near the project site for landscape irrigation.



WE Credit 1.1: Water Efficient Landscaping
Option 1: Reduce by 50% (2 Points)

4. Requirements

- Reduce potable water use for irrigation by 50% from calculated mid-summer baseline using any combination of the following:
 - Plant species, density and microclimate factor
 - Irrigation frequency
 - Use of captured rainwater
 - Use of recycled wastewater
 - Use of water treated & conveyed by public agency specifically for non-potable uses



WE Credit 1.1: Water Efficient Landscaping
Option 2: No Potable Water Use or Irrigation (4 Points)

4. Requirements

- a) Meet requirements for Option 1
- AND -
- b) **PATH 1**
 - Use only the following for irrigation:
 - Captured rainwater
 - Recycled wastewater
 - Recycled graywater
 - Water treated & conveyed by public agency specifically for non-potable uses



- OR -

WE Credit 1.1: Water Efficient Landscaping
Option 2: No Potable Water Use or Irrigation (4 Points)

4. Requirements

- OR -
- a) Meet requirements for Option 1
- AND -
- c) **PATH 2**

- Install landscaping not requiring permanent irrigation systems
 - Temporary irrigation systems used to establish plants are only allowed if removed within 1 yr. of installation



Water Efficient Landscaping

5. Strategies & Implementation

- a) Plan & design site considering water use
 - Plan water use zones
 - Consider shading & heat island reduction
- b) Limit use of turf grass for functional benefits (i.e. recreation)
- c) Analyze soil & amend accordingly for appropriate plant material



Water Efficient Landscaping

5. Strategies & Implementation

- d) Consider native or adaptive plants to reduce or eliminate irrigation
 - Consider mature size, form & growth rates
 - Avoid monocultures (single species) or excessive number of species
 - Select species requiring little or no fertilization
 - Consider species for integrated pest management
- e) Effective & efficient irrigation & controls
 - Consider drip & subsurface irrigation & smart irrigation controls (computer, satellite, sensors)
 - Keep water away from buildings & air intakes
- f) Mulch landscaped areas
 - Conserves moisture



Water Efficient Landscaping

6. Documentation

- a) Create the design case
 - Determine landscape area for project
 - Sort area into main vegetation types (trees, shrubs, groundcover, mixed and turf grass) listing area for each
 - Determine characteristics for each area (see table pg. 185)
 - Species factor (ks)
 - Density factor (kd)
 - Microclimate factor (kmc)
 - Calculate landscape coefficient (KL) $KL = Ks \times Kd \times Kmc$
 - Determine irrigation efficiency for each landscape area
 - Determine reference evapotranspiration rate (ET_o) for region
 - Calculate project-specific evapotranspiration rate (ETL)
 - $ETL (in) = ET_o \times KL$
 - Determine irrigation efficiency (IE): sprinklers = 0.625, drip = 0.90
 - Determine controller efficiency (CE)
 - Determine volume of reuse water avail. In design month (e.g. July)

Design Case TWA (gal) = (Area (sf) x ETL (in) / IE) x CE x 0.6233 (gal/sf/in) - Reuse

Water Efficient Landscaping

6. Documentation

b) Create the baseline case

- Use ave. values representing conventional equip. & practices for
 - Species factor (Ks)
 - Density factor (Kd)
 - Microclimate factor (kmc)
- Use same microclimate factor (kmc) & (ETo) for design & baseline
- Total landscape area must match design case
- Use typical landscape area ratios for baseline case
 - Eg. %'s for trees, shrubs, turf area & planting beds
 - Cannot assume 100% turf grass if not typical for region
- Calculate Total Water Applied (TWA) for baseline case

$$\text{Baseline Case TWA (gal)} = (\text{Area (sf)} \times \text{ETL (in)} / \text{IE}) \times \text{CE} \times 0.6233 \text{ (gal/sf/in)}$$

Water Efficient Landscaping

6. Documentation

c) Calculate % reduction in total irrigation water use

- Include reductions in potable water use & expected reuse water available in design month (i.e. July)
- **AND -**

$$\% \text{ Reduction of Potable Water} = \left(1 - \frac{\text{Design (TPWA)}}{\text{Baseline (TWA)}} \right) \times 100$$

- If 50% reduction in potable water use for irrigation is achieved, than Option 1 is met (**2 Points**)
- If 100% reduction in potable water use for irrigation is achieved, and the reduction in total water use for irrigation is reduced >50% than Option 2 is met (**4 Points**)

$$\% \text{ Reduction of Total Water} = 1 - \frac{\text{Design (TPWA)}}{\text{Baseline (TWA)}} \times 100$$

d) Include landscape plan showing planting & irrigation

Option 1 (WEc1.1): Landscaping and Irrigation Systems

3,652,443 gallons - Calculated Baseline Irrigation Water Consumption (Total Water Applied - TWA):

1,757,144 gallons - Calculated Design Case Irrigation Water Consumption (Total Water Applied - TWA)

1,757,144 gallons - Calculated Total Potable Water Applied - TPWA

51.9% - Percentage Reduction of Potable Water

A 50% reduction in Potable Water Use is required for 1 point. A 100% reduction in potable water use, and a 50% reduction of total water is required for 2 points.

Sheet Description Log

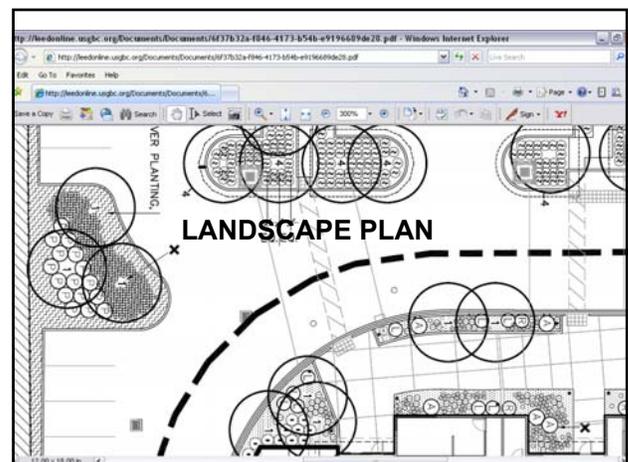
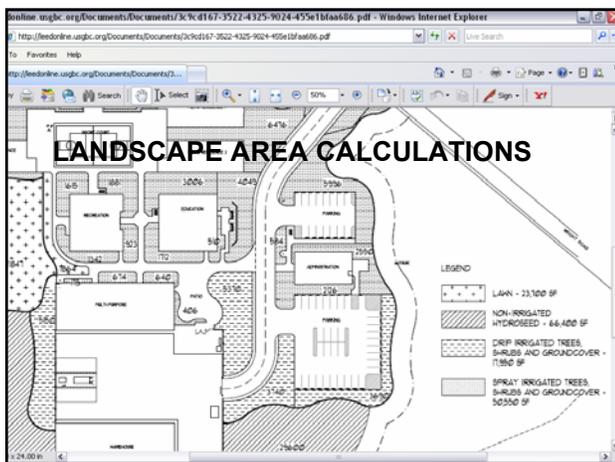
Please include sheet name, sheet number and file name for each uploaded, referenced drawing (e.g. A-101, Site Plan, siteplan.pdf)

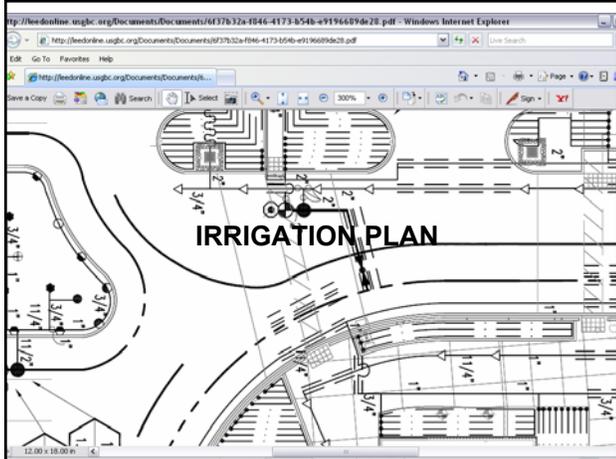
PLANTING PLAN, L1.1, L1_1PartialPlantingPlan.dwf
 PLANTING PLAN, L1.2, L1_2PartialPlantingPlan.dwf
 IRRIGATION PLAN, L2.1, L2_1PartialIrrigationPlan.dwf
 IRRIGATION PLAN, L2.2, L2_2PartialIrrigationPlan.dwf
 PLANTING SCHEDULE, NOTES AND DETAILS, L3.1, L3_PlantingScheduleNotesAndDetails.dwf
 IRRIGATION SCHEDULE AND WATER USE SUMMARY, Irrigation Schedule and Water Use Summary.pdf
 Project Water Budget, Project Water Budget.pdf
 CCC CAMARILLO LEED LANDSCAPE NARRATIVE.pdf
 LEED CREDIT WE 1 LANDSCAPE COMPLIANCE CALCULATIONS, LEED CREDIT WE 1 LANDSCAPE AREA CALCULATIONS.pdf

I have provided the appropriate supporting documentation in the document upload section of LEED Online. Please refer to the above sheets.

NARRATIVE (Required)

Please provide a detailed narrative describing the landscaping and irrigation design strategies employed by the project. Please include specific information regarding the water use calculation methodology used to determine savings. For projects using non-potable water, please provide specific information regarding source and available quantity of non-potable water.





Landscape Guidelines Resources

- Bay-Friendly Landscape Guidelines
 - [www.stopwaste.org/docs/bay-friendly-landscape-guidelines - all chapters.pdf](http://www.stopwaste.org/docs/bay-friendly-landscape-guidelines-all-chapters.pdf)
- River-Friendly Landscape Guidelines
 - www.sacramentostormwater.org/SSQP/Riverfriendly/Documents/RiverFriendly_Guidelines.pdf
 - Planting
 - Irrigation
 - Energy
 - Pest Management



Water Use Reduction

1. Prereq. & Credits for NC, Schools & CS
2. Design Phase Credit
3. Intent
 - Increase water efficiency within buildings to reduce the burden on municipal water supply and waste water systems.

Water Use Reduction

4. Requirements

- Employ strategies that combined use less water than calculated building baseline (excluding irrigation)



WE Prereq. 1	20% reduction	Required
WE Credit 3	30%	2 Points
	35%	3 Points
	40%	4 Points

* Exemplary Performance for 45% reduction

Water Use Reduction

4. Requirements (cont.)

- Calculate baseline water use according to commercial and/or residential baselines
- Calculations to only include:
 - Water closets
 - Urinals
 - Lavatory faucets
 - Showers
 - Kitchen sink faucets
 - Pre-rinse spray valves (food service)

Water Use Reduction

Commercial Fixture	Baseline Water Use
Toilets	1.6 gallons per flush (gpf) Blow-out fixtures 3.5 gpf
Urinals	1.0 gpf
Lavatory faucets	2.2 gallons per min. (gpm) guest/patient rms. 0.5 gpm @ 60 psi – all others except private 0.25 gal./cycle for metering faucets
Pre-rinse (food service)	≤ 1.6 gpm

Referenced Standards

- Energy Policy Act (EPAAct) of 1992
- Energy Policy Act (EPAAct) of 2005
- IAPMO/ANSI UPC 1-2006, Section 402.0
- ICC, IPC 2006, Section 604

Water Use Reduction

4. Requirements (cont.)

Residential Fixture	Baseline Water Use
Toilets	1.6 gpf
Lavatory faucets	1.0 gpf
Lavatory faucets Kitchen faucets	2.2 gpm @ 60 psi
Showerheads	2.5 gpm @ 80 psi

Excluded fixtures & appliances

- Dishwashers (commercial & residential)
- Automatic commercial ice makers
- Clothes washers (commercial & residential)
- Commercial steam cookers
- Can be used for exemp. performance calcs for SS c3

Water Use Reduction

5. Strategies & Implementation

- Establish Baseline Water Use
- Based on estimated occupant usage
- a) Consider the following:
 - Flow restrictors/reduced flow aerators on lavatory Sinks
 - Automatic faucet sensors & metering controls
 - Low-flow flushing fixtures (high efficiency toilets & urinals)
 - Non-water fixtures (waterless urinals, composting toilets)
 - Low flow showerheads
 - Collect rainwater
 - Some technologies affecting energy may require commissioning



Water Use Reduction

6. Documentation

- Can enter several fixture usage groups if different types of occupants use facilities
 - Example: Hotel may have 3 fixture use groups:
 1. Restaurant customers & staff
 2. Administration (back of house)
 3. Guest rooms (hotel guests)
- Can use default fixture use values for different occupancy types
 - See Reference Guide, page 171

$$\text{Water Savings} = \frac{\text{Design Case Water Use}}{\text{Baseline Water Use}}$$

Calculate Baseline Water Use

Table 1.1 - Flush Fixture Data - Baseline Case

Fixture Reference	Baseline Fixture Type	Gender	Flush Rate (GPF)	Daily Uses Per Person				Included in Project?
				FTE	Student/ Visitor	Retail Customer	Residential	
1	Conventional Water Closet	Neutral	1.6	2.0				<input checked="" type="checkbox"/>
2	Conventional Water Closet	Male	1.6					<input type="checkbox"/>
3	Conventional Urinal	Male	1.0	2.0	0.4			<input checked="" type="checkbox"/>

Annual Baseline Flush Fixture Water Usage: 10,500 gallons/year

Table 1.2 - Flow Fixture Data - Baseline Case								
Fixture Reference	Baseline Fixture Type	Flow Rate (GPM)	Duration (seconds)	Daily Uses Per Person				Included in Project?
				FTE	Student/ Visitor	Retail Customer	Residential	
A	Conventional Lavatory	2.5	15	3.0	0.5			<input checked="" type="checkbox"/>
B	Conventional Shower	2.5	300					<input type="checkbox"/>
C	Kitchen Sink	2.5	15					<input type="checkbox"/>
D	Janitor Sink	2.5	15	0.1				<input checked="" type="checkbox"/>
E								<input type="checkbox"/>

TOTAL ANNUAL BASELINE WATER USAGE: 15,421 gallons/year

Annual Baseline Flow Fixture Water Usage: 4,921 gallons/year

Table 2.1 - Flush Fixture Data - Design Case												
Fixture Reference	Design Case Fixture Type	Gender	Fixture Manufacturer	Fixture Model	Flush Rate (GPF)	Percent of Occupants	Daily Uses Per Person				Included in Project?	
							FTE	Student/ Visitor	Retail Customer	Residential		
1	Dual-Flush Water Closet, Full-Flush	Neutral	Sloan	WES-111	1.4	100 %	2.0					<input checked="" type="checkbox"/>
2		Male				100 %						<input type="checkbox"/>
3	Non-Water Urinal	Male	Falco	F-1000	0.0	100 %	2.0	0.4				<input checked="" type="checkbox"/>

Fixture Reference	Design Case Fixture Type	Fixture Manufacturer	Fixture Model	Flow Rate (GPM)	Percent of Occupants	Duration (seconds)	Daily Uses Per Person				Included in Project?	
							FTE	Student/ Visitor	Retail Customer	Residential		
A	Ultra Low-Flow Lavatory	Sloan	EBF-06	0.5	100 %	15	3.0	0.5				<input checked="" type="checkbox"/>
B					100 %	300						<input type="checkbox"/>
C					100 %	15						<input type="checkbox"/>
D	Janitor Sink	American Standard	8344112	2.5	100 %	15	0.1					<input checked="" type="checkbox"/>

Annual Design Case Flow Fixture Water Usage: 1,109 gallons/year

Annual Design Case Flush and Flow Fixture Water Usage: 8,271 gallons/year

WATER USE SUMMARY

Baseline Case - Annual Water Consumption (gal):	15,421	gallons/year
Design Case - Annual Water Consumption (gal):	8,271	gallons/year
Total Annual Non-Potable Water Consumption (gal):		gallons/year
Total Water Savings:	46.4	%

NARRATIVE (Required)

Please provide any additional comments or notes regarding special circumstances or considerations regarding the project's credit approach. Describe the water savings features of this project, and include specific data regarding any water saving fixtures and/or reclaimed water usage (greywater re-use / rainwater reuse).

This project uses a dual-flush water closet, non-water urinal, and ultra-lowflow lavatory with a sensor operated faucet. Method for calculating gpf for dual-flush toilet due to male use of urinal:

1 Female x (33% x 1.1 + 67% x 1.6) / 100% = 1.265 gpf
 1 Male x 100% x 1.6 = 1.6 gpf

Now average male with female to get:
 (1.265 + 1.6) / 2 = 1.4325 gpf

WE Credit 2: Innovative Wastewater Technologies

- Credit worth 2 points for NC, Schools & CS
- Design Phase Credit
- Intent
 - Reduce wastewater generation and potable water demand, while increasing the local aquifer recharge



WE Credit 2: Innovative Wastewater Technologies

- Requirements
 - Option 1 – Water Savings Calculation**
 - Reduce potable water use for building sewage conveyance 50% using:
 - Water-conserving fixtures (toilets, urinals)
 - Non-potable water
 - Captured rainwater
 - Recycled greywater
 - On-site or municipally treated wastewater
 - Option 2 – On-Site Wastewater Treatment**
 - Treat 50% of wastewater on-site to tertiary standards
 - Must use or infiltrate treated water on-site
- ★ Innovation: 100% reduction or treatment

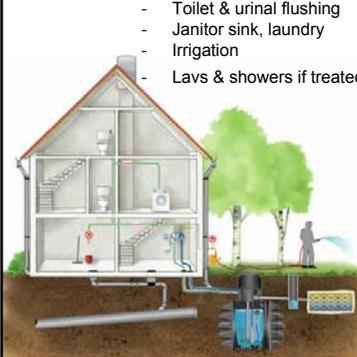
WE Credit 2: Innovative Wastewater Technologies

- Strategies & Implementation
 - Specify high-efficiency fixtures & dry fixtures
 - Waterless urinals, dual-flush toilets, low flow showerheads, faucet sensors
 - Composting toilets
 - Reuse stormwater or graywater for sewage conveyance
 - Consider condensate water
 - On-site wastewater treatment
 - Constructed wetlands
 - Mechanical recirculating sand filters
 - Anaerobic biological treatment reactors




Rainwater Harvesting

- Captures, filters & reuses rainwater for
 - Toilet & urinal flushing
 - Janitor sink, laundry
 - Irrigation
 - Lavs & showers if treated




“Case Study – IslandWood

- Bainbridge Island, WA
- All wastewater treated onsite with combination of
 - Constructed wetlands
 - “Living machine”
- Natural bioremediation
 - Aquatic plants
 - Microorganisms & snails
 - Cleanses effluent
- Water reused or reintroduced natural water cycle



WE Credit 2: Innovative Wastewater Technologies

5. Documentation

- Select option used
- Enter project information
 - Male/female occupancy breakdown tables
 - Annual days of operation
 - Calculate baseline wastewater use (1.6 gal WC, 1 gal urinal)
 - Calculate design case flush fixture data
- **Option 1 – Water Savings Calculation**
 - Enter non-potable water source, if any
 - **Baseline water/(design case water + non-potable water) ≤ 0.5**
- **Option 2 – On-Site Waste Water Treatment**
 - Drawings documenting on-site water treatment capabilities

WE Credit 4: Process Water Use Reduction

1. Credit worth 1 point only for Schools

2. Design Phase Credit

3. Intent

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



WE Credit 4: Process Water Use Reduction

3. Requirements – Buildings must have

- No refrigeration equipment using once-through cooling with potable water
- No garbage disposals
- At least 4 process items where water use is at or below levels shown in table (page 207)
 - Any equipment not shown must document a 20% reduction in water use from benchmark or industry standard

Equip. Type	Max. Water Use	Other Req'm'ts.
Clothes washers	7.5 gallons/cu. ft./cycle	(com. CEE Tier3a, res. CEE Tier 1)
Dishwashers w/ racks	1.0 gallons/rack	
Ice machines (CEE Tier 3)	>175 lb/day - 20 gal./100 lb <175 lb/day - 30 gal./100 lb	No water-cooled machines
Food Steamers	2 gallons/hour	Boilerless only
Prerinse spray valves	1.4 gallons per minute	

★ **Innovation: 40% reduction in process water use**

WE Credit 4: Process Water Use Reduction

4. Strategies & Implementation

- Addresses water use in equipment not included in other WE credits
 - Dishwashers
 - Clothes washers
 - Ice machines
 - Food steamers
 - Prerinse valves
 - Others achieving 20% reduction
- Garbage disposals & refrigeration equip. w/ once-through cooling w/ potable water cannot earn credit



WE Credit 4: Process Water Use Reduction

5. Documentation

- Submit documents showing:
 - Manufacturer
 - Model
 - Water consumption rates
- Assemble info on baseline water use (based on industry standard) or benchmarks for non-listed equipment



Innovation in Design

Credit	Innovation in Design: Provide Specific Title	NC	Schools	CS
		6 Pts.	6 Pts.	6 Pts.
Credit 1.1	Innovation in Design: Provide Specific Title	1	1	1
Credit 1.2	Innovation in Design: Provide Specific Title	1	1	1
Credit 1.3	Innovation in Design: Provide Specific Title	1	1	1
Credit 1.4	Innovation in Design: Provide Specific Title	1	1	1
Credit 1.5	Innovation in Design: Provide Specific Title	1	NA	1
Credit 2	LEED® Accredited Professional	1	1	1
Credit 3	The School as a Teaching Tool	NA	1	NA



ID Credit 1: Innovation in Design

1. Credits for

- NC – 1-5 Points
- Schools – 1-4 Points
- CS – 1-5 Points

2. Design or Construction Phase Credits

3. Intent

- To provide for exceptional performance above requirements set by other LEED credits
- **AND/OR** -
- Innovative performance in Green Building categories not addressed by LEED-BD&C



ID Credit 1: Innovation in Design

4. Requirements

- **Path 1 – Innovation in Design**
 - 1-5 Points for NC & CS, 1-4 Points for Schools
 - Identify the following in writing for each credit sought:
 - Intent of the proposed innovation credit
 - Proposed requirement for compliance
 - Proposed submittals to demonstrate compliance
 - Design approach (strategies) used to meet the requirements
- **Path 2 – Exemplary Performance**
 - 1-3 Points (as portion of total ID Credit 1 points)
 - Identify the following in writing for each credit sought:
 - Achieve double the credit requirement, or next incremental % threshold for LEED credit

ID Credit 1: Innovation in Design

5. Strategies & Implementation

- **Innovation Strategies**
 - Must demonstrate comprehensive approach and have significant, measurable benefits
 - Only for categories not specifically addressed by LEED & must include:
 - 1) Project must demonstrate quantitative performance improvements for environmental benefit
 - 2) Process or specification must be comprehensive & apply to entire project
 - 3) Concept must be applicable to other projects & be much better than standard sustainable design practices
 - Consider meeting LEED-O&M credits for ID (Green cleaning, IPM)
 - Can only get one credit related to same criteria (i.e. Education)
 - Cannot get ID credit for effort helping earn another credit
 - Not automatic, just because another project was awarded

ID Credit 1: Innovation in Design

5. Strategies & Implementation

- **Exemplary Performance** (max. 3 points)
- Substantially exceed a LEED-NC performance credit
 - Achieve double the credit requirement, or next incremental % threshold for LEED credit
 - i.e. energy or water efficiency
 - Review credit candidates for exemplary performance
 - Not available for all LEED credits, but as ID'd in Ref. Guide
 - Examples:
 - WE Credit 1: 45% reduction in water use
 - SS Credit 4.1: Within ¼ mile of 2 rail or 4 bus stops



ID Credit 1: Innovation in Design

6. Documentation

- Document process used to develop or implement benefits beyond normal LEED requirements or in other areas
 - ID credit title
 - Narrative statement of credit intent
 - Narrative statement describing credit requirements
 - Narrative describing approach to credit
 - Supporting documentation (drawings, photos, etc.)

7. Resource: Innovation in Design Credit Catalog

www.usgbc.org/ShowFile.aspx?DocumentID=3569

- 32 Pages of past approved ID credits under NC v2.2
 - Not necessarily awarded through BD&C v3.0

ID Credit 1: Innovation in Design

8. Examples:

- Educational Program on environ. & health benefits of green building, be instructional & include at least 2:
 1. Comprehensive signage program/displays
 2. Case study highlighting successes of LEED project
 3. Guided tours of project focusing on sustainability
 4. Educational outreach program engaging occupants & public through periodic events on green building topics
 5. Website or electronic newsletter informing occupants & visitors about building features & strategies for home
- Evaluate substantial products using ISO 14040 (LCA)
- Divert significant waste volume beyond building (i.e. home Ewaste)

ID Credit Sample: Chemical Free Cooling Tower Water Treatment

ID Credit Title	Chemical Free Cooling Tower Water Treatment
Narrative Statement of Credit Intent	Intent is to use alternative means of cooling tower water treatment to avoid the use of harmful and/or expensive chemicals.
Narrative Statement describing Credit Requirements	Use alternative means of cooling tower water treatment that do not make use of chemical treatment.
Narrative Describing Project's Approach to the credit	Project uses Clearwater Systems Dolphin water treatment units. The units are inline pulsed-power devices that destroy organisms in the water using electricity rather than any form of chemical treatment.

Sheet Description Log

Please include sheet name, sheet number and file name for each t

M0.3, Mechanical Schedules 2, M0.3WaterTreatment.pdf
M2.1, Mechanical Floor Plan Piping, M2.1WaterTreatment.pdf
M4.2, Condenser Water Flow Diagram, M4.2WaterTreatment.pdf

ID Credit Sample: Exemp. Performance SS c5.2 Open Space

ID Credit Title	SS5.2 - Exemplary Performance
Narrative Statement of Credit Intent	Provide a high ratio of open space to development footprint to promote biodiversity
Narrative Statement describing Credit Requirements	This ID credit is sought on the basis of achieving the exemplary performance criteria defined for credit SS5.2.
Narrative Describing Project's Approach to the credit	As the site is a State building, and is not covered by City zoning requirements, we are required under SS5.2 to provide 2 times the building footprint as open space. The site design provides significantly more than that, as noted on attached site plan.

What do these people have in common?

ID Credit 2: LEED Accredited Professional

1. Credit available for NC, Schools & CS
2. Design & Construction Phase Credit
3. Intent
 - To support and encourage the design integration required by LEED green building project and to streamline the application and certification process.



ID Credit 2: LEED Accredited Professional

4. Requirements

- At least one **principal participant** of the project team shall be a LEED Accredited Professional (AP).

5. Strategies & Implementation

- Can educate project team members about green building design & construction integration of LEED early in project
- Consider assigning LEED AP as a facilitator of an integrated design & construction process.
- Can engage internal LEED AP or hire through consultant

6. Documentation

- Name & company of LEED AP & copy of certificate
- Describe LEED AP's project role

ID Credit 3: The School as a Teaching Tool

1. Credit only available for Schools
2. Design & Construction Phase Credit
3. Intent
 - Integrate the sustainable features of a school facility with the school's educational mission



ID Credit 3: The School as a Teaching Tool

4. Requirements

- Design a curriculum based on high-performance features of building
- Commit to implement curriculum within 10 months of LEED certification
 - Describe features as well as relationship between human ecology, natural ecology & building
 - Must meet local or state curriculum standards
 - Must be approved by school administrators
 - Must provide 10 or more hours of classroom instruction per year per full-time student



ID Credit 3: The School as a Teaching Tool

5. Strategies & Implementation

- Raises awareness through hands-on learning
- Students can interact with everyday functions of facility to raise awareness of energy conservation, resources, etc.

6. Documentation

- Document process project team has worked to develop or implement curriculum based on bldg. features
- Maintain confirmation that curriculum was reviewed & approved & meets local or state standards

7. Examples

- Water gardens, constructed wetlands, green roof, open space into gardens, renewable energy, meters, etc.

Regional Priority Credits

	NC	Schools	CS
Credit 1.1 Regional Priority Credit: Defined by Zip Code	1*	1*	1*
Credit 1.2 Regional Priority Credit: Defined by Zip Code	1*	1*	1*
Credit 1.3 Regional Priority Credit: Defined by Zip Code	1*	1*	1*
Credit 1.4 Regional Priority Credit: Defined by Zip Code	1*	1*	1*
Credit 1.5 Regional Priority Credit: Defined by Zip Code	1*	1*	1*
Credit 1.6 Regional Priority Credit: Defined by Zip Code	1*	1*	1*

<http://www.usgbc.org/ShowFile.aspx?DocumentID=5667>



Accreditation

Regional Priority Credits 1.1-1.6

- 1-4 Credits max. out of 6 available for NC, Schools, CS
- Design or Construction Phase Credits
- Intent
 - Provide incentives for achievement of credits addressing geographically specific environmental priorities



Regional Priority Credits 1.1-1.6

4. Requirements

- Earn 1-4 of the regional priority credits identified by USGBC regional councils & chapters
 - Have environmental importance to project's region
 - 4 Points maximum allowable out of 6 total
 - Identified by state and zip code at:

<http://www.usgbc.org/ShowFile.aspx?DocumentID=5667>

5. Documentation

- Met by meeting credit requirements listed



Regional Priority Credits 1.1-1.6

6. Example A: Downtown Sacramento - 95814

- SS c4.1 – Alternative Transportation, Public Transp. Access
- SS c7.1 – Heat Island Effect, Non-Roof
- WE c2 – Innovative Wastewater Technologies
- WE c3 (40%) – Water Use Reduction 40%
- EA c2 (1%) – On-Site Renewable Energy 1%
- IEQ c8.1 – Daylight & views, Daylight 75% of Spaces

7. Example A: Downtown Los Angeles - 90004

- SS c5.2 – Maximize Open Space
- WE c2 – Innovative Wastewater Technologies
- WE c3 (40%) – Water Use Reduction 40%
- EA c2 (1%) – On-Site Renewable Energy 1%
- MR c1.1 (55%) – Building Reuse 55% of Exist. walls, floors, roof
- IEQ c8.1 – Daylight & views, Daylight 75% of Spaces

LEED-NC Application Guide for Multiple Buildings and On-Campus Projects



www.usgbc.org/ShowFile.aspx?DocumentID=1097

Overview

Challenge

- LEED-NC most commonly applied to individual buildings
- How to apply to campuses or multiple building projects?

Solution

- Multiple Building Application Guide developed
- Alternative credit requirements may be used in lieu of LEED-NC requirements



Session 3: May 11, 2009

DGS: LEED BD&C Certification & Accreditation

Three Multiple Bldg./ Campus Approaches

1. Certify new building within setting of existing campus

- One owner or common property management control

2. Certify a group of new buildings as a package

- May be entire new or subset of existing campus

3. Certify individual buildings with common standards, part of a campus



1. New Building within Existing Campus

Site credits most affected

- Establish "LEED Project Site" boundary
- Must remain consistent for all LEED credits
- Application Guide has details for shared amenities (parking, open space, etc.)

Credit application

- May choose campus reqmt.'s & submittals in lieu of LEED reqmt.'s where applicable



2. Certifying Group of New Buildings

Campus requirements & submittals

- To avoid excessive documentation
- Methods & calculations provided for averaging across set of buildings
- Some credits must be met by every building included in group
- One registration & certification process



3. Certifying Individual Campus Buildings

Campus-wide design standards

- Common masterplan, specs, etc., for each new building
- Allows "prototype" credits to be set for repetition on subsequent projects
- Total credits & certif. levels may vary between buildings
- Individual certification for each building

First building "prototype" review

- a) Thorough review of 1st project, incl. prototype credits
- b) Include all supporting docs for prototype credits
- c) Receives prelim. & final LEED review
- d) Appeal process available for 1st project
- e) All prototype prereq.'s/credits designated once final

3. Certifying Individual Campus Buildings

Certification reviews for subsequent projects

- a) Up to 6 prereq.'s/credits audited
- b) Not req'd to submit documentation for approved prototype credits unless selected for audit
- c) Failure of audited prototype credit drops it out of use
 - Demonstrated achievement on next 3 attempts to return to prototype status
- d) Prototype credit appeals not allowed in subsequent projects
- e) Prereq.'s/credits may be dropped or added to prototype list after 3 consecutive demonstrated achievements
- f) Pending credits (awaiting campus development) cannot be awarded until amenities developed.

Multiple Building Site Credit Reqmts

SS Credit 1: Site Selection

- Consider phasing of site disturbance
- If site of multi-building development doesn't comply, then cannot achieve group certification.
- Individual buildings within campus can obtain credit
 - If area disturbed by building's construction complies, or
 - If defined consistent "LEED project site boundary" complies

SS Credit 2: Devel. Density & Comm. Connect.

- Common campus green spaces can be exempted from calculations
 - Outdoor recreation areas, agricultural land, etc.
 - 15 acre campus can use campus boundary for density calcs

Site Credits (cont.)

SS Credit 3: Brownfield Redevelopment

- If entire site is considered brownfield, credit can be obtained for each building (even non-contaminated)

SS Credit 4.1: Alt. Transp. – Public access

- Campus or public bus lines

SS Credit 4.2: Alt. Transp. – Bike storage

- Bike storage within 50 ft. of main entrances
- Calculate transient occupancy (students) for campus
- Shower facilities not required if all non-transient building occupants housed on campus (or within ½ mile)

Site Credits (cont.)

SS Credit 4.3: Alt. Transp. – Alt. fuel vehicles

- Credit also avail. if 50% of fleet or motorpool alt. fuel

SS Credit 4.4: Alt. Transp. – Parking Capacity

- Size parking of campus according to Portland standard

SS Credit 5.1: Site Devel. – Protect or restore

- Enter aggregate data for multiple buildings

SS Credit 5.2: Site Devel. – Max open space

- Enter aggregate data for multiple buildings
- Open space can be set apart in non-adjacent part of campus

Site Credits (cont.)

SS Credit 6.1-2: Stormwater Design

- Aggregate data for multiple buildings or centralized stormwater management

SS Credit 7.1: Heat Island Effect – Non-roof

- Enter aggregate data for multiple buildings

SS Credit 7.2: Heat Island Effect – Roof

- Enter aggregate data for multiple buildings
- Each building must meet requirement for multiple buildings

SS Credit 8: Light Pollution Reduction

- Develop exterior lighting master plan
- Provide design narrative

Water Efficiency Credits

WE Credit 1: Water Efficient Landscaping

- Enter aggregate data for multiple buildings
- Consider reused/recycled water

WE Credit 2: Innov. Wastewater Technologies

- Enter weighted aggregate data for multiple buildings based on square footage
 - Ensures each building generally meets requirement

WE Credit 3: Water Use Reduction

- Weighted ave. for mult. bldgs based on square footage
- Water use may be calculated based on total number of each type of applicable fixtures

Energy & Atmosphere Prerequisites

EA Prereq 1: Fundamental Cx

- Each building must independently meet reqmt's

EA Prereq 2: Minimum energy performance

- Each building must independently meet reqmt's

EA Prereq 3: Fundamental refrig. mgmt.

- Each building must independently meet reqmt's
- If connected to central plant, chillers must be CFC free or plan be in place to phase out within 5 years
- Or alternative compliance path if 3rd party audit determines conversion is not feasible
 - If simple payback is greater than 10 years

Energy & Atmosphere Credits

EA Cr 1: Optimize energy performance

- For single rating for group of buildings, use weighted average based on conditioned square footage
 - Or aggregate data into one calculation

EA Cr 2: On-site renewable energy

- Group of bldgs. may be evaluated on group average
 - Show aggregated data for multiple buildings

EA Cr 3: Enhanced commissioning

- Each building must independently meet reqmt's

EA Cr 4: Enhanced refrig. management

- Each building must independently meet reqmt's

Energy & Atmosphere & Material Credits

EA Cr 5: Measurement & Verification

- Each building must independently meet reqmt's

EA Cr 6: Green Power

- May be purchased on a centralized basis
- Volume discounts may be avail. from Green Tag brokers

MR Prereq. 1: Stor. & collect. of recyclables

- Central sorting & collection facility serving multiple buildings can meet intent of credit

MR Credits 1-7

- Enter aggregate data if multiple buildings

IEQ & Innovation Credits

EQ Prereq.'s & Credits

- Each building must independently meet requirements for each credit & prereq.

ID Credits 1.1-1.5: Innovation in design

- Campus-wide efforts may be available for credits, especially if operated & maintained by same organiz.



Study References for Today's & Next Classes

LEED BD&C Reference Guide

- 5/11: Water Efficiency pp 161-212
- 5/11: Innovation in Design – pp 591-606
- 5/11: Regional Priority Credits - pp 607-610
- <http://www.usgbc.org/ShowFile.aspx?DocumentID=5667>
- 5/11: Multiple Building Application Guide www.usgbc.org/ShowFile.aspx?DocumentID=1097
- 5/18: Energy and Atmosphere (pp. 213-333)