Sustainability in Master Planning: LEED-NC & LEED-ND

Sharing Future Space

11 April 2006

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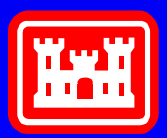


US Army Corps of Engineers

Army Sustainable Design

- Army Sustainable Design
- LEED-NC (New construction)
- LEED-ND (Neighborhood Developments)
- SDD in Master Planning
- Facility Composer

"The world we have created today as a result of our thinking thus far has problems that cannot be solved by thinking the way we thought when we created them." - Albert Einstein

Policy

Foundation

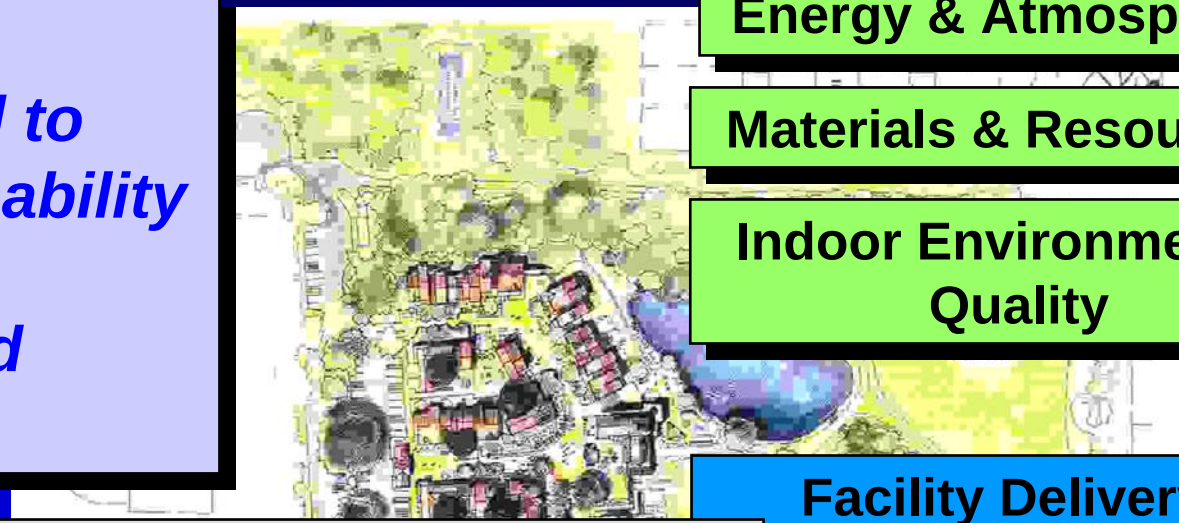
- **EO 13123**, Greening The Government Through Efficient Energy Management, June, 1999.
- **EO 13101**, Greening The Government Through Waste Prevention, Recycling, And Federal Acquisition, September, 1998.
- **EO 12873**, Federal Acquisition, Recycling, And Waste Prevention, October, 1993.

Current

- **ETL 1110-3-491**, Engineering and Design, Sustainable Design for Military Facilities, 1 May 2001.
- **ECB 2003-20**, Engineering and Design, Sustainable Project Rating Tool (SPiRiT), 24 November 2003.
- **DASA (I&E) Memo**, Sustainable Design and Development Policy Update - SPiRiT to LEED Transition, 05 January 2006.

Sustainable Project Rating Tool *(SPiRiT)*

SPiRiT- A self-assessment tool to evaluate sustainability of all facility construction and repair projects



- Water Efficiency
- Sustainable Sites
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality
- Facility Delivery Process
- Current Mission
- Future Mission

ETL 1110-3-491 defines <u>sustainability</u> as ". . . the design, construction, operation and reuse/removal of the built environment (infrastructure as well as buildings) in an environmentally and energy efficient manner. . . meeting the needs of today without compromising the ability of future generations to meet their needs."

LEED®-NC 2.2 Silver Starting FY08
(as of 05 January 2006)

- All MILCON New Construction Projects on Army Installations, Regardless of Fund Source.
- Applies to Renovation, Upgrade and Rehabilitation Projects Unless Any Cost Increase Will Put the Project Over the “50% of the Replacement” Cost Threshold.
- ‘Certified’ by the DPW (or Reserve equivalent), District Commander, Designer and Constructor.
- FY06 & 07 Projects Still Apply SPiRiT at GOLD level.
- LEED is Optional for FY06 & 07 Projects
- Design-Build RFPs Will Include SPiRiT or LEED Criteria and Achieve Gold or Silver Rating Levels
- FH Projects Will Use SPiRiT Until LEED-H Is Approved for Army Use

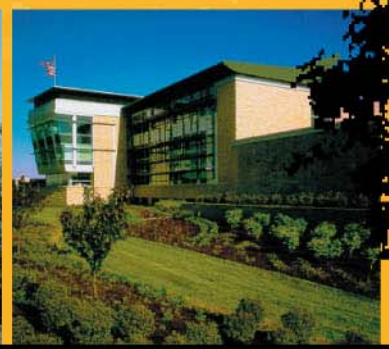
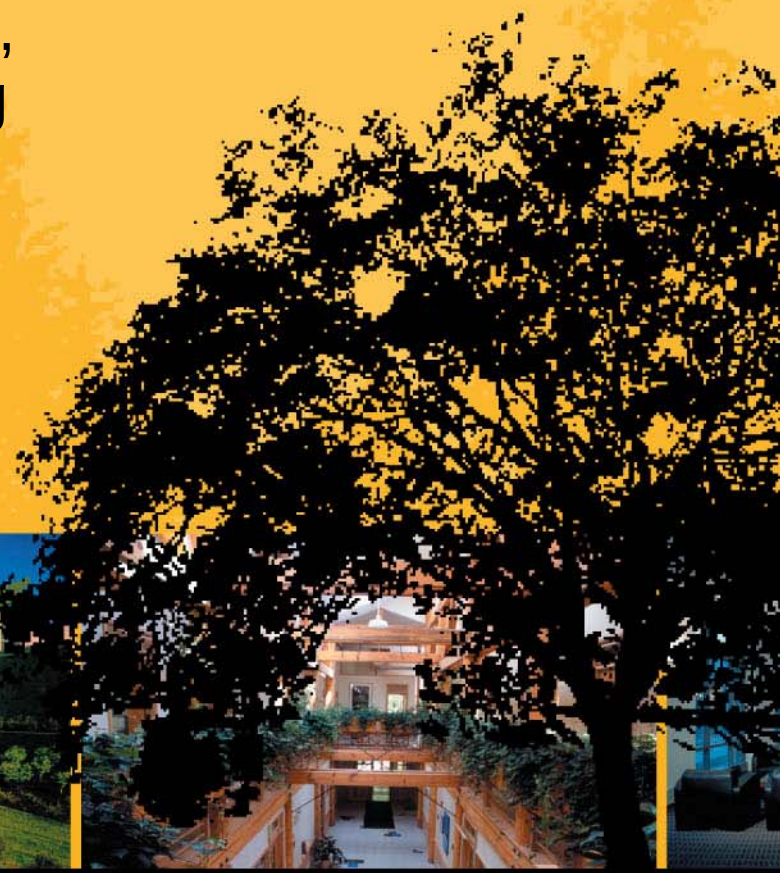
LEED
GREEN BUILDING RATING SYSTEM

Leadership in Energy & Environmental Design®

A leading-edge system for designing, constructing, operating and certifying the world's greenest buildings.

USGBC's flagship rating system is LEED for New Construction and Major Renovations (LEED®-NC)



LEED-NC Version 2.2 Registered Project Checklist

LEED-NC

LEED-NC Version 2.2 Registered Project Checklist
<< enter project name >>
<< enter city, state, other details >>

Yes ? No

Sustainable Sites — 14 Points

Y	Prereq 1	**Construction Activity Pollution Prevention**	Required
	Credit 1	**Site Selection**	1
	Credit 2	**Development Density & Community Connectivity**	1
	Credit 3	**Brownfield Redevelopment**	1
	Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
	Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
	Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
	Credit 4.4	**Alternative Transportation**, Parking Capacity	1
	Credit 5.1	**Site Development,** Protect of Restore Habitat	1
	Credit 5.2	**Site Development,** Maximize Open Space	1
	Credit 6.1	**Stormwater Design,** Quantity Control	1
	Credit 6.2	**Stormwater Design,** Quality Control	1
	Credit 7.1	**Heat Island Effect,** Non-Roof	1
	Credit 7.2	**Heat Island Effect,** Roof	1
	Credit 8	**Light Pollution Reduction**	1

Yes ? No

Water Efficiency — 5 Points

	Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
	Credit 2	**Innovative Wastewater Technologies**	1
	Credit 3.1	**Water Use Reduction**, 20% Reduction	1
	Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Yes ? No

Energy & Atmosphere — 17 Points

Y	Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y	Prereq 2	**Minimum Energy Performance**	Required
Y	Prereq 3	**Fundamental Refrigerant Management**	Required
	Credit 1	**Optimize Energy Performance**	1 to 10
	Credit 2.1	**On-Site Renewable Energy**	1 to 3
	Credit 3	**Enhanced Commissioning**	1
	Credit 4	**Enhanced Refrigerant Management**	1
	Credit 5	**Measurement & Verification**	1
	Credit 6	**Green Power**	1

Yes ? No

Materials & Resources — 13 Points

Y	Prereq 1	**Storage & Collection of Recyclables**	Required
	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
	Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
	Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
	Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
	Credit 3.1	**Materials Reuse**, 5%	1
	Credit 3.2	**Materials Reuse**,10%	1
	Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
	Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
	Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regior	1
	Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regior	1
	Credit 6	**Rapidly Renewable Materials**	1
	Credit 7	**Certified Wood**	1

Yes ? No

Indoor Environmental Quality — 15 Points

Y	Prereq 1	**Minimum IAQ Performance**	Required
Y	Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
	Credit 1	**Outdoor Air Delivery Monitoring**	1
	Credit 2	**Increased Ventilation**	1
	Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
	Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
	Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
	Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
	Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
	Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
	Credit 5	**Indoor Chemical & Pollutant Source Control**	1
	Credit 6.1	**Controllability of Systems**, Lighting	1
	Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
	Credit 7.1	**Thermal Comfort**, Design	1
	Credit 7.2	**Thermal Comfort**, Verification	1
	Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Yes ? No

Innovation & Design Process — 5 Points

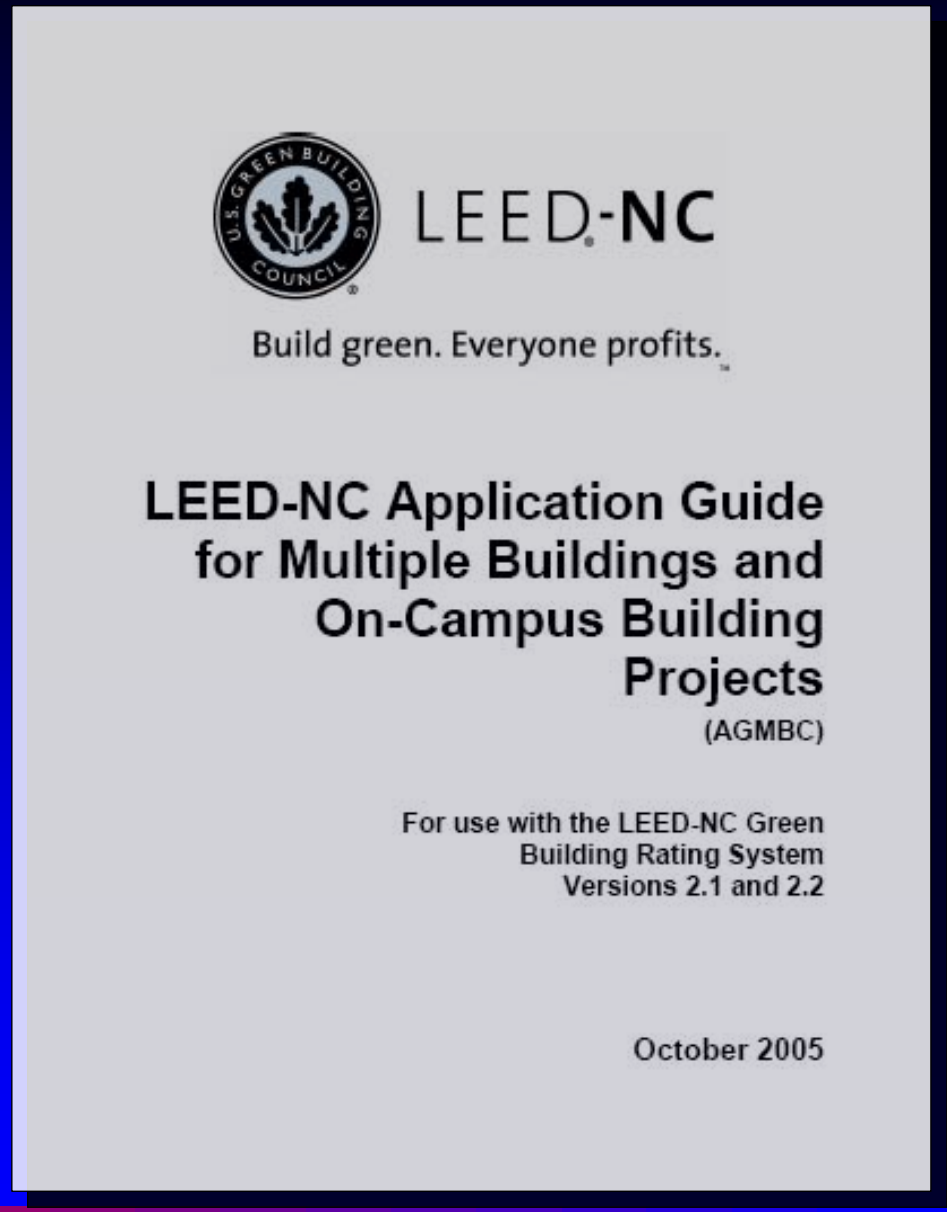
	Credit 1.1	**Innovation in Design**: Provide Specific Title	1
	Credit 1.2	**Innovation in Design**: Provide Specific Title	1
	Credit 1.3	**Innovation in Design**: Provide Specific Title	1
	Credit 1.4	**Innovation in Design**: Provide Specific Title	1
	Credit 2	**LEED® Accredited Professional**	1

Yes ? No

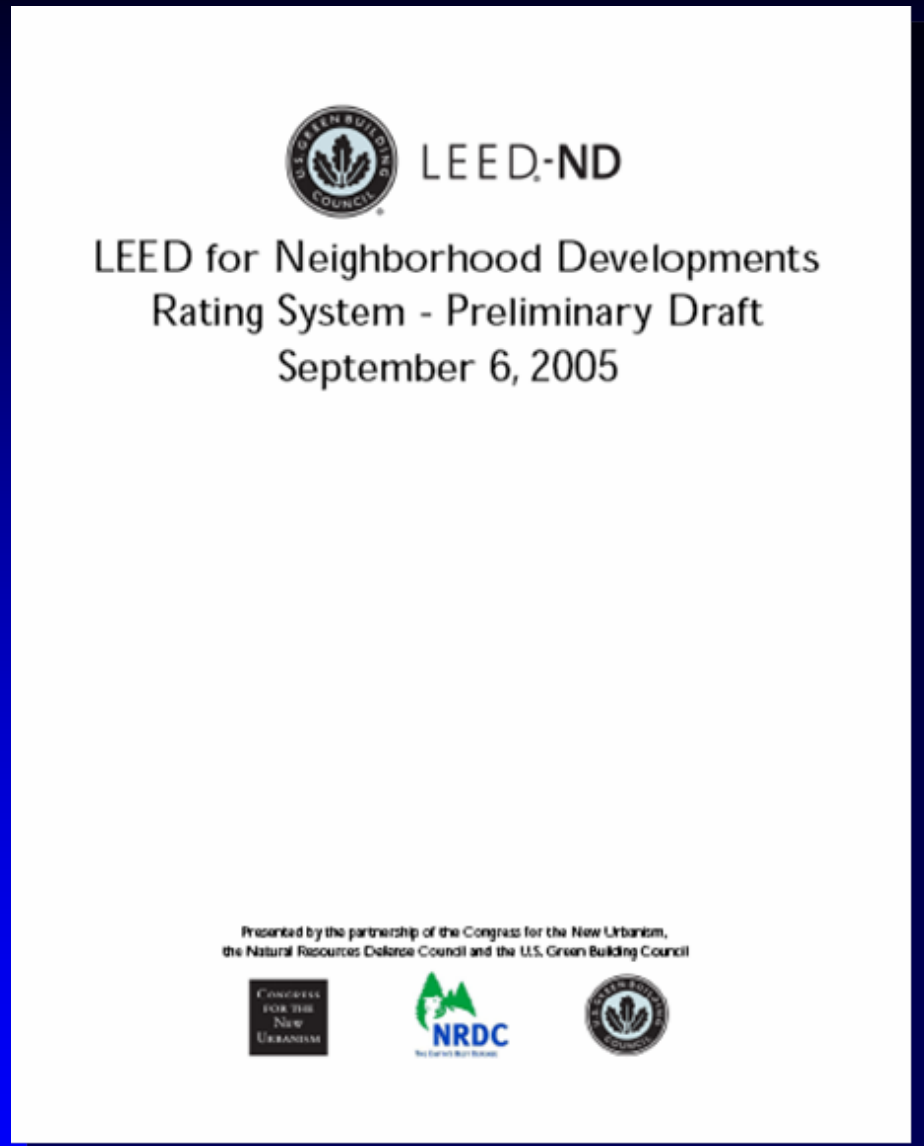
Project Totals (pre-certification estimates) — 69 Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

- Rating on Single Facility Within a Multi-Building Setting; or
- 'Aggregation' of 'Points' across Multiple Facilities; or
- Pre-Certification of Points Based on Approved Standards (ex. Installation Master Plan, IDG, etc.)



- USGBC, CNU, and NRDC Collaboration.
- National Standard For Neighborhood Design
- Combines Smart Growth, Urbanism, and Green Building.
- Smart Growth Network's Ten Principles Of Smart Growth And The Charter For New Urbanism.
- Compact Design, Proximity to Transit, Mixed Use, Mixed Housing Type, and Pedestrian- and Bicycle-Friendly Design.



LEED-ND (Neighborhood Developments) Project Checklist

Preliminary Draft -- September 6, 2005

LEED-ND

LEED for Neighborhood Developments Rating System
Preliminary Draft -- September 6, 2005

Yes	?	No				Percentage of total points
			Location Efficiency	**28** Points		**25%**
Y			Prereq 1	Transportation Efficiency	Required	
Y			Prereq 2	Water and Stormwater Infrastructure Efficiency	Required	
			Credit 1	Contaminated Brownfields Redevelopment	4	3.5%
			Credit 2	High Cost Contaminated Brownfields Redevelopment	1	0.9%
			Credit 3	Adjacent, Infill, or Redevelopment Site	3 to 10	8.8%
			Credit 4	Reduced Automobile Dependence	2 to 6	5.3%
			Credit 5	Contribution to Jobs-Housing Balance	4	3.5%
			Credit 6	School Proximity	1	0.9%
			Credit 7	Access to Public Space	2	1.8%
			Environmental Preservation	**13** Points		**11%**
Y			Prereq 1	Imperiled Species and Ecological Communities	Required	
Y			Prereq 2	Parkland Preservation	Required	
Y			Prereq 3	Wetland & Water Body Protection	Required	
Y			Prereq 4	Farmland Preservation	Required	
Y			Prereq 5	Erosion & Sedimentation Control	Required	
			Credit 1	Support Off-Site Land Conservation	2	1.8%
			Credit 2	Site Design for Habitat or Wetlands Conservation	1	0.9%
			Credit 3	Restoration of Habitat or Wetlands	1	0.9%
			Credit 4	Conservation Management of Habitat or Wetlands	1	0.9%
			Credit 5	Steep Slope Preservation	1	0.9%
			Credit 6	Minimize Site Disturbance During Construction	1	0.9%
			Credit 7	Minimize Site Disturbance Through Site Design	1	0.9%
			Credit 8	Maintain Stormwater Runoff Rates	1	0.9%
			Credit 9	Reduce Stormwater Runoff Rates	1	0.9%
			Credit 10	Stormwater Treatment	2	1.8%
			Credit 11	Outdoor Hazardous Waste Pollution Prevention	1	0.9%
			Compact, Complete, & Connected Neighborhoods	**42** Points		**37%**
Y			Prereq 1	Open Community	Required	
Y			Prereq 2	Compact Development	Required	
Y			Prereq 3	Diversity of Uses	Required	
			Credit 1	Compact Development	1 to 5	4.4%
			Credit 2	Transit-Oriented Compactness	1	0.9%
			Credit 3	Diversity of Uses	1 to 3	2.6%
			Credit 4	Housing Diversity	4	3.5%
			Credit 5	Affordable Rental Housing	1 to 2	1.8%
			Credit 6	Affordable For-Sale Housing	1 to 2	1.8%
			Credit 7	Reduced Parking Footprint	2	1.8%
			Credit 8	Community Outreach and Involvement	1	0.9%
			Credit 9	Block Perimeter	1 to 4	3.5%

continued…

Yes	?	No				
			Compact, Complete, & Connected Neighborhoods	**42** Points		**37%**
			Credit 10	Locating Buildings to Shape Walkable Streets	1	0.9%
			Credit 11	Designing Building Access to Shape Walkable Streets	1	0.9%
			Credit 12	Designing Buildings to Shape Walkable Streets	1	0.9%
			Credit 13	Comprehensively Designed Walkable Streets	2	1.8%
			Credit 14	Street Network	1	0.9%
			Credit 15	Pedestrian Network	1	0.9%
			Credit 16	Maximize Pedestrian Experience	1	0.9%
			Credit 17	Superior Pedestrian Experience	1 to 2	1.8%
			Credit 18	Applying Regional Precedents in Urbanism and Architecture	1	0.9%
			Credit 19	Transit Subsidy	3	2.6%
			Credit 20	Transit Amenities	1	0.9%
			Credit 21	Access to Nearby Communities	1	0.9%
			Credit 22	Adaptive Reuse of Historic Buildings	1 to 2	1.8%
			Resource Efficiency	**25** Points		**22%**
			Credit 1	Certified Green Building	1 to 5	4.4%
			Credit 2	Energy Efficiency in Buildings	1 to 3	2.6%
			Credit 3	Water Efficiency in Buildings	1 to 2	1.8%
			Credit 4	Heat Island Reduction	1	0.9%
			Credit 5	Infrastructure Energy Efficiency	1	0.9%
			Credit 6	On-Site Power Generation	1	0.9%
			Credit 7	On-Site Renewable Energy Sources	1	0.9%
			Credit 8	Efficient Irrigation	1	0.9%
			Credit 9	Greywater & Stormwater Reuse	2	1.8%
			Credit 10	Wastewater Management	1	0.9%
			Credit 11	Reuse of Materials	1	0.9%
			Credit 12	Recycled Content	1	0.9%
			Credit 13	Regionally Provided Materials	1	0.9%
			Credit 14	Construction Waste Management	1	0.9%
			Credit 15	Comprehensive Waste Management	1	0.9%
			Credit 16	Light Pollution Reduction	1	0.9%
			Credit 17	Contaminant Reduction in Brownfields Remediation	1	0.9%
			Other (0 Prerequisites / 2 Credits / 6 Points / 5% of total poin	**6** Points		**5%**
				LEED® Accredited Professional	1 to 2	
				Anticipated Innovation in Design Credit(s)	1 to 4	3.5%
			TOTAL (Pre-Certification estimates)		**114**	**100%**

Certified 46-56 points **Silver** 57-67 points **Gold** 68-90 points **Platinum** 91-114 points

LEED-ND Preliminary Draft

- Location Efficiency
- Environmental Preservation
- Compact, Complete, & Connected Neighborhoods
- Resource Efficiency
- Innovation & Design Process

LEED-ND Preliminary Draft

- Location Efficiency
  - Transportation Efficiency
  - Water and Stormwater Infrastructure Efficiency
  - Contaminated Brownfields Redevelopment
  - High Cost Contaminated Brownfields Redevelopment
  - Adjacent, Infill, or Redevelopment Site
  - Reduced Automobile Dependence
  - Contribution to Jobs-Housing Balance (??)
  - School Proximity
  - Access to Public Space

LEED-ND Preliminary Draft

- Environmental Preservation
  - Imperiled Species and Ecological Communities
  - Parkland Preservation (Green Space??)
  - Wetland & Water Body Protection
  - Farmland Preservation (Training Land??)
  - Erosion & Sedimentation Control
  - Support Off-Site Land Conservation (Off-Installation??)
  - Site Design for Habitat or Wetlands Conservation
  - Restoration of Habitat or Wetlands

LEED-ND Preliminary Draft

- Environmental Preservation (cont.)
  - Conservation Management of Habitat or Wetlands
  - Steep Slope Preservation
  - Minimize Site Disturbance During Construction
  - Minimize Site Disturbance Through Site Design
  - Maintain Stormwater Runoff Rates
  - Reduce Stormwater Runoff Rates
  - Stormwater Treatment
  - Outdoor Hazardous Waste Pollution Prevention

LEED-ND Preliminary Draft

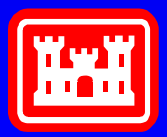
- Compact, Complete, & Connected Neighborhoods
  - Open Community
  - Compact Development
  - Diversity of Uses
  - Compact Development
  - Transit-Oriented Compactness
  - Diversity of Uses
  - Housing Diversity
  - Affordable Rental Housing (AFH??)
  - Affordable For-Sale Housing (AFH??)
  - Reduced Parking Footprint
  - Community Outreach and Involvement
  - Block Perimeter (??)
  - Locating Buildings to Shape Walkable Streets
  - Designing Building Access to Shape Walkable Streets
  - Designing Buildings to Shape Walkable Streets
  - Comprehensively Designed Walkable Streets

LEED-ND Preliminary Draft

- Compact, Complete, & Connected Neighborhoods (cont.)
  - Street Network
  - Pedestrian Network
  - Maximize Pedestrian Experience
  - Superior Pedestrian Experience
  - Applying Regional Precedents in Urbanism and Architecture
  - Transit Subsidy (??)
  - Transit Amenities (??)
  - Access to Nearby Communities
  - Adaptive Reuse of Historic Buildings

LEED-ND Preliminary Draft

- Resource Efficiency
  - Certified Green Building
  - Energy Efficiency in Buildings
  - Water Efficiency in Buildings
  - Heat Island Reduction
  - Infrastructure Energy Efficiency
  - On-Site Power Generation
  - On-Site Renewable Energy Sources
  - Efficient Irrigation
  - Greywater & Stormwater
  - Wastewater Management
  - Reuse of Materials
  - Recycled Content
  - Regionally Provided Materials
  - Construction Waste Management
  - Comprehensive Waste Management
  - Light Pollution Reduction
  - Contaminant Reduction in Brownfields Remediation



LEED-ND Preliminary Draft

- Innovation & Design Process
  - Innovation in Design
  - LEED® Accredited Professional

Sustainable Design in Installation Master Planning

Sustainable Design in Master Planning

- Allows Optimization of Sustainability at Installation, Community and Regional Levels (Holistic Approach to SDD); Effective implementation of Installation Sustainability Goals;
- Implementation of SDD Concepts During Master Planning and Site Selection Provides Highest Potential for Installation Facilities Impact;
- Identification of Installation Wide ‘Sustainable’ Projects;

Sustainable Design in Master Planning

- Adjust 'Traditional' Master Planning Practices to Achieve Installation Sustainability Goals;
  - Redevelopment, Infill, Compact Design, Density, Mixed Use
  - New Urbanism, Smart Growth
  - Distributed Vs. Consolidated Community Facilities/Services
  - Proximity To Transit, and Pedestrian- / Bicycle- Friendly Design
- Effective integration of SDD in the Master Planning process is Essential to Achieving of LEED® Silver
  - Silver Target for all facilities in FY08
  - MP Primarily Affects: Site, Water, & Energy LEED Points

Potential SDD MP Products or Content

- Storm Drainage Plan
- Sewer Plan
- Water Plan
- Transportation Plan
- Installation Plan
- Lighting Plan
- Electrical Plan
- ADP / LRP
- IDG

Potential SDD MP Products or Content

- Storm Drainage Plan (Plan for the Management of Water Quality / Quantity)
  - Reduction of impervious surfaces;
  - Detention, retention strategies;
  - Open swales, curb less parking/roads;
  - Bio-filtration/Infiltration;
  - Building/Impermeable surface run-off capture, management, reuse (irrigation, vehicle wash, etc.);
  - Management by watershed; and
  - Stormwater reuse *(Water Plan)*

Potential SDD MP Products or Content

- Sewer Plan (Plan for the Reduction of Potable Water Usage) or
- Water Plan
  - Waste Water / Greywater Reuse;
  - Stormwater Reuse;
  - Site Irrigation; and
  - Local / Drought Tolerant Species Use (*IDG*) (*Tree Cover Plan*)

Potential SDD MP Products or Content

- Tree Cover Plan
  - Ecosystem Restoration Plan;
  - Native / Drought Tolerant Species ‘Restoration’ Plan; and
  - Heat Island Management Plan (Site) (*IDG*).
- Transportation Plan
  - Installation Transportations Systems; Transit Stops; Present / Future;
  - Bikeways / Pedestrian Ways; and
  - Satellite Parking / Commuter / Parking Reduction Plans *(AT / FP Plan?).*

Potential SDD MP Products or Content

- Installation Area Plan / Installation Plan
  - Contaminated Site Remediation Plan;
  - Heat Island Management Plan (Facility) (*IDG*);
  - Resource Reuse Plan (Collection, Storage, Sorting Facilities); and
  - Adaptation, Renewal, & Future Use Plan (*Installation Land Use Plan, Building Area Land Use Plan, IDG).*
- Lighting Plan
  - Exterior / Site Lighting (*IDG*);
  - Light Trespass Plan; and
  - Security Lighting Plan *(AT / FP Plan?).*

Potential SDD MP Products or Content

- Electrical Plan
  - Green Power Generation / Distribution
  - On Site Renewable Energy; and
  - Distributed Power Generation.
- IDG
  - ??All of the Above??

Potential SDD MP Products or Content

- ADP / LRP? / IDG?
  - Location Efficiency
    - Brownfields Redevelopment; Adjacent, Infill, or Redevelopment Site
  - Environmental Preservation
    - Ecosystem/Green Space Restoration/Preservation
    - Wetland & Water Body Protection and Restoration
    - Stormwater Management (Quality/Quantity) Erosion & Sedimentation Control
  - Compact, Complete, & Connected Neighborhoods
    - Compact Development, Functional Diversity, Transit-Oriented Compactness, Defined Neighborhoods;
    - Reduced Parking, Pedestrian Network;
    - Access to Community Resources, Adaptive Reuse of Historic Buildings

Potential SDD MP Products or Content

- ?? ‘New’ Contributing Plans ??
  - Stormwater Management
  - Potable Water Reduction Management
  - Ecosystem Restoration
  - Native Plant / Drought Tolerant Species Planting
  - Contaminated Site Remediation
  - Comprehensive Heat Island Management
  - Resource Reuse
  - Adaptation, Renewal, & Future (Facilities / Land) Use (SPiRiT)
  - Anti-Terrorism / Force Protection (AT / FP)
  - Distribution of On Site Renewable Energy

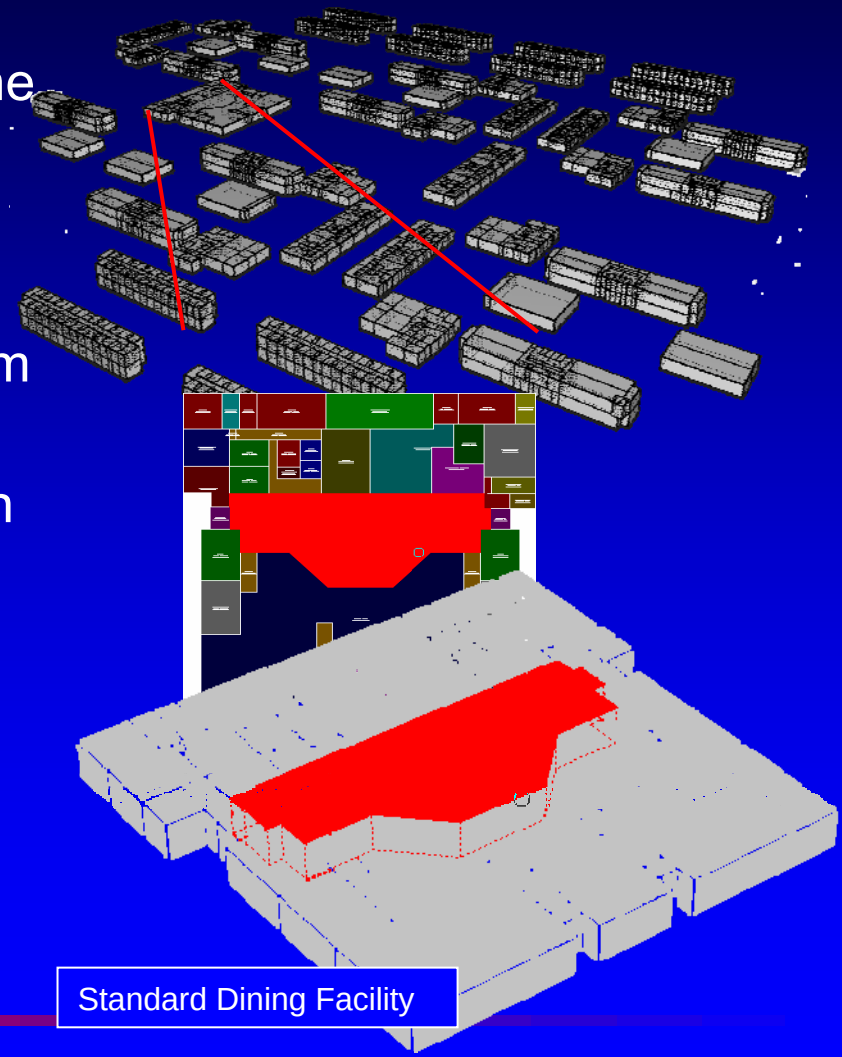
Master Planner Roles and Responsibilities

- Does Sustainable Design and Development Mean Anything Different for the Master Planner??
  - Holistic Design
  - Partnering
  - Participation in Planning, Programming & Design Charrettes
  - Participation in (Leading?) Installation Sustainability Goal Setting Workshops / Activities

Facility Composer – Part of the Solution

Facility planning tool that accelerates the development and management of:

- The project and building program
- Facility standard guidance
- Preliminary layouts based on program and facility standard guidance
- Standard data model for working with other AEC, cost estimating, and Building Information Model (BIM) applications
- Complements design/build RFP initiative



Standard Dining Facility

Sustainable Design and Development - Engineering Knowledge Online - Microsoft Internet Explorer

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ENGINEERING KNOWLEDGE ONLINE

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Sustainable Design and Development

Welcome to ERDC CERL's Sustainable Design and Development Resource! Integrating Concepts and Application of Sustainability

What is SDD?

- Meets the needs of the present without compromising the quality of life of future generations.
- Maintains economic growth while producing an absolute minimum of pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to life in a pleasant and healthy environment.
- Meets human needs by maintaining a balance between development, social equality, ecology, and economics.
- Demands systematic considerations of environmental impact, energy use, natural resources, economy, and quality of life.
- Has optimal benefit only when addressed at the inception of a project, and throughout the entire life cycle of a project -- from concept to planning, to programming, design, construction, and ownership.

Quick Links

- 2004 USGBC International Conference & Exposition (11/10/2004)
- CERL SDD Website
- EKO Sustainable Design & Development Forum
- HQUSACE Sustainable Design and Development Links
- Sustainable Project Rating Tool SPiRiT
- Sustainable Sources
- The Sustainable Designer's Aid

Hot News!

Jul. 19, 2004

Beta Version of Sustainable Designer's Aid now available

Newest SDD Items

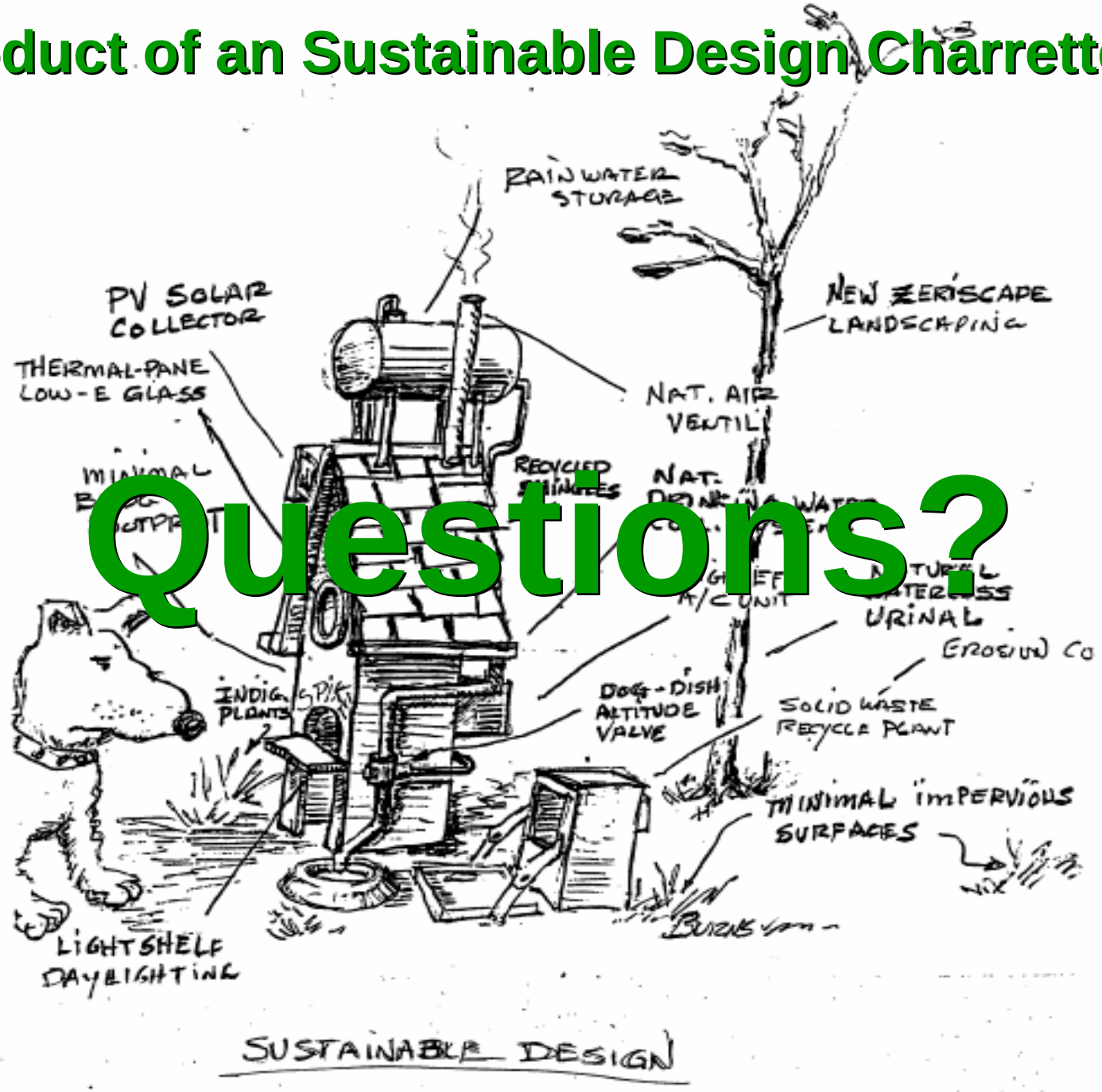
Internet

Points of Contact

- U. S. Army Corps of Engineers - **Harry Goradia**, CECW-ET, 202/761-4693, harry.goradia@usace.army.mil
- U. S. Army Assistant Chief of Staff, Installation Management - **John Scharl**, DAIM-FDF, 703/601-0700, John.Scharl@hqda.army.mil
- U. S. Army Engineer Research & Development Center
  - **Richard L. Schneider**, CEERD-CF-N, 217/373-6752, richard.l.schneider@erdc.usace.army.mil
  - **Annette L. Stumpf**, CEERD-CF-N, 217/373-7542, annette.l.stumpf@erdc.usace.army.mil

https://eko.usace.army.mil/cop/sdd/

Product of an Sustainable Design Charrette?



Questions?