



LEED 2009 and other Green Initiatives Programs Related to Stormwater Measures

**Engineering Resource Associates, Inc.
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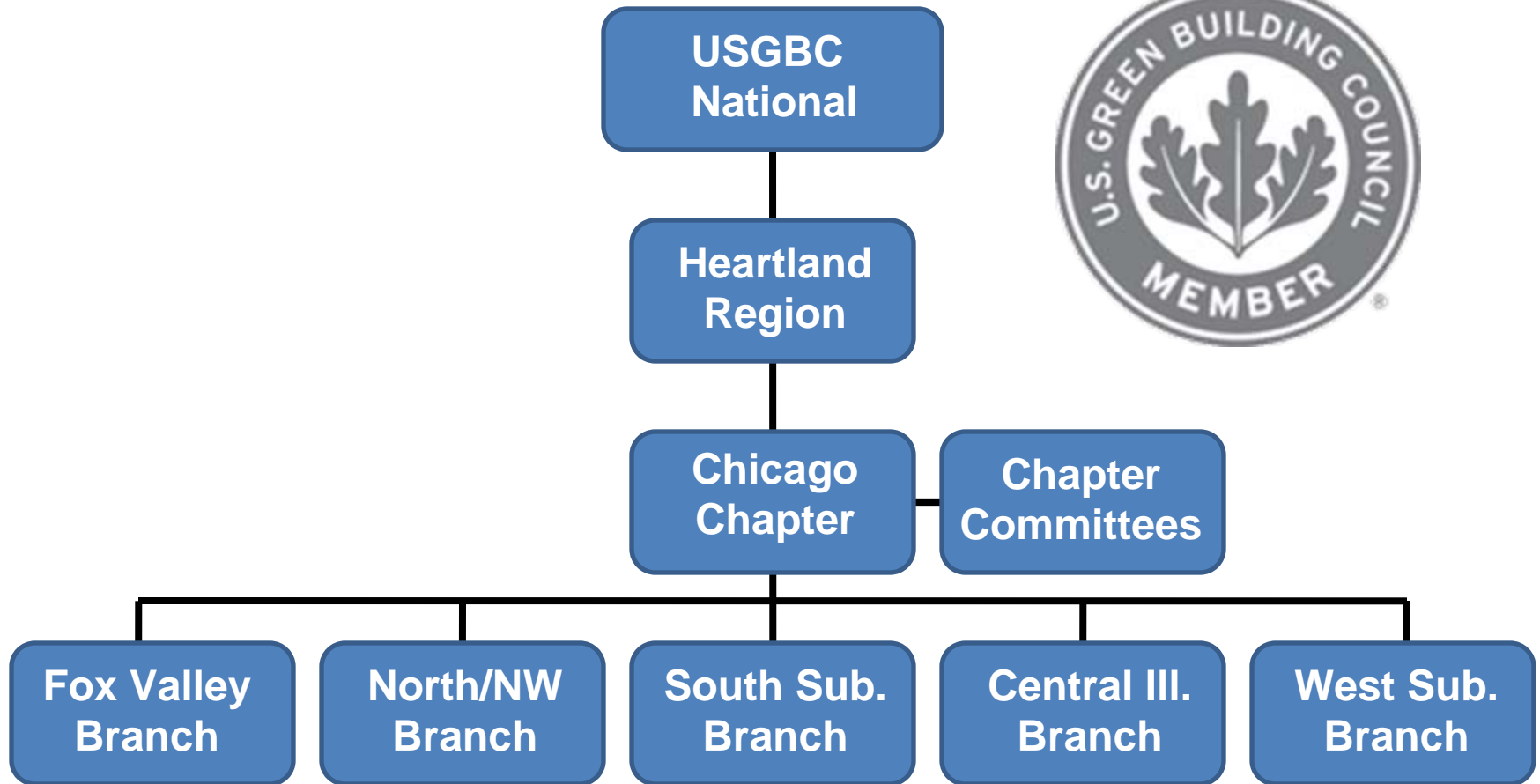


Leadership in Energy & Environmental Design



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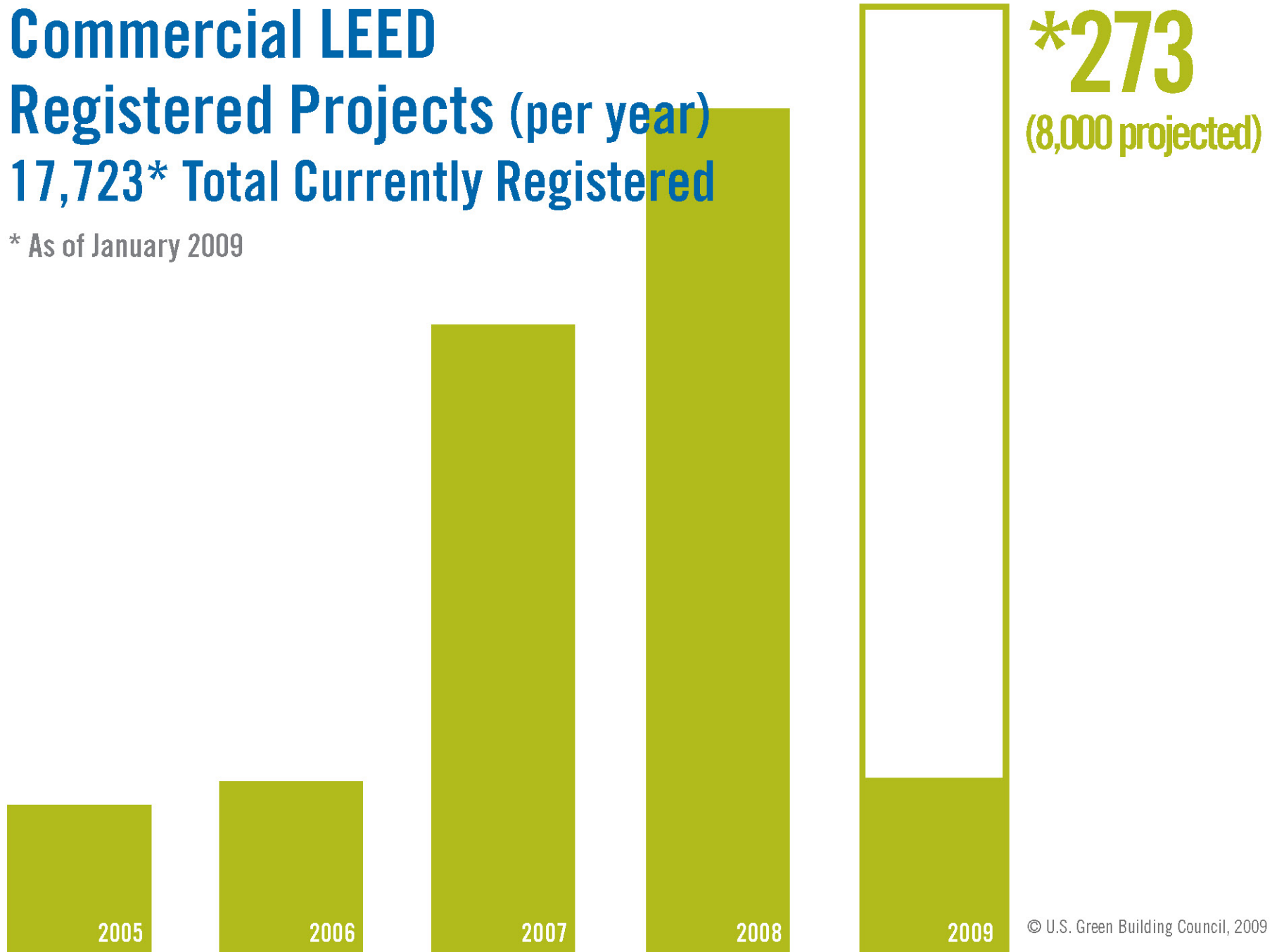
Organizational Chart



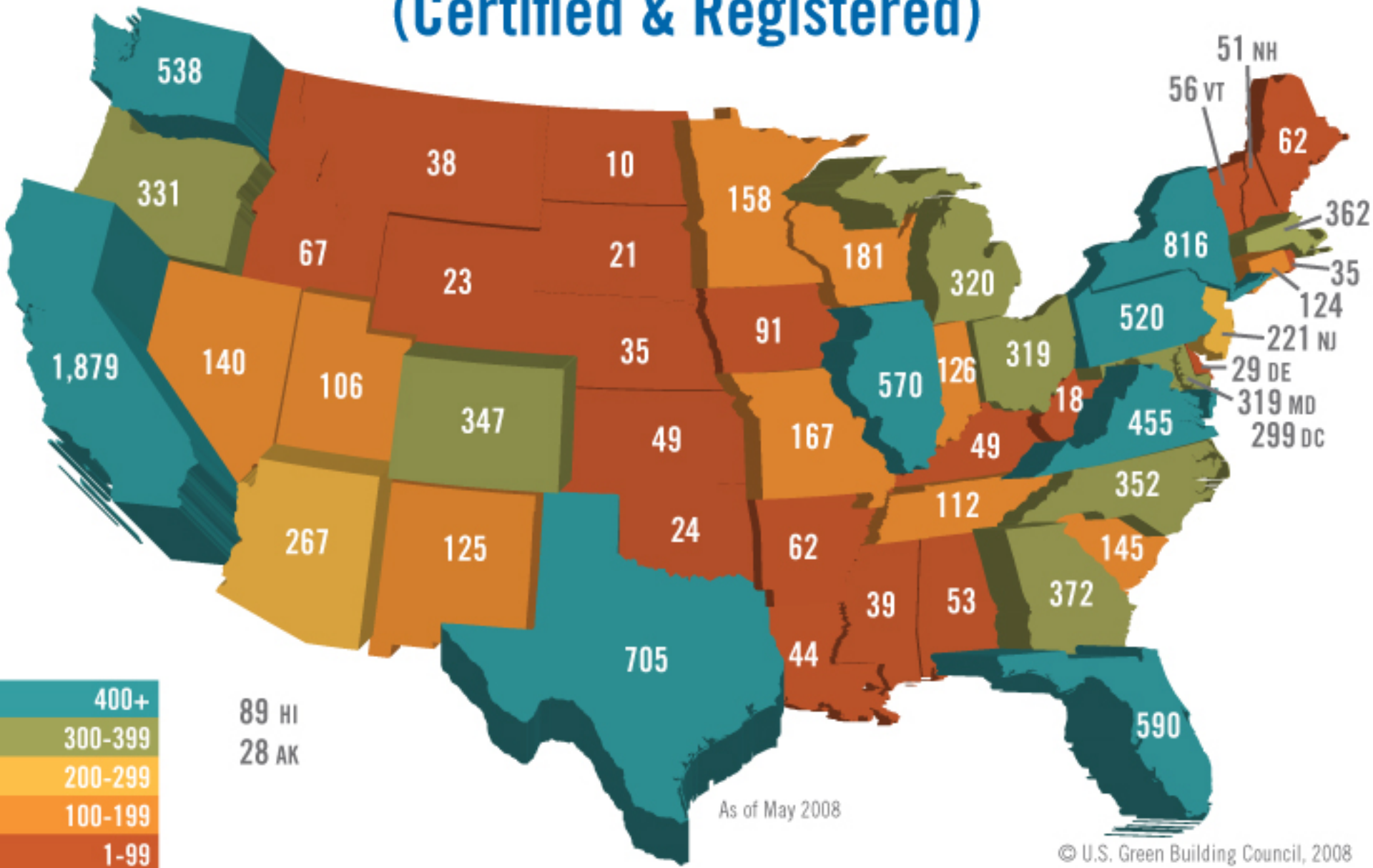
Commercial LEED Registered Projects (per year)

17,723* Total Currently Registered

* As of January 2009

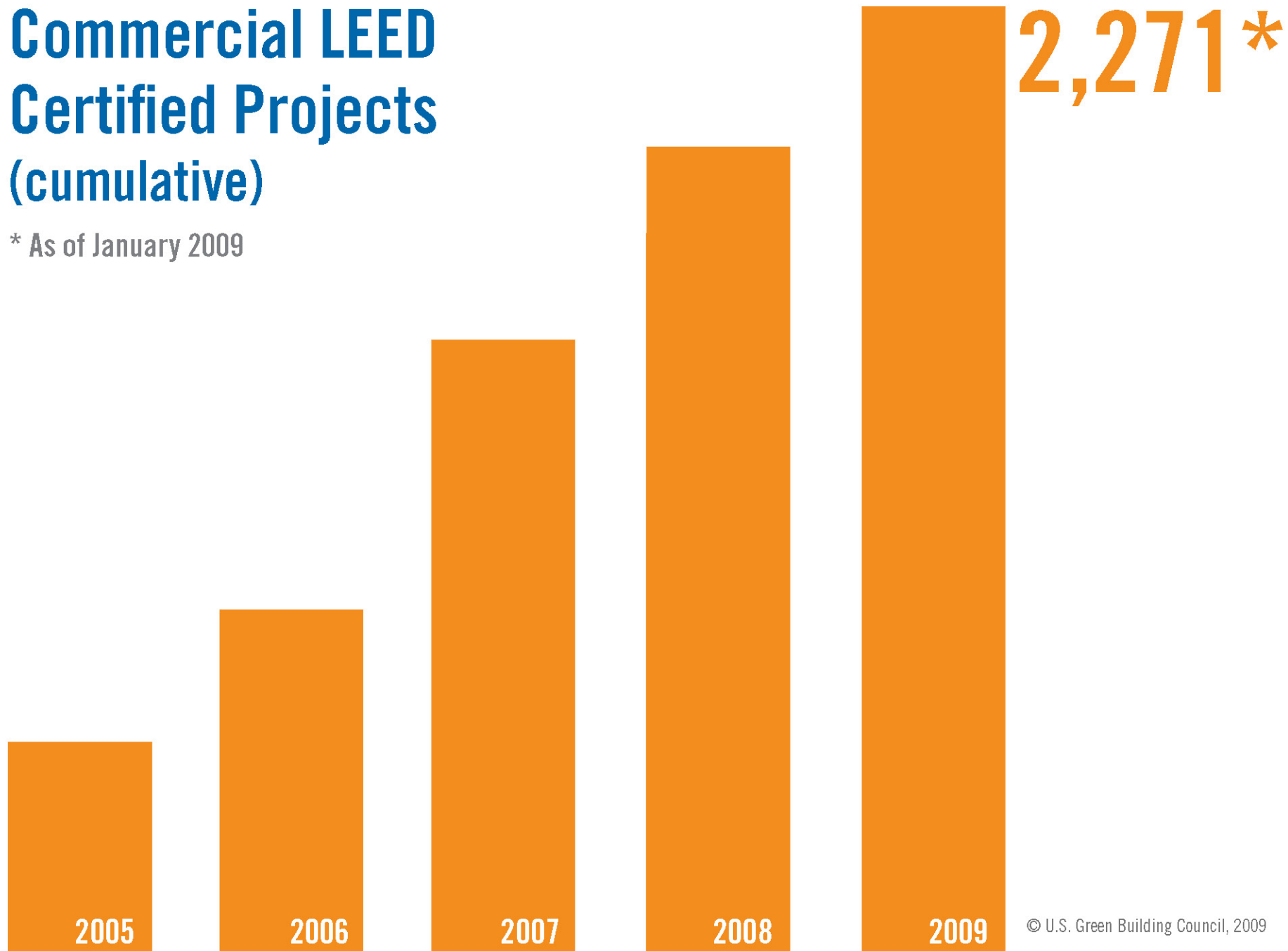


Commercial LEED Projects by State (Certified & Registered)

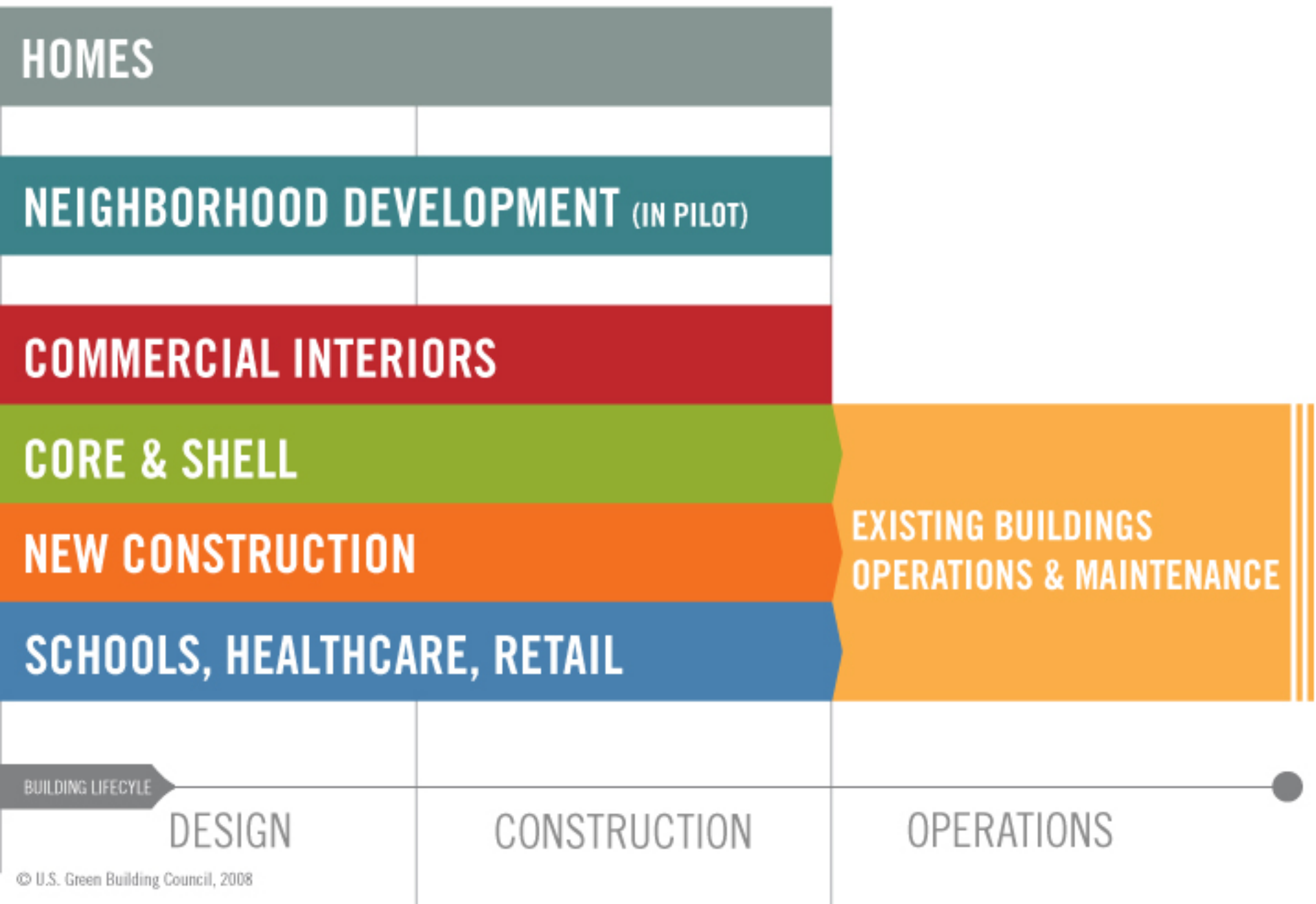


Commercial LEED Certified Projects (cumulative)

* As of January 2009



LEED address the complete lifecycle of buildings:



USGBC has four levels of LEED:



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Alignment to 100 point scale

LEED 2009 Point Distribution

	nc	eb	cs	ci	k-12	average
ss	26	26	28	21	24	25.00
we	10	14	10	11	11	11.20
ea	35	35	37	37	33	35.40
mr	14	10	13	14	13	12.80
eq	15	15	12	17	19	15.60
id	6	6	6	6	6	6.00
re	4	4	4	4	4	4.00
base points	100	100	100	100	100	100
total points	110	110	110	110	110	110



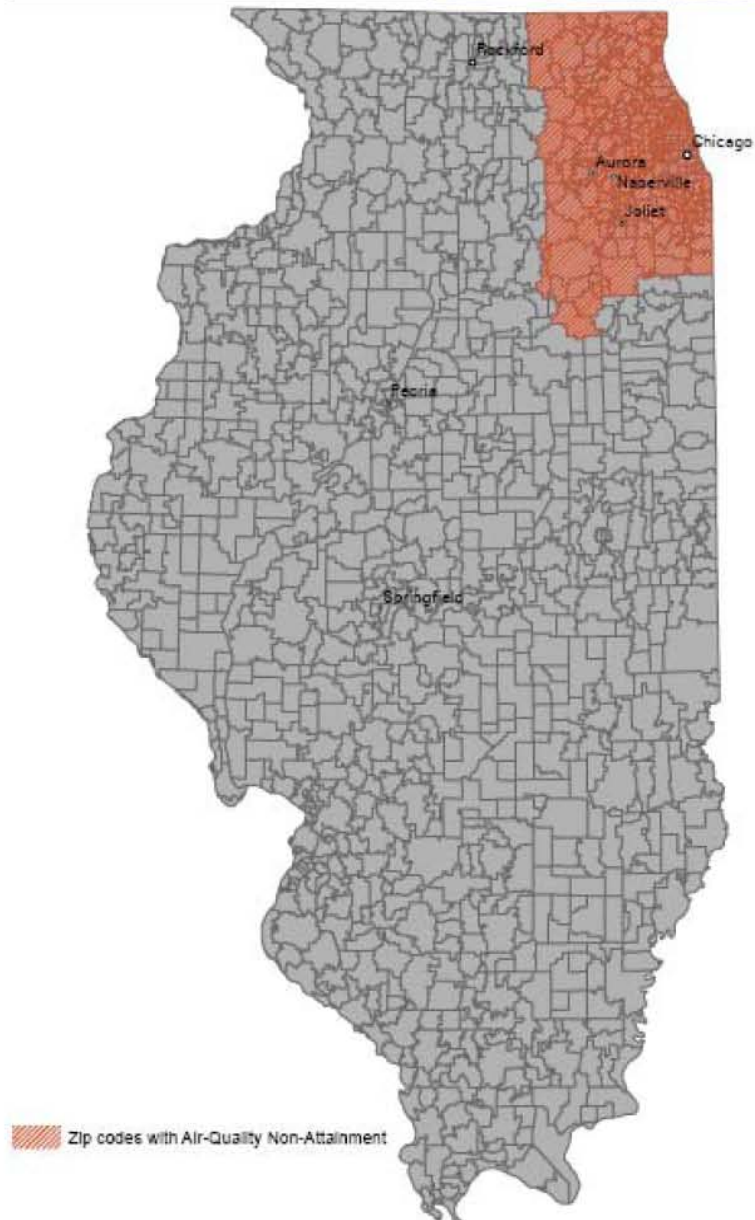


Heartland Region - 13 Chapters, 1 Affiliate



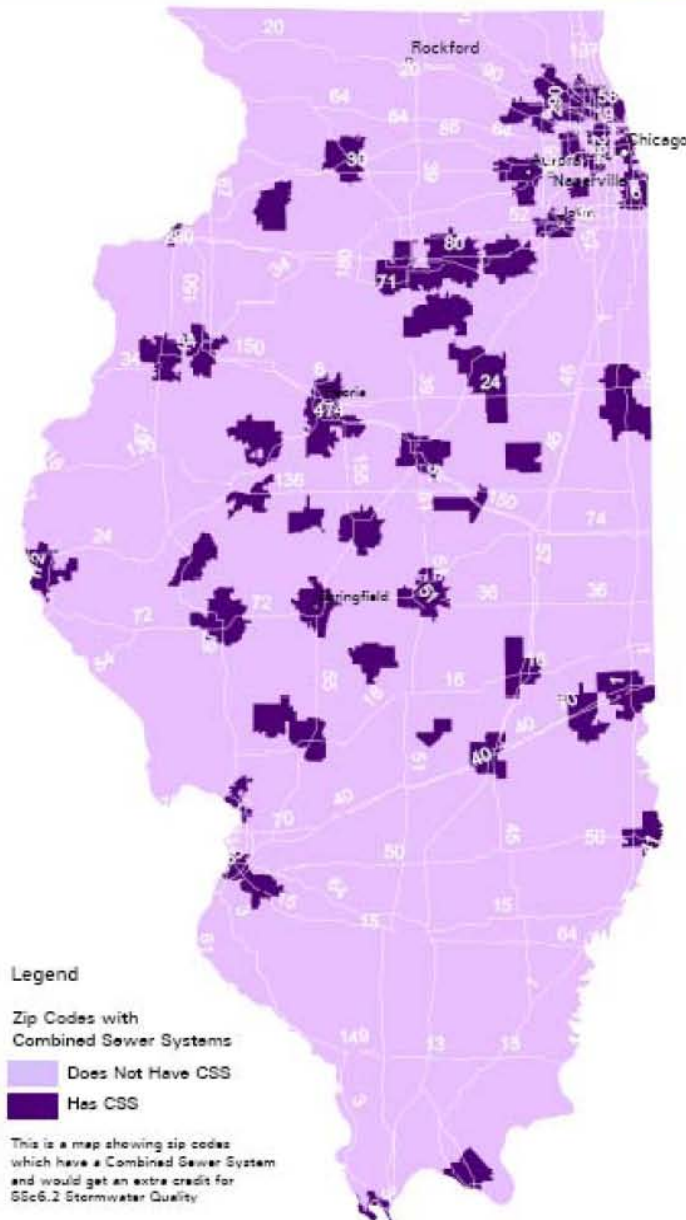
- Heartland region asked chapters to regionalize credits
- 6 Credits Incentivized
- Earn up to 4 points





Distinct data




- Zip codes with air quality non-attainment

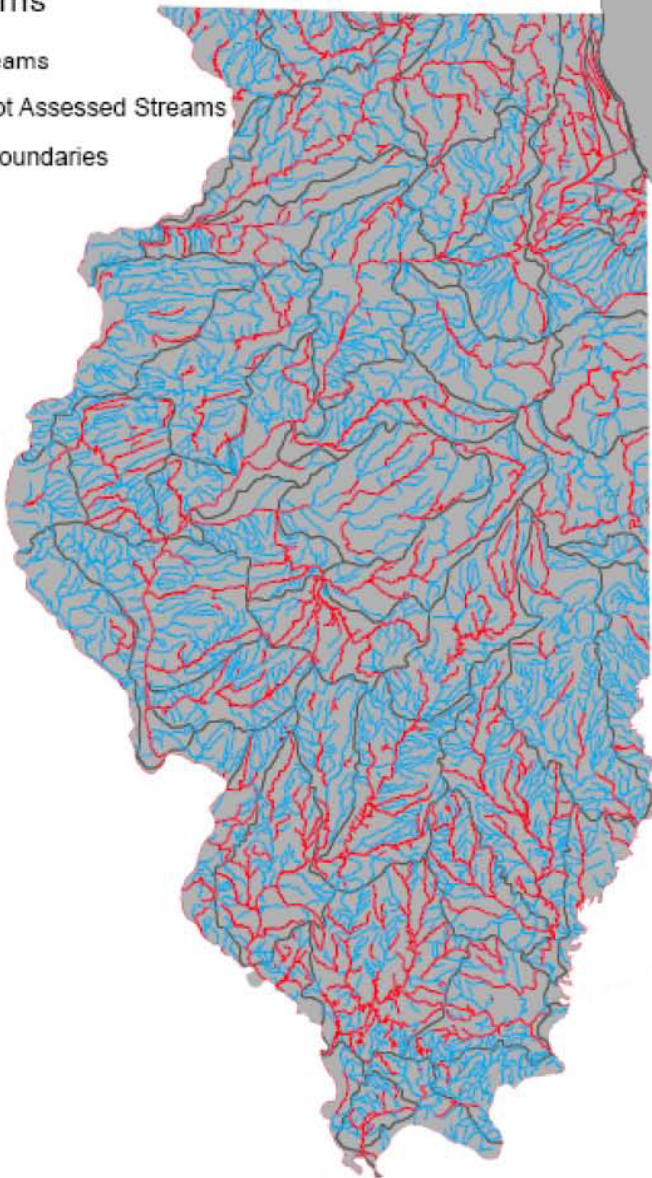


Distinct data

- Zip codes with combined storm and sewer

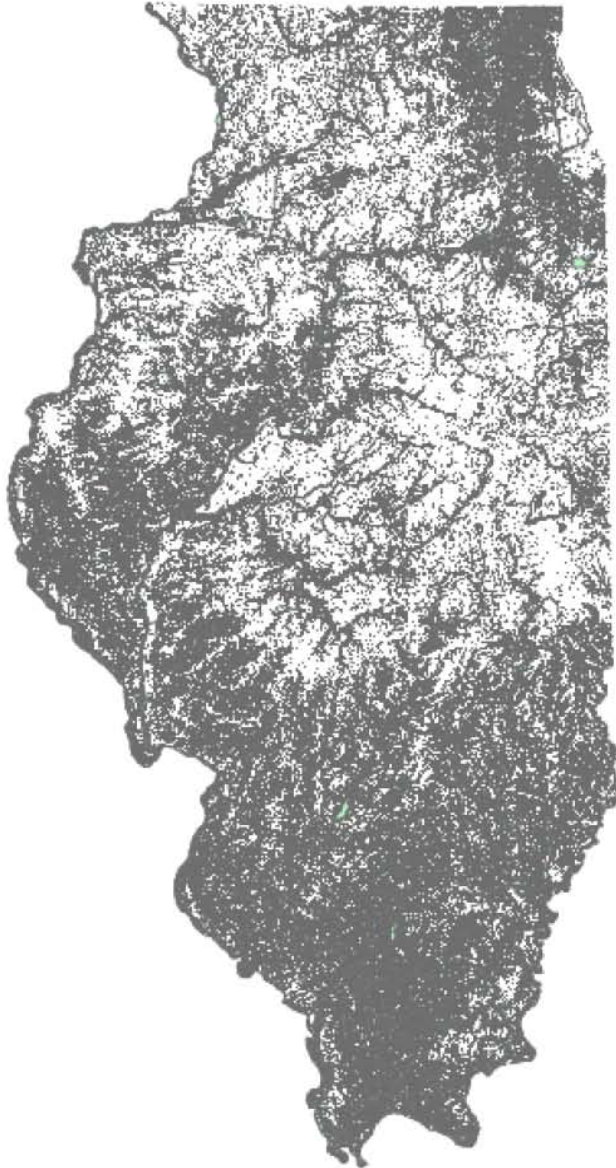
Polluted Streams

-  Polluted Streams
-  Healthy or Not Assessed Streams
-  Watershed Boundaries

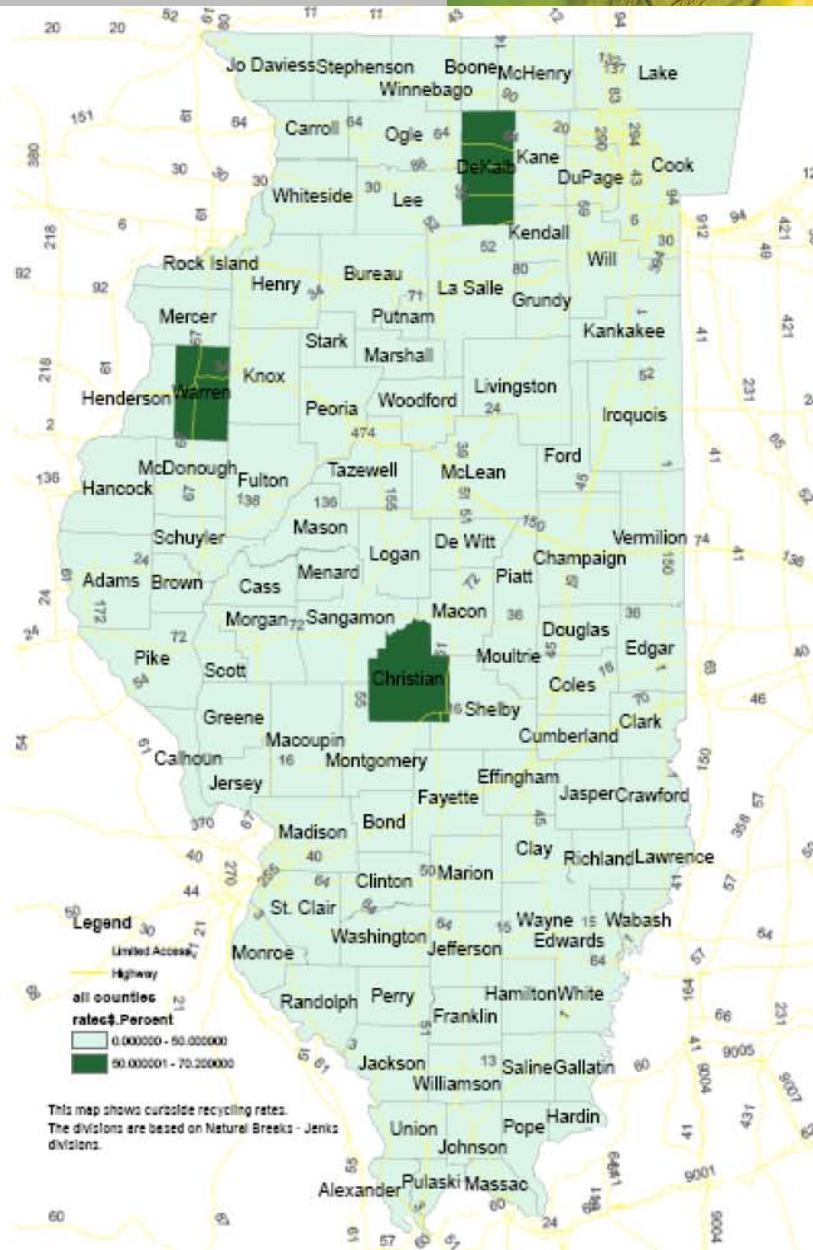


Universal data

– Polluted streams

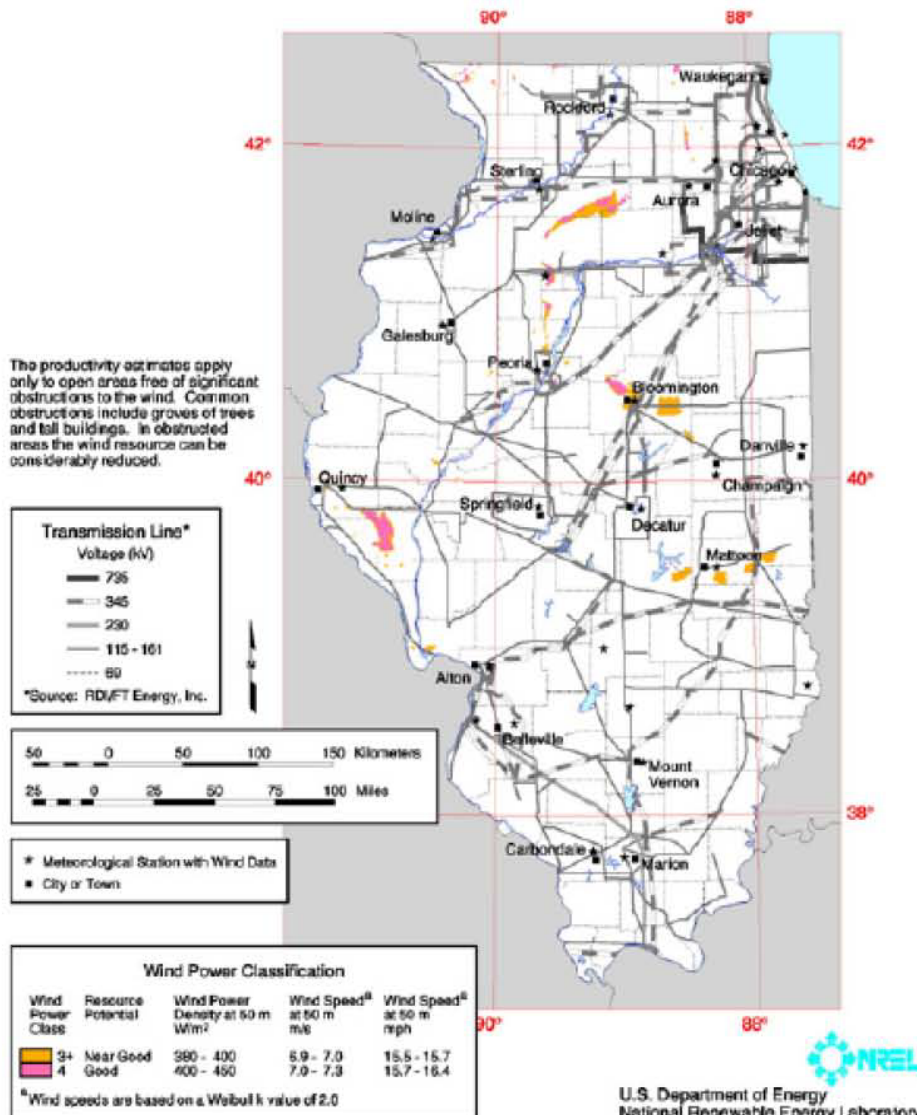


Universal data
– Wetlands

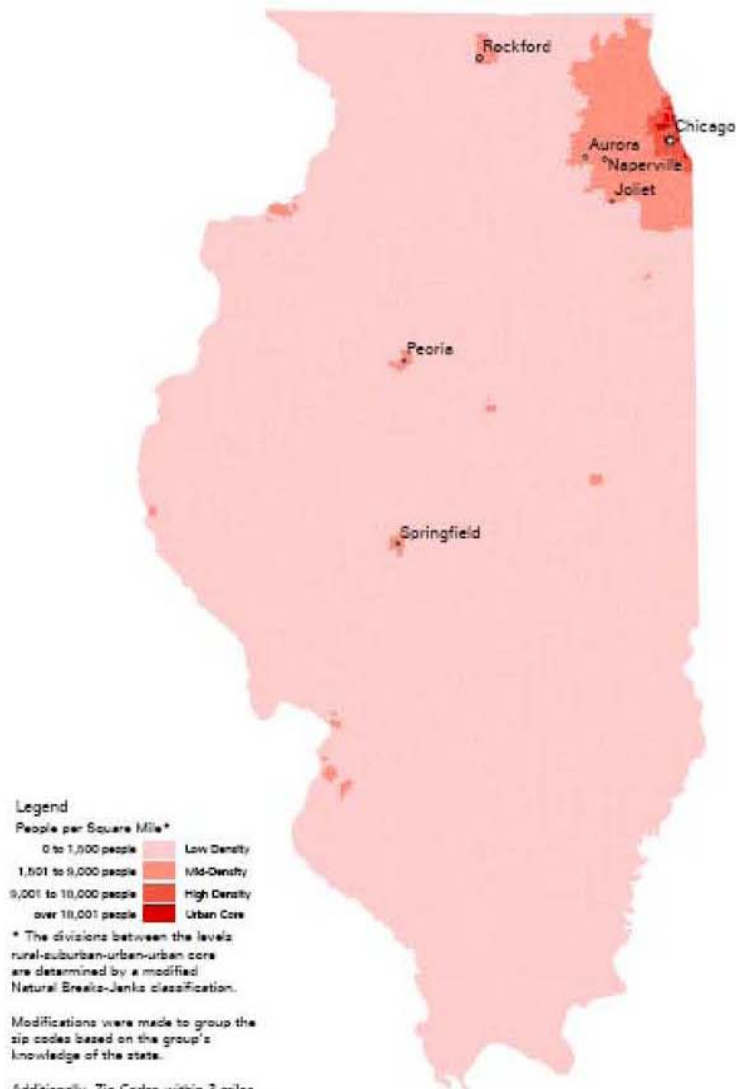


Inconclusive data
– Recycling rates

Illinois - Wind Resource Map Best Areas



Inconclusive data
– Wind resources



Modifications were made to group the zip codes based on the group's knowledge of the state.

Additionally, Zip Codes within 3 miles of an "Urban Core" zone are coded as High Density and Zip Codes within 30 miles of a High Density area are coded as Medium Density.

- Zip codes with density criteria (people/sq. mile)
 - 1-1,500
 - 1,501-9,000
 - 9,001-18,000
 - Over 18,000

Zones

- 100 – Urban Core (with combined storm sewer & air quality non-attainment)
- 200 – High Density (with air quality non-attainment)
- 210 – High Density & Combined Storm Sewer (air quality non-attainment)
- 300 – Medium Density
- 310 – Medium Density & Combined Storm Sewer
- 320 – Medium Density & Air Quality Non-attainment
- 330 – Medium Density, Combined Storm Sewer & Air Quality Non-attainment
- 400 – Low Density
- 410 – Low Density & Combined Storm Sewer
- 420 – Low Density & Air Quality Non-attainment
- 430 – Low Density, Combined Storm Sewer & Air Quality Non-attainment



100 – Urban Core Issues*

- Low park and open space per capital
- Heat Island Effect
- Lack of urban redevelopment
- Areas with low bicycle usage, but high potential

* 3 of 4 have direct positive impact to stormwater



200 - High Density Issues*

- Heat Island Effect
- Areas with low bicycle usage, but high potential
- Lack of urban redevelopment
- High single occupancy vehicle usage

* 2 of 4 have direct positive impact to stormwater



300 - Medium Density Issues*

- Greenfield development – development pressure on agriculture, development near wetlands or in flood plains
- Sprawl
- Public transportation exists, but is underutilized
- Heat Island Effect
- Few waste diversion options and low tipping fees
- Areas with low bicycle usage, but high potential
- Lack of urban redevelopment
- High single occupancy vehicle usage

* 3 of 6 have direct positive impact to stormwater



400 - Low Density Issues*

- Good locations for wind and solar power
- Greenfield development – development pressure on agriculture, development near wetlands or in flood plains
- Invasive species and habitat fragmentation
- High use of potable water for irrigation
- Few waste diversion options and low tipping fees
- Need to improve forestry practices

* 4 of 6 have direct positive impact to stormwater and water quality





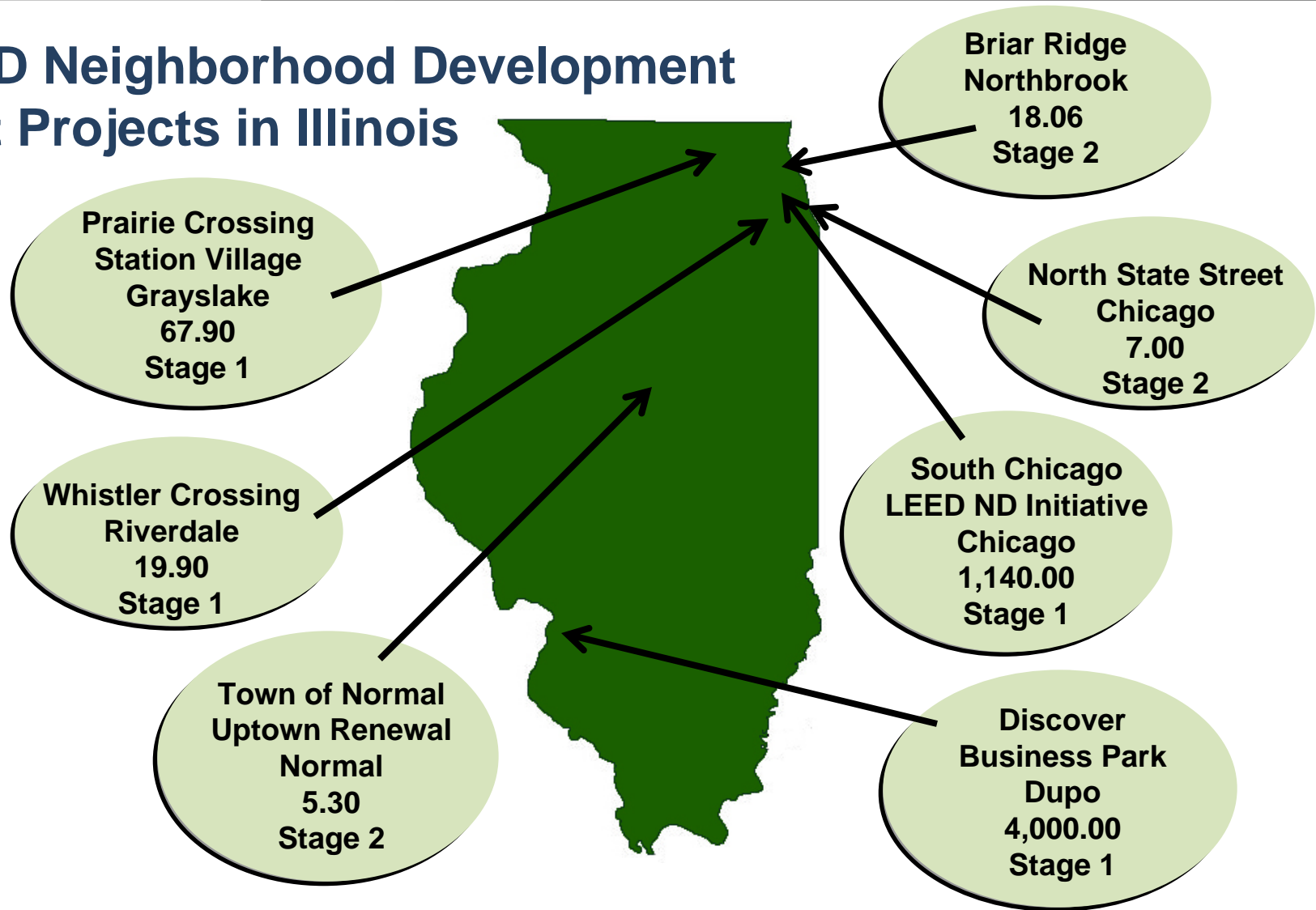
LEED Neighborhood Development Pilot Program

- Sponsors
 - U.S. Green Building Council
 - Congress for New Urbanism
 - Natural Resources Defense Council



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LEED Neighborhood Development Pilot Projects in Illinois



LEED Neighborhood Development

- Levels of Certification

Certification	40 – 49 points
Silver	50 – 59 points
Gold	60 – 79 points
Platinum	80 – 106 points



LEED Neighborhood Development

Smart Location and Linkage	Max. - 30 points
Neighborhood Pattern and Design	Max. - 39 points
Green Infrastructure and Buildings	Max. - 31 points
Innovation and Design Process	Max. - 5 points
Regional Priority	Max. - 4 points
	109 points



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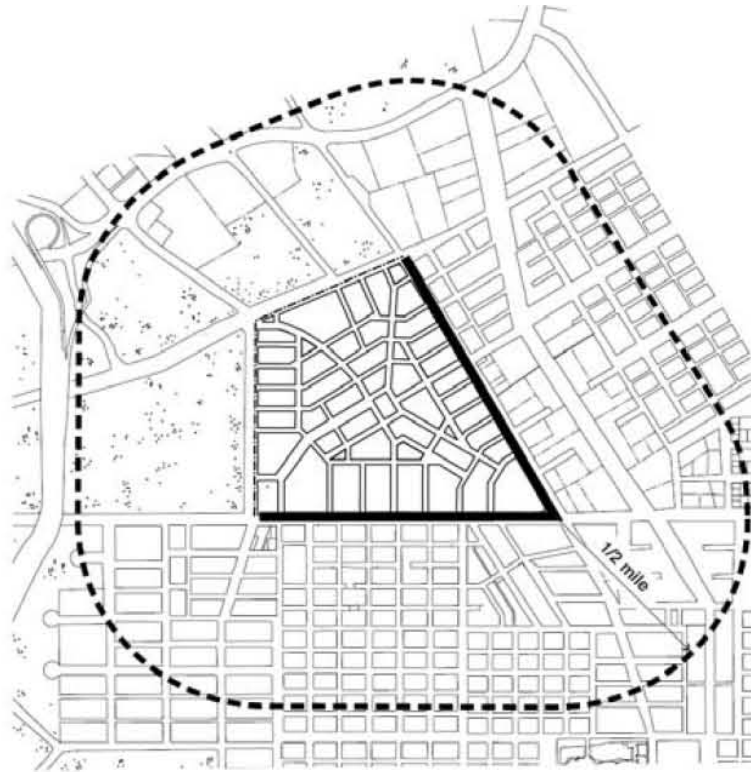
LEED Neighborhood Development

Smart Location and Linkage

30 points	Credit Categories	Stormwater Impact		
Prerequisite 1	Smart Location	R	M	VQ
Prerequisite 2	Proximity to Water & Wastewater Infrastructure	R	N	-
Prerequisite 3	Imperiled Species & Ecological Communities	R	N	-
Prerequisite 4	Wetland & Water Body Conservation	R	S	Q
Prerequisite 5	Farmland Conservation	R	S	VQ
Prerequisite 6	Flood Avoidance	R	S	VQ



Smart Location – Infill Site



Definition: Infill Site (3)



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Smart Location – Adjacent Site



Definition: Adjacent Site



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LEED Neighborhood Development

Smart Location and Linkage

30 points Max.	Credit Categories	Stormwater Impact		
Credit 1	Preferred Location	10	M	V
Credit 2	Brownfield Development	2	S	Q
Credit 3	Reduced Automobile Dependence	8	N	-
Credit 4	Bicycle Network	1	N	-
Credit 5	Housing and Jobs Proximity	3	N	-
Credit 6	Steep Slope Protection	1	S	Q
Credit 7	Site Design for Habitat or Wetlands Conservation	1	S	VQ
Credit 8	Restoration of Habitat or Wetlands	1	S	Q
Credit 9	Conservation Management of Habitat or Wetlands	1	S	Q





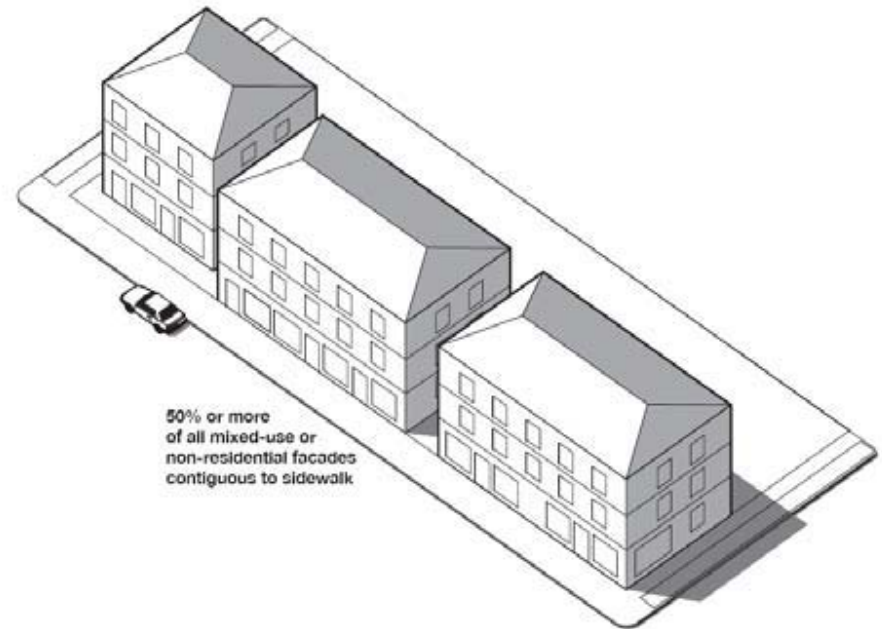
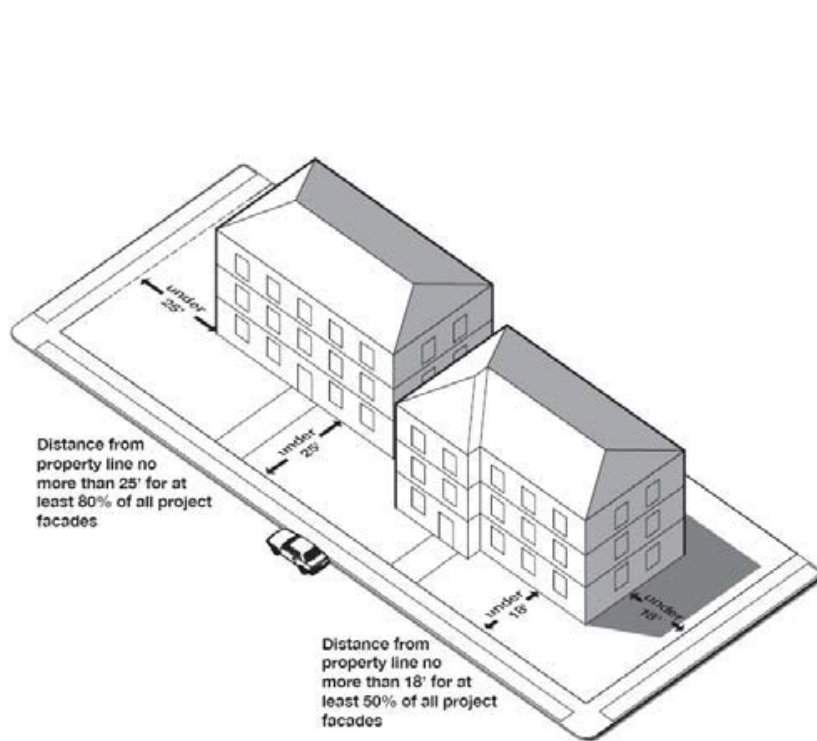
LEED Neighborhood Development Neighborhood Pattern and Design

39 points Max.	Credit Categories	Stormwater Impact		
Prerequisite 1	Walkable Streets	R	N	-
Prerequisite 2	Compact Development	R	S	VQ
Prerequisite 3	Connected and Open Community	R	N	-



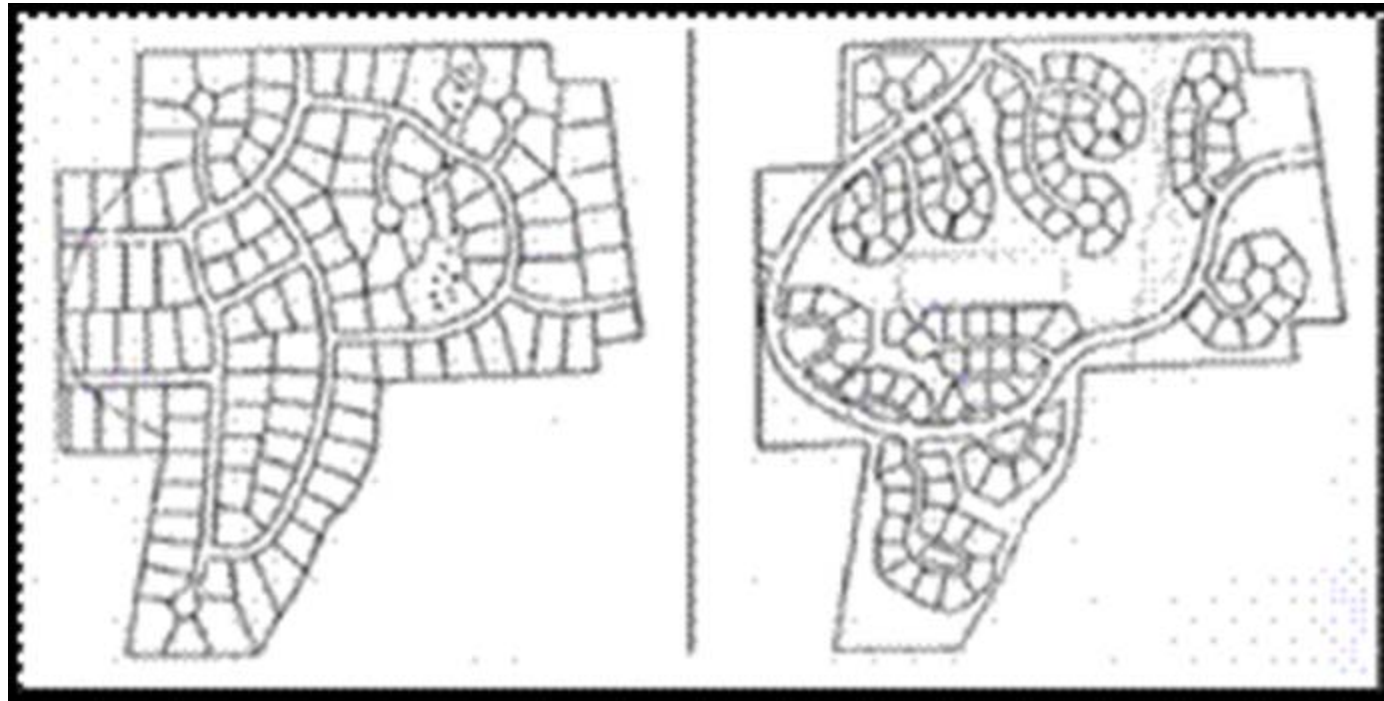
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Commercial Development



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Residential Development



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LEED Neighborhood Development Neighborhood Pattern and Design

39 points Max.	Credit Categories	Stormwater Impact		
Credit 1	Walkable Streets	12	M	V
Credit 2	Compact Development	6	S	VQ
Credit 3	Diversity of Uses	4	N	-
Credit 4	Mixed-Income Diverse Communities	7	N	-
Credit 5	Reduced Parking Footprint	1	S	VQ
Credit 6	Street Network	2	N	-
Credit 7	Transit Facilities	1	N	-
Credit 8	Transportation Demand Management	2	M	V
Credit 9	Access to Public Spaces	1	M	QV
Credit 10	Access to Active Public Spaces	1	M	QV
Credit 11	Universal Accessibility	1	N	-
Credit 12	Community Outreach and Involvement	1	M	QV
Credit 13	Local Food Production	1	M	V
Credit 14	Tree Lined and Shaded Streets	2	M	QV
Credit 15	Neighborhood Schools	1	N	-

LEED Neighborhood Development Green Infrastructure & Buildings

31 points Max.	Credit Categories	Stormwater Impact		
Prerequisite 1	LEED Certified Green Building	R	N	-
Prerequisite 2	Minimum Building Energy Efficiency	R	N	-
Prerequisite 3	Minimum Building Water Efficiency	R	N	-
Prerequisite 4	Construction Activity Pollution Prevention	R	S	Q





LEED Neighborhood Development Green Infrastructure & Buildings

31 points Max.	Credit Categories	Stormwater Impact		
Credit 1	LEED Certified Green Building	5	M	V
Credit 2	Building Energy Efficiency	1	N	-
Credit 3	Water Efficient Landscaping	1	S	QV
Credit 4	Existing Building Reuse	2	N	-
Credit 5	Historic Building Preservation and Adaptive Use	1	N	-
Credit 6	Minimize Site Disturbance During Construction	1	M	Q
Credit 7	Stormwater Management	4	S	QV
Credit 8	Heat Island Reduction	1	S	QV
Credit 9	Solar Orientation	1	N	-
Credit 10	On-site Renewable Energy Sources	1	N	-
Credit 11	District Heating & Cooling	1	N	-
Credit 12	Infrastructure Energy Efficiency	1	N	-
Credit 13	Wastewater Management	3	M	VQ
Credit 14	Recycled Content in Infrastructure	1	N	-
Credit 15	Comprehensive Waste Management	1	M	Q
Credit 16	Light Pollution Reduction	1	N	-

Green Infrastructure Examples



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Green Infrastructure Examples



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Green Infrastructure Examples



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LEED Neighborhood Development Innovation & Design Process

5 points Max.	Credit Categories	Stormwater Impact		
Credit 1	Innovation in Design (1)	1	?	-
Credit 1.2	Innovation in Design (2)	1	?	-
Credit 1.3	Innovation in Design (3)	1	?	-
Credit 1.4	Innovation in Design (4)	1	?	-
Credit 1.5	Innovation in Design (5)	1	?	-
Credit 2	LEED Accredited Professional	1	N	-





LEED Neighborhood Development Summary of Stormwater Impact

	Significant S	Minor M	Total Available Credits
Smart Location...	6	10	30
Neighborhood...	7	20	39
Green Infrastructure....	6	10	31
	19	40	100



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THE SUSTAINABLE SITES INITIATIVE™



GUIDELINES AND PERFORMANCE BENCHMARKS

DRAFT 2008

American Society of Landscape Architects

Lady Bird Johnson Wildflower Center, University of Texas at Austin

United States Botanic Garden

5

ECOSYSTEM SERVICES MATRIX

- ☒ Credits or prerequisites that may achieve the selected ecosystem service
- ☐ Credits or prerequisites that have little or no chance of achieving the selected ecosystem service

PREREQUISITES AND CREDITS		ECOSYSTEM SERVICES									
1 SITE SELECTION Select locations to preserve existing resources and repair damaged systems		GLOBAL CLIMATE REGULATION	LOCAL CLIMATE REGULATION	AIR AND WATER CLEANSING	WATER SUPPLY AND REGULATION	EROSION AND SEDIMENT CONTROL	HAZARD MITIGATION	POLLINATION	HABITAT FUNCTIONS	WASTE DECOMPOSITION AND TREATMENT	HUMAN HEALTH AND WELL-BEING BENEFITS
1.1 Prerequisite	Preserve threatened or endangered species habitat										
1.2 Prerequisite	Protect and restore floodplain functions of riparian and coastal zones										
1.3 Prerequisite	Limit disturbance of prime farmland soils, unique soils, and soils of statewide importance										
1.4 Credit	Select brownfields or greyfields for redevelopment										
2 PRE-DESIGN ASSESSMENT AND PLANNING Plan for sustainability from the onset of the project		GLOBAL CLIMATE REGULATION	LOCAL CLIMATE REGULATION	AIR AND WATER CLEANSING	WATER SUPPLY AND REGULATION	EROSION AND SEDIMENT CONTROL	HAZARD MITIGATION	POLLINATION	HABITAT FUNCTIONS	WASTE DECOMPOSITION AND TREATMENT	HUMAN HEALTH AND WELL-BEING BENEFITS
2.1 Prerequisite	Conduct a pre-design site assessment										
2.2 Prerequisite	Use an integrated design process										
2.3 Prerequisite	Develop a program plan with site performance goals										
2.4 Credit	Engage users and other stakeholders in meaningful participation in site design										
3 SITE DESIGN—ECOLOGICAL COMPONENTS Protect and restore site processes and systems		GLOBAL CLIMATE REGULATION	LOCAL CLIMATE REGULATION	AIR AND WATER CLEANSING	WATER SUPPLY AND REGULATION	EROSION AND SEDIMENT CONTROL	HAZARD MITIGATION	POLLINATION	HABITAT FUNCTIONS	WASTE DECOMPOSITION AND TREATMENT	HUMAN HEALTH AND WELL-BEING BENEFITS
3.1 Prerequisite	Control and manage invasive species										
3.2 Prerequisite	Use appropriate, non-invasive plants										
3.3 Prerequisite	Preserve special status trees										
3.4 Prerequisite	Reduce potable water consumption for irrigation										
3.5 Credit	Minimize or eliminate potable water consumption for irrigation										
3.6 Credit	Preserve and restore plant biomass on-site										
3.7 Credit	Minimize building heating and cooling requirements with vegetation										
3.8 Credit	Reduce urban heat island effects										
3.9 Credit	Promote a sense of place with native vegetation										
3.10 Credit	Preserve and restore native wildlife habitat										
3.11 Credit	Protect and restore riparian and wetland buffers										

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PREREQUISITES AND CREDITS

1 SITE SELECTION

Select locations to preserve existing resources and repair damaged systems

- 1.1 Prerequisite Preserve threatened or endangered species habitat
- 1.2 Prerequisite Protect and restore floodplain functions of riparian and coastal zones
- 1.3 Prerequisite Limit disturbance of prime farmland soils, unique soils, and soils of statewide importance
- 1.4 Credit Select brownfields or greyfields for redevelopment

2 PRE-DESIGN ASSESSMENT AND PLANNING

Plan for sustainability from the onset of the project

- 2.1 Prerequisite Conduct a pre-design site assessment
- 2.2 Prerequisite Use an integrated design process
- 2.3 Prerequisite Develop a program plan with site performance goals
- 2.4 Credit Engage users and other stakeholders in meaningful participation in site design

3 SITE DESIGN—ECOLOGICAL COMPONENTS

Protect and restore site processes and systems

- 3.1 Prerequisite Control and manage invasive species
- 3.2 Prerequisite Use appropriate, non-invasive plants
- 3.3 Prerequisite Preserve special status trees
- 3.4 Prerequisite Reduce potable water consumption for irrigation



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PREREQUISITES AND CREDITS		ECOSYSTEM SERVICES									
3 SITE DESIGN—ECOLOGICAL COMPONENTS (continued) Protect and restore site processes and systems		GLOBAL CLIMATE REGULATION	LOCAL CLIMATE REGULATION	AIR AND WATER CLEANSING	WATER SUPPLY AND REGULATION	EROSION AND SEDIMENT CONTROL	HAZARD MITIGATION	POLLINATION	HABITAT FUNCTIONS	WASTE DECOMPOSITION AND TREATMENT	HUMAN HEALTH AND WELL-BEING BENEFITS
3.12 Credit	Repair or restore damaged or lost streams, wetlands, and coastal habitats										
3.13 Credit	Preserve existing healthy soils										
3.14 Credit	Preserve existing topography										
3.15 Credit	Restore soils disturbed by previous development										
3.16 Credit	Manage water on-site										
3.17 Credit	Cleanse water on-site										
3.18 Credit	Eliminate potable water use in ornamental or stormwater features										
3.19 Credit	Minimize use of potable water in water features designed for full human contact										
3.20 Credit	Mitigate potential wildfire risks										
4 SITE DESIGN—HUMAN HEALTH COMPONENTS Build strong communities and a sense of stewardship											
4.1 Credit	Promote equitable site design, construction, and use										
4.2 Credit	Promote sustainability awareness and education										
4.3 Credit	Provide for optimum site accessibility, safety, and wayfinding										
4.4 Credit	Provide views of the natural environment to building occupants										
4.5 Credit	Provide opportunities for outdoor physical activity										
4.6 Credit	Connect site to surrounding resources, amenities, and services										
4.7 Credit	Provide outdoor spaces for mental restoration										
4.8 Credit	Provide outdoor spaces for social interaction										
4.9 Credit	Design stormwater management features to be a landscape amenity										
4.10 Credit	Prevent and abate sensory stress										
4.11 Credit	Protect and promote unique cultural and historical site attributes										

CONTINUED ON PAGE 40

PREREQUISITES AND CREDITS

3 SITE DESIGN—ECOLOGICAL COMPONENTS (continued)
Protect and restore site processes and systems

3.12 Credit	Repair or restore damaged or lost streams, wetlands, and coastal habitats
3.13 Credit	Preserve existing healthy soils
3.14 Credit	Preserve existing topography
3.15 Credit	Restore soils disturbed by previous development
3.16 Credit	Manage water on-site
3.17 Credit	Cleanse water on-site
3.18 Credit	Eliminate potable water use in ornamental or stormwater features
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- Credits or prerequisites that have little or no chance of achieving the selected ecosystem service

PREREQUISITES AND CREDITS		ECOSYSTEM SERVICES									
5 SITE DESIGN—MATERIALS SELECTION Reuse/recycle existing materials and support sustainable production practices		GLOBAL CLIMATE REGULATION	LOCAL CLIMATE REGULATION	AIR AND WATER CLEANSING	WATER SUPPLY AND REGULATION	EROSION AND SEDIMENT CONTROL	HAZARD MITIGATION	POLLUTION	HABITAT FUNCTIONS	WASTE DECOMPOSITION AND TREATMENT	HUMAN HEALTH AND WELL-BEING BENEFITS
5.1 Prerequisite	Eliminate use of lumber from threatened tree species										
5.2 Credit	Support sustainable practices in plant production										
5.3 Credit	Support sustainable practices in materials manufacturing										
5.4 Credit	Reuse on-site structures, hardscape, and landscape amenities										
5.5 Credit	Use salvaged and recycled content materials										
5.6 Credit	Use certified wood										
5.7 Credit	Use products designed for reuse and recycling										
5.8 Credit	Use adhesives, sealants, paints, and coatings with reduced VOC emissions										
5.9 Credit	Conduct a life cycle assessment										
6 CONSTRUCTION Minimize effects of construction-related activities											
6.1 Prerequisite	Create a soils management plan										
6.2 Prerequisite	Restore soils disturbed during construction										
6.3 Credit	Achieve a carbon-neutral site										
6.4 Credit	Divert construction and demolition materials from disposal										
6.5 Credit	Control and retain construction pollutants										
6.6 Credit	Use excess vegetation, rocks, and soil generated during construction										
7 OPERATIONS AND MAINTENANCE Maintain the site for long-term sustainability											
7.1 Prerequisite	Plan for sustainable landscape maintenance										
7.2 Credit	Minimize exposure to localized air pollutants										
7.3 Credit	Recycle organic matter generated during site operations and maintenance										
7.4 Credit	Provide for storage and collection of recyclables										
7.5 Credit	Use renewable sources for site outdoor electricity										

PREREQUISITES AND CREDITS

5 SITE DESIGN—MATERIALS SELECTION

Reuse/recycle existing materials and support sustainable production practices

5.1 Prerequisite Eliminate use of lumber from threatened tree species

5.2 Credit Support sustainable practices in plant production

5.3 Credit Support sustainable practices in materials manufacturing

5.4 Credit Reuse on-site structures, hardscape, and landscape amenities

5.5 Credit Use salvaged and recycled content materials

5.6 Credit Use certified wood

5.7 Credit Use products designed for reuse and recycling

5.8 Credit Use adhesives, sealants, paints, and coatings with reduced VOC emissions

5.9 Credit Conduct a life cycle assessment

6 CONSTRUCTION

Minimize effects of construction-related activities

6.1 Prerequisite Create a soils management plan

6.2 Prerequisite Restore soils disturbed during construction

6.3 Credit Achieve a carbon-neutral site

6.4 Credit Divert construction and demolition materials from disposal

6.5 Credit Control and retain construction pollutants

6.6 Credit Use excess vegetation, rocks, and soil generated during construction

7 OPERATIONS AND MAINTENANCE

Maintain the site for long-term sustainability

7.1 Prerequisite Plan for sustainable landscape maintenance

7.2 Credit Minimize exposure to localized air pollutants

7.3 Credit Recycle organic matter generated during site operations and maintenance

7.4 Credit Provide for storage and collection of recyclables

7.5 Credit Use renewable sources for site outdoor electricity



Federal

- American Reinvestment & Recovery Act of 2009
 - <http://appropriations.house.gov/pdf/PressSummary02-13-09.pdf>
 - http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.txt.pdf
 - <http://www.recovery.gov>
- US EPA
 - <http://www.epa.gov/efinpage/publications/GFT2008.pdf>
 - <http://www.epa.gov/water/funding.html>
 - <http://www.epa.gov/owow/funding.html>



State

- Department of Commerce & Economic Opportunity
Community Development Assistance Program (CDAP)
 - http://www.illinoisbiz.biz/dceo/Bureaus/Community_Development/Grants/CDAP.htm
- Partners for Conservation Conservation 2000 Program
 - <http://dnr.state.il.us/orep/pfc/>





Helpful Resources

- Green Infrastructure Policies
 - <http://efpub.epa.gov/npdes/greeninfrastructuretechnology.cfm>
- Municipal Handbook
 - <http://efpub.epa.gov/npdes/munichandbook.cfm>
- US Green Building Council National and Chicago
 - <http://www.usgbc.org>
 - <http://www.usgbc-chicago.org>



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Other Helpful Resources

- Federal Network for Sustainability
 - www.federalsustainability.org
- SustainLane
 - www.sustainlane.com
- Sustainable Sites Initiatives
 - www.sustainableites.org
- Water Environment Federation
 - www.wef.org
- World Business Council for Sustainable Development
 - www.wbcsd.org



Thank You



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