

2015

# UMass Amherst Campus Green Building Resources

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# UMass Amherst Campus Green Building Resources

# Presentation Overview

1. Sustainability Timeline and Commitments
2. Overview of Green Buildings
  - LEED
  - LEED Certified Facilities
  - Public Resources
3. Overview of LEED Staff Resources
  - LEED Scorecard
  - Green Building Guidelines and related documents
  - Energy Modeling Guidelines
  - Education Credits
  - Post-Occupancy
  - LEED v4
4. Discussion and Questions

# UMass Amherst Sustainability Timeline

2004-07

- **A&F Bulletin – MA LEED Plus (2006)**
- Design Guidelines with Responsible Use of Energy & Natural Resources (2004)
- **EO 484 – MA LEED Plus (2007)**
- **President Wilson signs**

Town of Amherst Climate Action Plan 2005

2008-09

- Interim Chancellor Cole creates EPAC
- Eco Rep Program launched
- Campus hires first part-time sustainability coordinator
- **Green Building Guidelines Published**
- **Commitment to certify at LEED Silver or better**

2010 - 11

- 2010 EPAC publishes campus's inaugural Climate Action Plan (CAP)
- **2011 UMass Amherst Achieves STARS Gold Rating – 66 pts.**
- Permaculture garden begins winning awards
- Campus hires full-time sustainability manager

2012 - 13

- **EPAC Publishes CAP 2.0 & becomes Chancellor's Sustainability Committee**
- UMass wins the **White House Champions of Change award**
- 300+ Sustainability Courses/11 Programs
- Sustainability Innovation & Engagement Fund
- Chancellor commits to Real Food Challenge

2014 - Today

- **UMass Achieves STARS v1.2 Gold -71 (top 8)**
- GHG emission reporting expands to employee travel & commuting
- **Princeton Review Honor Roll**
- Master Plan Sustainability Chapter
- Energy Master Plan and Solar PPA to procure renewables on campus

# MA A&F Green Building Commitments - 2006

- A&F Bulletin 12 – Established Minimum Standards for Sustainable Design and Construction of New Buildings and Major Renovations by Executive Agencies 8/11/2006
- Major renovation projects are defined as those projects that include a complete overhaul of a significant portion of the original structure and where the cost of the renovation is greater than 50% of the assessed value of the building
- Higher up-front cost shall not preclude construction unless costs cannot be justified with a payback of 10 years or less

# MA LEED Plus Standard - 2006

- For projects over 20,000 GSF obtain LEED Certification Plus following specific credits within LEED-NC v2.2
  - Energy performance exceeding MA Energy Code requirements by at least %20 (EA c1)
  - Third party building commissioning (EA c1, c3)
  - At least one of the four Smart Growth criteria
    - SS c2 - construct or renovate on a previous developed site or within a ½ mile of ten basic services and a residential neighborhood with average density of 10 units/acre and with pedestrian access between buildings and services
    - SS 3 – construct or renovate on a brownfield site
    - SS 4.1 – construct or renovate on a site with public transportation within ½ mile
    - MR c1.1 – maintain 75 percent of existing building structure and envelope
  - Two irrigation and building water efficiency criteria
    - WE c1.1 – reduce potable water consumption for irrigation by 50 percent
    - WE c3.1 Incorporate strategies that will conserve %20 of building water use

# Executive Order 484 (facility requirements) - 2007

- New construction & major renovation projects larger than 20,000 GSF (LEED Plus)
  - LEED + 20% better energy performance (LEED-NC v2.2)
  - 50% reduction in irrigation water consumption and 20% reduction in building water use
  - Building Commissioning
  - Smart Growth criteria
- Projects smaller than 20,000 GSF
  - LEED Plus or 20% better energy performance or New Buildings Institute's Advanced Buildings Benchmark prescriptive approach
- Major renovation projects definition: complete overhaul of a significant portion of the original structure where the cost of the renovation is greater than 50% of the assessed value of the building
- Higher first costs justified with LCCA of 10 year payback or less

# ACUPCC

- UMass President Jack Wilson signed the American College and University President's Climate Commitment in 2007
- Climate Action Plan approved in 2010 and updated in 2012
- Identifies strategies to help the campus reach carbon neutrality by 2050
- Campus achieved Second Nature Climate Leadership Award 2014

<http://www.umass.edu/sustainability/about/climate-action-plan>



# UMass Amherst Commitment

- Obtain LEED Silver certification or better for all new construction and major renovation projects (2008)

## GB GUIDELINES

### GOING BEYOND

LEED is one tool in the quest for a more sustainable built environment. The GBC is using LEED to help steer sustainable design and building on campus. However, the GBC is aware that LEED is a limited approach to sustainable building. For this reason, we continue to look beyond LEED, towards more integrative and holistic environmental design.



# Green Building Subcommittee Charge

- The Green Building Committee (GBC) is a cross disciplinary group of faculty, staff, and students committed to building a more sustainable campus. Through research and advocacy, the GBC addresses how new buildings are designed and constructed, campus landscape is maintained, and existing buildings are operated:
- <http://www.umass.edu/sustainability/get-involved/green-building-subcommittee>
- The committee is currently chaired by Ted Mendoza of Design & Construction Management

# USGBC – LEED Rating Systems

There are five rating systems that address multiple project types:



**Building Design  
and Construction**



**Interior Design  
and Construction**



**Building Operations  
and Maintenance**



**Neighborhood  
Development**



**Homes**

- New Construction
- Core & Shell
- Schools
- Retail
- Hospitality
- Data Centers
- Warehouses & Distribution Centers
- Healthcare

- Commercial Interiors
- Retail
- Hospitality

- Existing Buildings
- Schools
- Retail
- Hospitality
- Data Centers
- Warehouses & Distribution Centers

- Plan
- Built Project

- Homes
- Multifamily Lowrise
- Multifamily Midrise



# UMass LEED Projects - Completed

Building Name	Certification Date	Project Manager	LEED Certification	LEED GSF
George N. Parks Minuteman Marching Band Building	1-Apr-2012	Burt Ewart	V2.2 LEED Gold	21,424
UMass Police Station	1-May-2012	Joseph Balzano	LEED V2.2 Gold	27,250
CNS Greenhouses	28-Jan-2013	Joseph Balzano	LEED V3 Gold	15,555
Hampshire Dining Commons	1-Jul-2014	Burt Ewart	LEED V3 Gold	46,001
McGuirk Stadium & Football Champions Center	1-Oct-2014	Joseph Balzano	LEED V3 Gold	52,960
Life Sciences Laboratories	July-2015	Jeff Quackenbush	LEED Gold	231,006
Commonwealth Honors College Residential Complex	23-Oct-2015	Andy Soles	LEED v2009 Silver	512,485

**394,196 square feet LEED certified Gold and 512,485 square feet certified Silver - or 7% of all campus gross square feet, supporting 2,313 occupants**

# UMass LEED Projects – in Progress

Building Name	Certification Date	Project Manager	LEED Certification	LEED GSF
Paige Laboratory Renovations	Occupancy 6/1/2014/ LEED Pending	Stephen Lobik	Targeting LEED Silver	26,500
Lincoln Campus Center Dining Renovations	Occupancy 8/1/2014/ LEED Pending	Stephen Lobik	Targeting LEED Silver	34,000
Integrative Learning Center	Occupancy 9/1/2014/ LEED Pending	Jeff Quackenbush	Targeting LEED Gold	172,970
Champions Center	In Construction Phase	Cleve Carrens	Targeting LEED Gold	56,500
Chapel Renovation	In Construction Phase	Jeff Quackenbush	Targeting LEED Silver	13,296
Furcolo School of Education Renovations	In Construction Phase	Burt Ewart	Targeting LEED Silver	97,254
Design Building	In Design Phase	Burt Ewart	Targeting LEED Silver	117,864
Physical Sciences Building	In Design Phase	Joseph Balzano	Targeting LEED Silver	95,203
South College Academic Facility	In Design Phase	Henry Merriman	Targeting LEED Silver	96,800

**710,387 additional square feet LEED certified Silver or Gold over next 2 – 3 years**

# Public Resources: Campus Planning Website

## Services Quick Links

[Space Request](#)

[Tririga](#)

[Sharepoint Access](#)

[Master Plan Explorer](#)

[Campus Development Guidelines](#)

[Campus Planning Scholarworks Archive](#)

[Map Gallery](#)

[Idea Collector](#)

[Sustainability Explorer](#)

[Green Building Resources](#)



UMassAmherst Links Search UMass

# Campus Planning

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Space Requests and Campus Space Planning

Building  
Facility Program Development and Feasibility Analysis

Campus  
Comprehensive Planning for the Campus Environment

<http://www.umass.edu/cp/>

# We create campus.

# Public Resources: Design & Construction Management Website

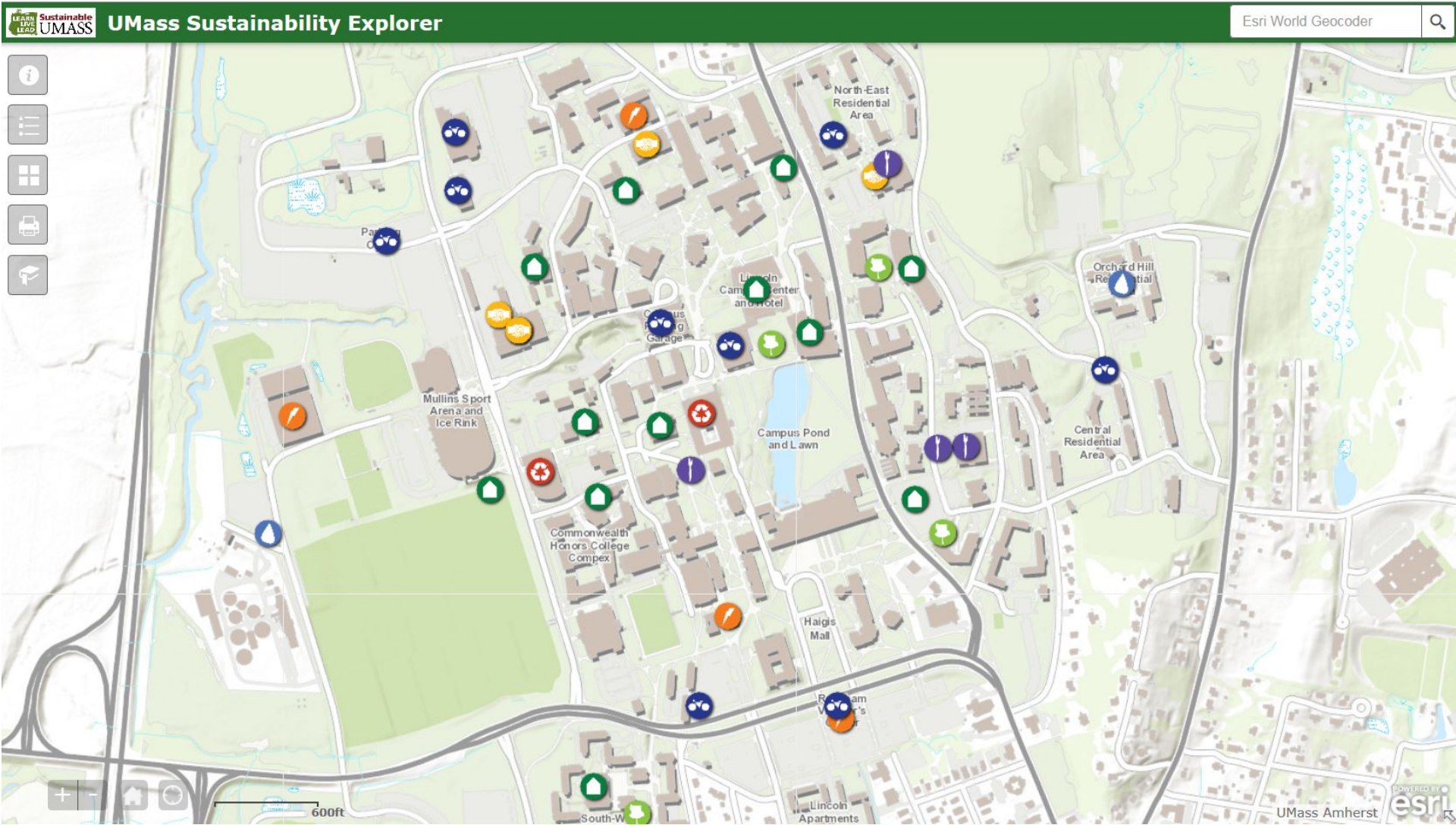


**Building tomorrow today.**

<http://www.umass.edu/dcm/>



# Public Resources: Sustainability Explorer



# Public Resources: ScholarWorks@UMassAmherst

[Home](#) > [CP](#)

Facilities & Campus Services 

## Campus Planning

Campus planning is dedicated to supporting the overall mission of the University of Massachusetts by guiding the physical development of its flagship campus through the creation, maintenance and administration of a campus master planning process that includes systems planning and programming, facilities planning and programming and space and asset management. This is accomplished through communication and collaboration with the campus community supported by the use of dynamic and innovative planning processes and tools to produce creative, comprehensive and feasible solutions.

ScholarWorks supports Campus Planning by hosting documents of physical master plans, community presentations, maps, data and reports that underpin planning efforts and engage our community in research and scholarship that supports a culture of planning.

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# CP and DCM Resources for LEED Support

- USGBC Membership and USGBC Resources
  - Staff
  - Faculty
  - Student employees
  - Valid @umass.edu email addresses
  - Contact [lpavlova@cp.umass.edu](mailto:lpavlova@cp.umass.edu) for membership
  
- Additional Staff Resources
  - E-Builder Project Management Platform

# LEED v2009 Sunsets in 2016



**LEED-NC V2009**

**LEED – CI RETAIL V2009**

**Registration close date for all LEED 2009 rating systems is October 31, 2016  
and the sunset date for project certification is June 20,2021**

# Campus LEED Guidelines and Resources - GOALS

- Reduce energy consumption
- Prioritize sustainability strategies on campus to protect the natural environment
- Promote interconnected campus community
- Maximize durability and control maintenance costs
- Control storm water runoff
- Support academic research
- Aid UMA PMs in understanding LEED rating system
- Communicate campus environmental information to outside design teams
- Facilitate efficient LEED credit achievement
- Extend sustainability beyond LEED projects

# e-Builder LEED Resources

Documents for Campus, LEED Resources - Pavlova-Gillham, Ludmilla - X1110000A001: **1.** 0 Files Checked Out For Editing

**Folders**

- Expand All | Collapse All | Refresh All
- 04 Design [0]
- 05 Construction [0]
- 06 Permits-Notices-Haz Mat [0]
- 07 Commissioning [0]
- 08 Photographs [0]
- 09 Proj Closeout [0]
- 2.** **10 LEED-Sustainability [149]**
  - Building Energy Explorer [5]
  - Green Building Case Studies [2]
  - LEED Campus Boundaries [1]
  - LEED Certified Building Data [7]
  - LEED Certified Building Scorecards [1]
  - LEED Credit Library [26]
  - LEED Education [48]
  - LEED Rating Systems [36]
  - LEED Shared Resources [13]
  - Presentations [1]
- 11 - FF&E [0]
- 12 - Moves [0]

**Documents \ 10 LEED-Sustainability**  Show File Description

Upload | Properties | Create Folder | Subscriptions | Copy To Clipboard: Private URL

<input type="checkbox"/>	Name ▲	Date Uploaded
<input type="checkbox"/>	<b>ENERGY DESIGN and MODELING GUIDELINES.pdf</b> (version 1) Download (179.0KB)   Redline   Stamp   Compare With   Send   Properties	05.21.15 03:50PM
<input type="checkbox"/>	<b>gbGuidelines_2013.pdf</b> (version 1) Download (20.0MB)   Redline   Stamp   Compare With   Send   Properties	05.21.15 03:47PM
<input type="checkbox"/>	<b>MV Coord UMA-ProjectTeams.pdf</b> (version 1) Download (116.8KB)   Redline   Stamp   Compare With   Send   Properties	05.21.15 03:51PM
<input type="checkbox"/>	<b>UMASS M&amp;V Guide and Template Plan.pdf</b> (version 1) Download (1.3MB)   Redline   Stamp   Compare With   Send   Properties	05.21.15 03:47PM
<input type="checkbox"/>	<b>UMass-LEED-Buildings-Tracker.xlsx</b> (version 3) Checked out by Ludmilla Pavlova-Gillham Download (14.9KB)   Redline   Compare With   Send   Properties	04.16.15 02:06PM

1 - 5 of 5 documents

**\* Main folder contains all publically available guideline documents and templates**

**Folders**

Expand All | Collapse All | Refresh All

- 2. 10 LEED-Sustainability [149]
  - Building Energy Explorer [5]
  - Green Building Case Studies [2]
  - LEED Campus Boundaries [1]
  - LEED Certified Building Data [7]
  - LEED Certified Building Scorecards [5]
  - \*3. LEED Credit Library [26]
    - ID-Green Cleaning Policy [5]
    - IEQ-Occupant Thermal Comfort Survey [8]
    - IEQ-Tobacco Free Policy [1]
    - MR-UMass Recycling Policy [3]
    - SS-Alternative Transportation [8]
    - SS-Community Connectivity [1]
  - LEED Education [48]
  - LEED Rating Systems [36]
  - LEED Shared Resources [13]
  - Presentations [1]

**Documents \ 10 LEED-Sustainability \ LEED Credit Library \ ID-Green Cleaning Policy**

Upload | Properties | Create Folder | Subscriptions | Copy To Clipboard: Private URL

		Name ▲	Date
Delete   Move   Copy   Download   Check Out   Send   Fill Out Form   Compare   Pa			
	<input type="checkbox"/>	<b>1 - committmentLetter_dSullivan.docx</b> (version 1)	03.06
Download (224.0KB)   Redline   Compare With   Send   Properties   Edit			
	<input type="checkbox"/>	<b>2 -green cleaning_letter of intent .docx</b> (version 1)	03.06
Download (231.2KB)   Redline   Compare With   Send   Properties   Edit			
	<input type="checkbox"/>	<b>3 - Supplemental Green Cleaning Credit Documentation .docx</b> (version 1)	03.06
Download (110.1KB)   Redline   Compare With   Send   Properties   Edit			
	<input type="checkbox"/>	<b>IDc1.5_Green Cleaning_Training Manual.pdf.pdf</b> (version 1)	03.06
Download (315.9KB)   Redline   Stamp   Compare With   Send   Properties			
	<input type="checkbox"/>	<b>IDc1.5_Green Cleaning_UMA Policy.pdf.pdf</b> (version 1)	03.06
Download (144.3KB)   Redline   Stamp   Compare With   Send   Properties			

\* Select subfolder (LEED Credit Library highlighted as example) under LEED Sustainability to retrieve files/templates etc.

# LEED v2009 Scorecard

## LEED for New Construction and Major Renovations (v2009)

SUSTAINABLE SITES		POSSIBLE: 26
SSp1	Construction activity pollution prevention	REQUIRED
SSc1	Site selection	1
SSc2	Development density and community connectivity	5
SSc3	Brownfield redevelopment	1
SSc4.1	Alternative transportation - public transportation access	6
SSc4.2	Alternative transportation - bicycle storage and changing rooms	1
SSc4.3	Alternative transportation - low-emitting and fuel-efficient vehicles	3
SSc4.4	Alternative transportation - parking capacity	2
SSc5.1	Site development - protect or restore habitat	1
SSc5.2	Site development - maximize open space	1
SSc6.1	Stormwater design - quantity control	1
SSc6.2	Stormwater design - quality control	1
SSc7.1	Heat island effect - nonroof	1
SSc7.2	Heat island effect - roof	1
SSc8	Light pollution reduction	1

WATER EFFICIENCY		POSSIBLE: 10
WEp1	Water use reduction	REQUIRED
WEc1	Water efficient landscaping	4
WEc2	Innovative wastewater technologies	2
WEc3	Water use reduction	4

ENERGY & ATMOSPHERE		POSSIBLE: 35
EAp1	Fundamental commissioning of building energy systems	REQUIRED
EAp2	Minimum energy performance	REQUIRED
EAp3	Fundamental refrigerant management	REQUIRED
EAc1	Optimize energy performance	19
EAc2	On-site renewable energy	7
EAc3	Enhanced commissioning	2
EAc4	Enhanced refrigerant management	2
EAc5	Measurement and verification	3
EAc6	Green power	2

MATERIAL & RESOURCES		POSSIBLE: 14
MRp1	Storage and collection of recyclables	REQUIRED
MRC1.1	Building reuse - maintain existing walls, floors and roof	3
MRC1.2	Building reuse - maintain interior nonstructural elements	1
MRC2	Construction waste management	2
MRC3	Materials reuse	2
MRC4	Recycled content	2

MATERIAL & RESOURCES		CONTINUED
MRC5	Regional materials	2
MRC6	Rapidly renewable materials	1
MRC7	Certified wood	1

INDOOR ENVIRONMENTAL QUALITY		POSSIBLE: 15
EQp1	Minimum IAQ performance	REQUIRED
EQp2	Environmental Tobacco Smoke (ETS) control	REQUIRED
EQc1	Outdoor air delivery monitoring	1
EQc2	Increased ventilation	1
EQc3.1	Construction IAQ management plan - during construction	1
EQc3.2	Construction IAQ management plan - before occupancy	1
EQc4.1	Low-emitting materials - adhesives and sealants	1
EQc4.2	Low-emitting materials - paints and coatings	1
EQc4.3	Low-emitting materials - flooring systems	1
EQc4.4	Low-emitting materials - composite wood and agrifiber products	1
EQc5	Indoor chemical and pollutant source control	1
EQc6.1	Controllability of systems - lighting	1
EQc6.2	Controllability of systems - thermal comfort	1
EQc7.1	Thermal comfort - design	1
EQc7.2	Thermal comfort - verification	1
EQc8.1	Daylight and views - daylight	1
EQc8.2	Daylight and views - views	1

INNOVATION		POSSIBLE: 6
IDc1	Innovation in design	5
IDc2	LEED Accredited Professional	1

REGIONAL PRIORITY		POSSIBLE: 4
RPC1	Regional priority	4

**TOTAL** **110**

40-49 Points 50-59 Points 60-79 Points 80+ Points  
 CERTIFIED SILVER GOLD PLATINUM



# LEED v2009 Checklist-

## Categories/Credits UMass Typically Develops



### LEED 2009 for New Construction and Major Renovations

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Sustainable Sites</b>	Possible Points: <b>26</b>
--------------------------	--------------------------	--------------------------	--------------------------	----------------------------

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
			Credit 1	Site Selection	1
X			Credit 2	Development Density and Community Connectivity	5
			Credit 3	Brownfield Redevelopment	1
X			Credit 4.1	Alternative Transportation—Public Transportation Access	6
X			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
X			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
X			Credit 4.4	Alternative Transportation—Parking Capacity	2
			Credit 5.1	Site Development—Protect or Restore Habitat	1
X			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

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Water Efficiency</b>	Possible Points: <b>10</b>
--------------------------	--------------------------	--------------------------	-------------------------	----------------------------

Y			Prereq 1	Water Use Reduction—20% Reduction	
X			Credit 1	Water Efficient Landscaping	2 to 4
			Credit 2	Innovative Wastewater Technologies	2
			Credit 3	Water Use Reduction	2 to 4

# LEED v2009 Checklist Continued-

## Categories/Credits UMass Typically Develops

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Indoor Environmental Quality</b>	Possible Points: <b>15</b>
--------------------------	--------------------------	--------------------------	-------------------------------------	----------------------------

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1	Minimum Indoor Air Quality Performance	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 2	Environmental Tobacco Smoke (ETS) Control	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1	Outdoor Air Delivery Monitoring	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2	Increased Ventilation	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.1	Construction IAQ Management Plan—During Construction	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5	Indoor Chemical and Pollutant Source Control	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6.1	Controllability of Systems—Lighting	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6.2	Controllability of Systems—Thermal Comfort	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7.1	Thermal Comfort—Design	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7.2	Thermal Comfort—Verification	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 8.1	Daylight and Views—Daylight	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 8.2	Daylight and Views—Views	1

# LEED v2009 Checklist Continued-

## Categories/Credits UMass Typically Develops

### **Energy and Atmosphere** Possible Points: **35**

Y	Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y	Prereq 2	Minimum Energy Performance	
Y	Prereq 3	Fundamental Refrigerant Management	
	Credit 1	Optimize Energy Performance	1 to 19
X	Credit 2	On-Site Renewable Energy	1 to 7
	Credit 3	Enhanced Commissioning	2
	Credit 4	Enhanced Refrigerant Management	2
X	Credit 5	Measurement and Verification	3
	Credit 6	Green Power	2

### **Innovation and Design Process** Possible Points: **6**

X	Credit 1.1	Innovation in Design: Specific Title	1
X	Credit 1.2	Innovation in Design: Specific Title	1
	Credit 1.3	Innovation in Design: Specific Title	1
	Credit 1.4	Innovation in Design: Specific Title	1
	Credit 1.5	Innovation in Design: Specific Title	1
	Credit 2	LEED Accredited Professional	1

# UMass Amherst Credit Details-

## How we Support our LEED Projects



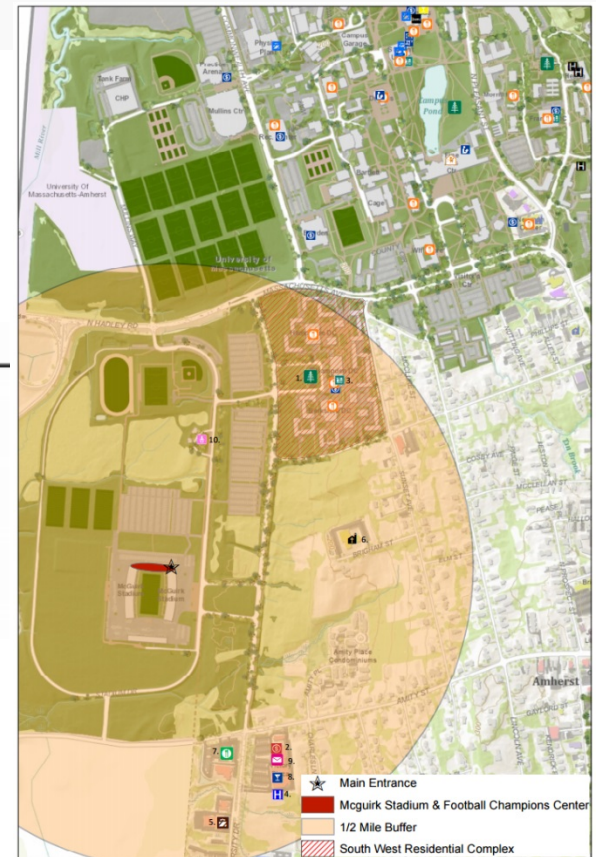
LEED BD+C: New Construction | v3 - LEED 2009

### Development density and community connectivity

SSc2 | Possible 5 points

#### Intent

To channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.



1 in = 512 ft  
**S.S. 2: COMMUNITY CONNECTIVITY**  
 (MCQUIRK STADIUM & FOOTBALL CHAMPIONS CENTER)  
 S. Farzinehadan  
 Campus Planning  
 JULY 2011

Type of Services	Name	Location Building	Address
1 Park	Southwest Residential Area		Southwest Cir
2 Financial	Greenfield Savings Bank		6 University Drive
3 Conv. Grocery	Hampden C-Store	Hampden Dining Hall	132 Southwest Cir
4 Healthcare	Newmarket Dentistry		28 University Drive
5 Retail	Hampshire Bicycle Exchange		65 University Drive
6 Place of Worship	Church of Jesus Christ Latter Day Saints		104 Sunset Avenue/ Brigham Lane
7 Restaurant	Rafters Restaurant		422 Amity Street
8 Restaurant	Amherst Brewing Company		10 University Drive
9 Mail	UPS Store		6 University Drive
10 Day Care Center	University Day Care Center	Toddler House	21 Clubhouse Dr

# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

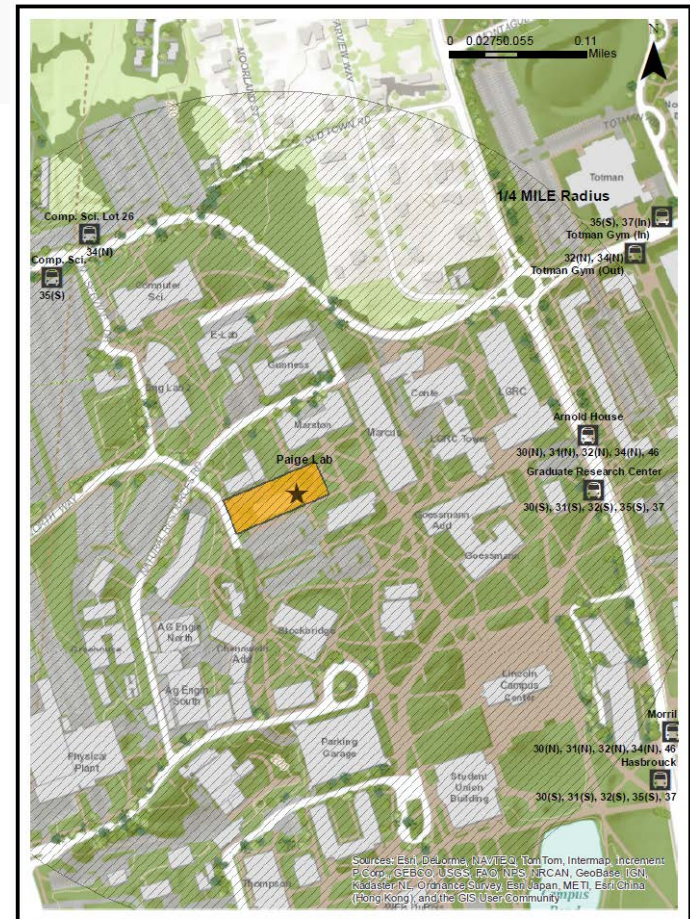
### Alternative transportation - public transportation access

SSc4.1 | Possible 6 points

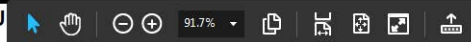
#### Intent

To reduce pollution and land development impacts from automobile use.

- UMass has bus routes throughout the campus. Project's main entrance must be located within  $\frac{1}{4}$  mile walking distance from bus station.
- UMass provides maps showing transport routes, bus stops etc.



SSc41 PU



# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

### Alternative transportation - bicycle storage and changing rooms

SSc4.2 | Possible 1 point

#### Intent

To reduce pollution and land development impacts from automobile use.



- UMass is responsible to confirm peak # of occupants in the area, ascertain whether there is a need for showers and provide documentation explaining whether current infrastructure is sufficient.



# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

### Alternative transportation - low-emitting and fuel-efficient vehicles

SSc4.3 | Possible 3 points

#### Intent

To reduce pollution and land development impacts from automobile use.

- 20% discounted parking permit for green vehicles
- UMass follows EPA's rating for clean vehicle permit qualification and its list for 2015 eligible vehicles



Parking Services  
Memorandum

FROM: Robert Hendry

SUBJECT: UMass Amherst Eligible Clean Vehicle Permit

DATE: Jun 07, 2015

This letter is to confirm the discounted parking permits for all low-emitting and fuel-efficient vehicles in Parking Services of University of Massachusetts Amherst. This discount is a two year discount of 20% off in annual parking permit. This discount is intended to encourage the use of "clean" vehicles and reward those commuters already doing their part to reduce the environmental impact of the automobile.

University of Massachusetts Amherst Parking Services uses the EPA's rating for clean vehicle permit qualification.

<http://www.epa.gov/greenvehicles/documents/420b14005.pdf>  
<http://www.fueleconomy.gov/feg/download.shtml>

All low-emitting, fuel-efficient vehicles, hybrids and electric vehicles that meet the US EPA Certified Smartway Elite vehicle threshold are qualified for this permit discount. Following chart shows the list of 2015 eligible vehicles.

UMass 2015 Clean Vehicle permit eligible			
1	Toyota Prius (all hybrid)	10	Chevrolet Spark EV
2	Honda Accord hybrid/plug in	11	Chevrolet Volt EV
3	Volkswagen Jetta hybrid	12	BMW i3 EV
4	Ford Fusion plug in hybrid	13	Fiat 500e EV
5	Honda Insight hybrid	14	Ford C-Max ev/hybrid
6	Lexus CT200h hybrid	15	Ford Focus electric EV
7	Toyota Camry hybrid	16	Honda Civic hybrid
8	Nissan Leaf EV	17	Honda Fit EV
9	Smartcar fortwo EV	18	Mitsubishi i-MiVE

Robert Hendry  
Commuter Options Program Manager  
Parking Services

Robert Hendry  
Commuter Options Program Manager  
Parking Services  
University of Massachusetts Amherst  
Transportation Services  
51 Forestry Way  
Amherst, MA 01003-9248  
Phone: (413) 545-6585  
Email: [rhendry@umass.edu](mailto:rhendry@umass.edu)

<http://www.epa.gov/greenvehicles/documents/420b14005.pdf>

<http://www.fueleconomy.gov/feg/download.shtml>

# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

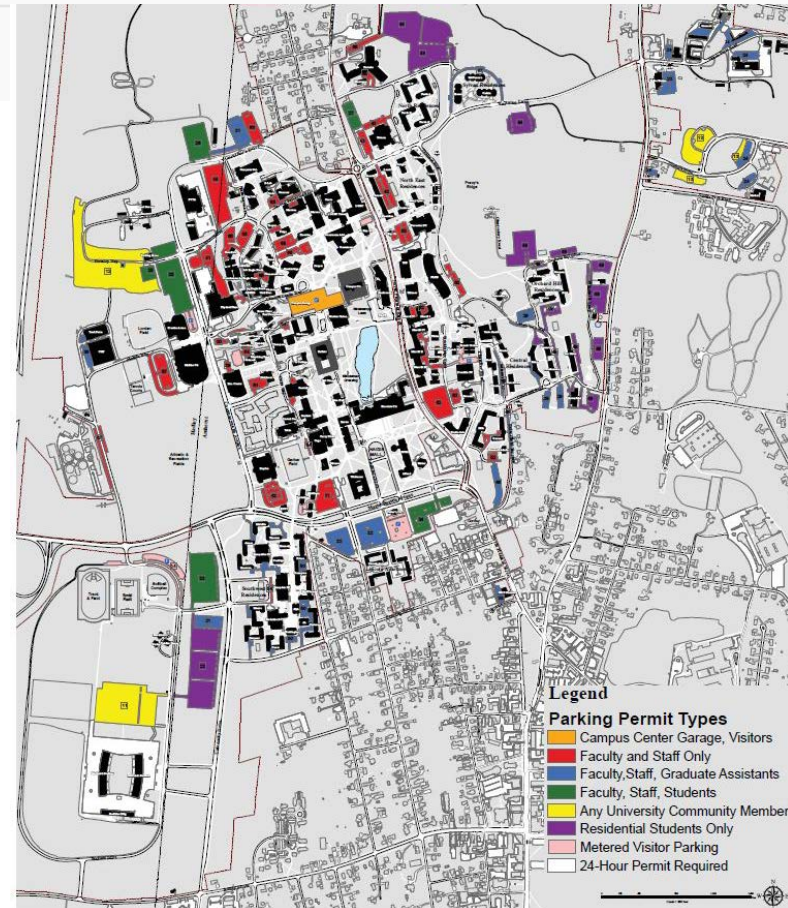
### Alternative transportation - parking capacity

SSc4.4 | Possible 2 points

#### Intent

To reduce pollution and land development impacts from automobile use.

- UMass is not subject to local zoning/parking requirements
- Because of the campus extensive parking resources for faculty, staff, students, vendors and the public, projects generally do not need to provide new parking.
- There is a general desire to eliminate core campus parking lots and only provide accessible/code mandated parking



See Campus-Wide Parking Vision Plan [http://scholarworks.umass.edu/cp\\_masterplans/2/](http://scholarworks.umass.edu/cp_masterplans/2/)



# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

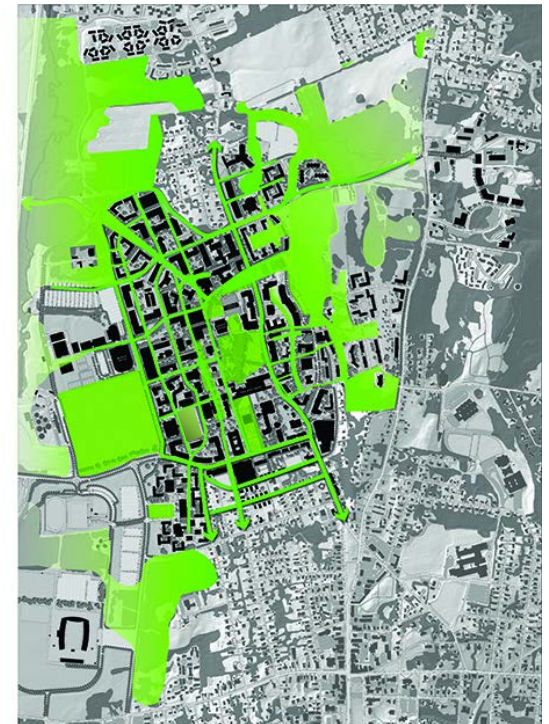
### Site development - maximize open space

SSc5.2 | Possible 1 point

#### Intent

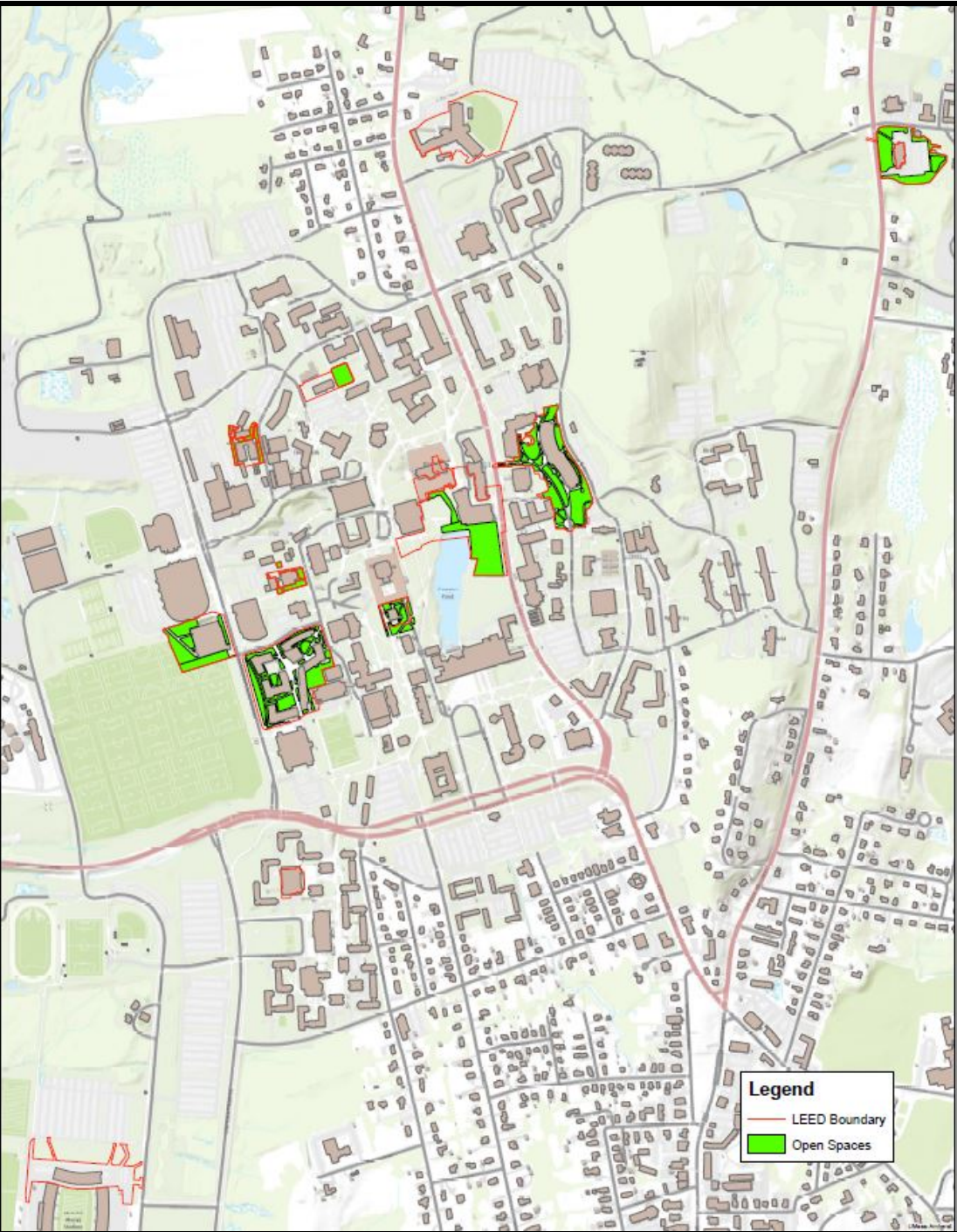
To promote biodiversity by providing a high ratio of open space to development footprint.

- The UMass Master Plan provided a framework for open space development and conservation.
- LEED projects are encouraged to designate open space areas within the LEED boundary if they coincide with the courtyards, pedestrian spines and complete streets outlined in the Campus Master Plan



See Campus Master Plan <http://www.umass.edu/cp/master-plan>

# LEED Impact on our Campus



# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

### Water efficient landscaping

WEc1 | Possible 4 points

#### Intent

To limit or eliminate the use of potable water or other natural surface or subsurface water resources available on or near the project site for landscape irrigation.

- UMass supports the selection of native plant species that do not require irrigation
- Most campus projects do not construct landscape irrigation systems
- However, first year irrigation is required for plant establishment



# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

### Fundamental commissioning of building energy systems

---

EAp1 | Required

#### Intent

To verify that the project's energy-related systems are installed, calibrated and perform according to the owner's project requirements, basis of design and construction documents.

Benefits of commissioning include reduced energy use, lower operating costs, reduced contractor callbacks, better building documentation, improved occupant productivity and verification that the systems perform in accordance with the owner's project requirements.

- UMass participates in the development of the Owner's Project Requirements and Basis of Design (including user requirements, environmental and sustainability goals, energy efficiency goals, IEQ requirements, equipment and system expectations, operation & maintenance requirements and identification of commissioned systems)

# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

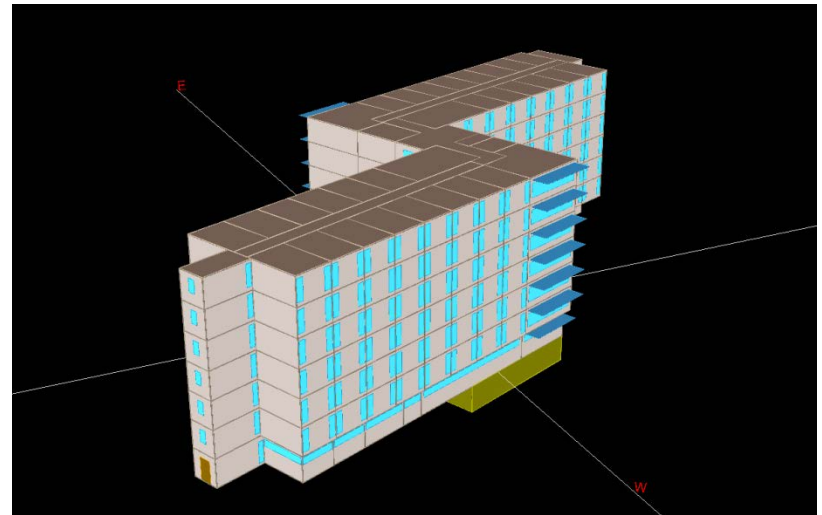
### Minimum energy performance

EAp2 | Required

#### Intent

To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

- UMass supports Project Managers and LEED project teams with specific documents such as Energy Modeling Guidelines, a Building Measurement, Verification and Coordinate Template Plan, and in-house case studies of existing LEED building performance.



See CP Green Building Resources: <http://www.umass.edu/cp/green-building-resources>

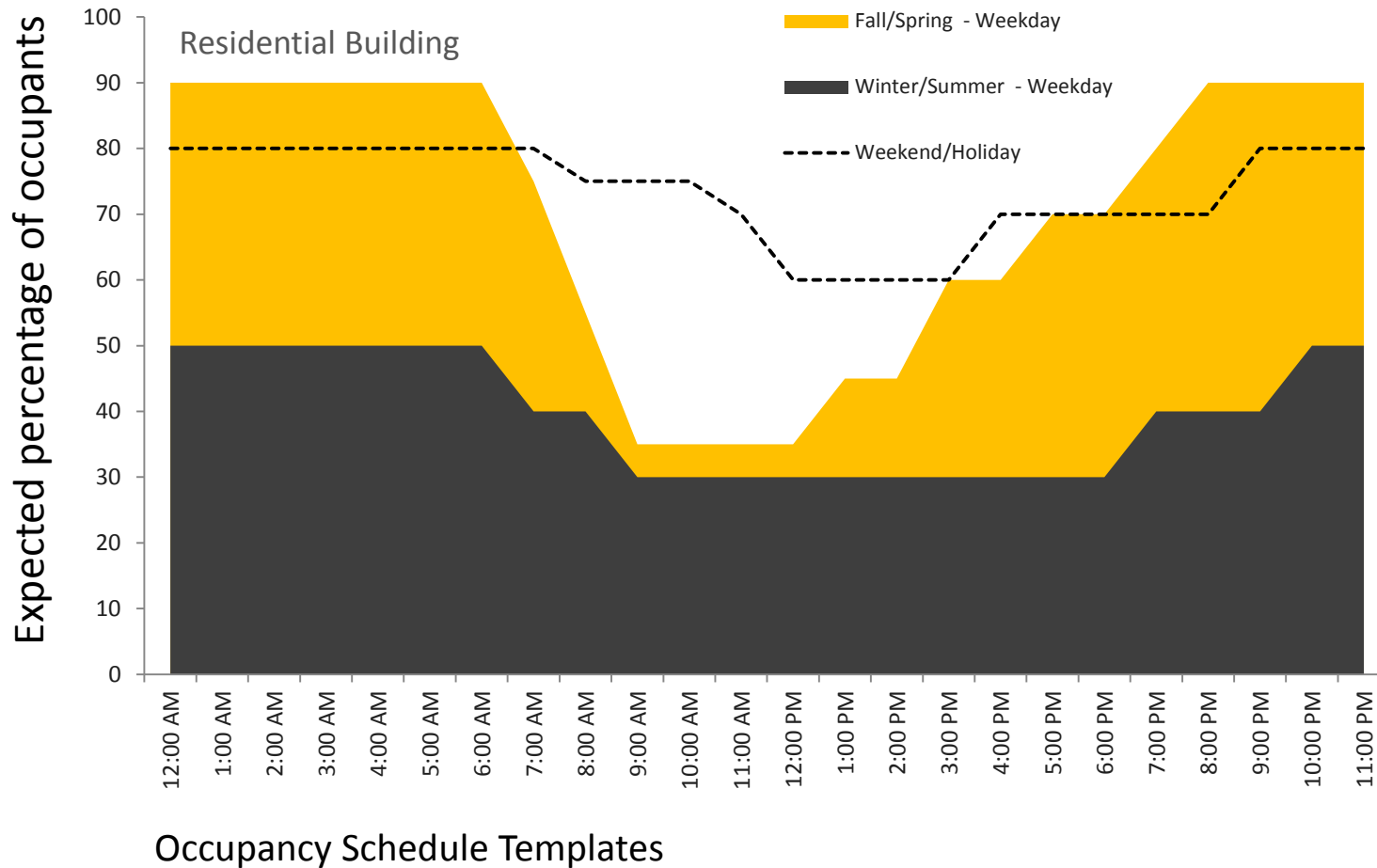
# Energy Design and Modeling Guidelines - Context

- General Information and UMass Intent
- Expectations for Projects' Phases
- CHP General Info
- Seasonal Thermostat Set-Points
- Occupancy Schedule Templates
- Measurement and Verification Process

# Central Heating Plant Basic Information FY2012

<b>Total Fuel</b>		<u>BTU</u>	
	Natural Gas	1,600,000,000,000	
	Oil (ULSD)	22,000,000,000	
	LNG	23,700,000,000	
	<b>Total</b>	<b>1,645,000,000,000</b>	
<b>Total Steam</b>		<u>pounds</u>	<u>BTU</u>
	HRSG	5.08E+08	591,310,000,000
	Boiler 200	1.46E+08	169,460,000,000
	Boiler 300	1.99E+08	207,140,000,000
	Boiler 400	1.26E+08	131,480,000,000
	<b>Total</b>	<b>1.01E+09</b>	<b>1,099,390,000,000</b>
<b>Total Electricity Produced</b>		<u>kWh</u>	<u>BTU</u>
	STG-1	9381421	32,011,000,000
	STG-2	16448341	56,124,000,000
	CT	69522765	237,221,000,000
	<b>Total</b>	<b>95352527</b>	<b>325,356,000,000</b>
<b>Plant Efficiency</b>			<b>0.77</b>

# Sample UMass Occupancy Schedule





# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

### Measurement and verification

EAc5 | Possible 3 points

#### Intent

To provide for the ongoing accountability of building energy consumption over time.

Facilities & Campus Services has created guidelines to complete post-occupancy Measurement & Verification (M+V) to facilitate data collection and better understand real energy use of our campus buildings. Tasks include:

- Data collection, analysis, and presentation to leverage M&V initiatives
- One year (and beyond) evaluation of energy utilization for buildings on campus; for the purpose of optimizing building energy performance, operations and maintenance
- Feedback to Design & Construction project teams on the successes and failures of implemented energy conservation initiatives

See CP Green Building Resources:

<http://www.umass.edu/cp/green-building-resources>



# UMass Amherst Credit Details-

## How we Support our LEED Projects



LEED BD+C: New Construction | v3 - LEED 2009

### Thermal comfort - verification

EQc7.2 | Possible 1 point

#### Intent

To provide for the assessment of building occupant thermal comfort over time.

Campus Planning works with users and facility management staff to develop a thermal comfort survey of employees and a mitigation plan to address significant issues if they surface. A survey generally asks employees to rate indoor environmental quality in the following categories:

- Acoustics
- Thermal Comfort
- Indoor Air Quality
- Lighting
- Cleanliness & Maintenance

UNIVERSITY OF MASSACHUSETTS AMHERST  
FOOTBALL PERFORMANCE CENTER  
THERMAL COMFORT SURVEY

White Sections To Be Filled Out By Occupant		Survey Number
1. Occupant's Room Number		Surveyor's Name
2. Date		Occupant Location in Area (Place an "X" in the approximate place where you most often work)
3. Time		
4. Approximate Outside Temperature °F or °C		
5. Sky Conditions <input type="checkbox"/> Clear <input type="checkbox"/> Mixed (sun and clouds) <input type="checkbox"/> Overcast (cloudy)		
6. Seasonal Conditions <input type="checkbox"/> Winter <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Fall		"INSERT PLAN"
7. Occupant's Clothing Please refer to the attached Table 1. Place a check mark next to the articles of clothing that you are currently wearing as you fill out this sheet. If you are wearing articles of clothing not listed in the table, please enter them into the space provided below. Article: Article:		
8. Occupant Activity Level (Check the one that is most appropriate) 1. <input type="checkbox"/> Reclining 2. <input type="checkbox"/> Reading Seated, Keyboarding or other light physical activity 3. <input type="checkbox"/> Office/School 4. <input type="checkbox"/> Standing, Relaxed 5. <input type="checkbox"/> Light Activity, Standing 6. <input type="checkbox"/> Medium Activity, Standing 7. <input type="checkbox"/> High Activity		Metabolic Rates (met) 1. 0.8 met 2. 1.0 met 3. 1.2 met 4. 1.2 met 5. 1.6 met 6. 2.0 met 7. 3.0 met
9. Equipment (Equipment running in the room adding to or taking away from heat load)		Total Heat Added/Subtracted
Item (computers, copiers, lighting, fans, etc.)	Quantity	
10. General Thermal Comfort 1. <input type="checkbox"/> Hot 2. <input type="checkbox"/> Warm 3. <input type="checkbox"/> Slightly Warm 4. <input type="checkbox"/> Neutral 5. <input type="checkbox"/> Slightly Cool 6. <input type="checkbox"/> Cool 7. <input type="checkbox"/> Cold		Thermal Sensation Scale 1. +3 2. +2 3. +1 4. 0 5. -1 6. -2 7. -3
11. General Environment Comments		Area Summary
		Room/Building Type
		Outside Relative Humidity %
		Thermostat Setting °F or °C
		Humidity Setpoint %
		Total Number of Occupants:

# LEED Innovation in Design: Education Credits

Educational outreach components of LEED building include:

- Brochure of Sustainable Features Overview of the projects' sustainable design features
- Green Building Tours include following materials:
  - Flyer
  - LEED Sustainability Tour Script for K-12 tours
  - USGBC West Branch Newsletter
- Campus Sustainability Website buildings' profile
- Dashboard
- User Manual

**ENERGY, ATMOSPHERE & INDOOR ENVIRONMENTAL QUALITY**

UMass Amherst strives to reduce energy use on campus through sustainable design. The team employed many strategies, including:

- Modeled energy use reduction of 23% over ASHRAE 2007.
- High-efficiency LED and fluorescent lighting fixtures equipped with timer controls and occupancy sensors.
- Non-smoking campus as of July 1, 2013.
- Indoor air quality management strategies were in place during construction.
- Used low-VOC flooring, paints, and adhesives and sealants.
- Composite wood does not contain added urea formaldehyde.
- Indoor chemical and pollutant source control.
- Thermal comfort design.
- More than 90% of the space offers access to views to the outdoors.

**LEARN LIVE LEAD it Sustainable UMass**

**HAMPSHIRE DINING COMMON**  
UNIVERSITY OF MASSACHUSETTS, AMHERST

**CAMPUS PLANNING DIVISION**  
www.umass.edu/cp

**DESIGN & CONSTRUCTION DIVISION**  
www.umass.edu/dco

**SUSTAINABILITY FEATURES**

## USER MANUAL

**USER MANUAL  
INTEGRATIVE LEARNING CENTER**

UNIVERSITY OF MASSACHUSETTS, AMHERST

**September 30, 2013  
Green Building Tour**  
UMass hosted Westover Job Corps Center Students

The tour started from the **George H. Parks** Museum Teaching Bowl Building, and then proceeded to the **Research and Education Green House**, both of which are LEED Gold Certified.

The tour also included the **UMass Amherst Dining Commons**, which are using LEED Gold. While enjoying the healthy menu, students learned about the **UMass Permaculture Garden** and sustainable dining practices.

The tour ends on the tour area on the **Southeast** concourse sub garden, which demonstrates low impact development landscape practices.

**September 30, 2013 Tour Timeline**

- 10:00 - 10:30 AM George H. Parks Museum Teaching Bowl Building
- 10:30 - 10:45 AM Walk
- 10:45 - 11:00 AM Research and Education Green House
- 11:00 - 11:30 AM Walk
- 11:30 - 12:00 PM Life Science Laboratories
- 12:00 - 12:30 PM Break
- 12:30 - 1:00 PM Hampshire Dining Commons
- 1:00 - 2:00 PM Walk

In the next step UMass will conduct the Green Building tour for the **Smith Vocational & Agricultural School**.

**LEARN LIVE LEAD it Sustainable UMass**

### Heat Recovery Chiller Plant

**Objectives:**  
To reduce energy use and associated costs for heating hot water and space heating.

**Methods used in LSI:**

- Air-conditioning systems transfer heat from one location to another. In this process, they generate "waste heat" which can be up to 23% more than the cooling that the process creates.
- In addition to providing a portion of the building's chilled water needs, such as process cooling loads for the walk-in coolers,

a **heat recovery chiller** simultaneously redirects waste heat (that would typically get rejected by a cooling tower) to the building's low temperature heating needs, such as non-potable heating hot water and space-heating loads.

• During times of the year when the heat recovery chiller is not needed, the building's low temperature heating needs are supplied by **steam heat from the campus CHP**.

**Click Green Education Button to See More**

## FOOTBALL PERFORMANCE CENTER

UNIVERSITY OF MASSACHUSETTS, AMHERST

### LEED SUSTAINABILITY TOUR

#### SUSTAINABLE FEATURES DIAGRAM

**SECOND FLOOR** | **FIRST FLOOR**

**Legend:**

- Sustainable Sites
- Energy Efficiency
- Water Efficiency
- Material & Resources
- Indoor Environmental Quality

**Second Floor Features:** Chillers, Restrooms, Air Handling Unit, Office and Meeting Rooms, Demand Control Ventilation, Restrooms, Hall of Fame Lobby, LED Lighting, Operable Windows, Corf Rooms, Demand Control Ventilation, Occupancy and Daylight Sensors.

**First Floor Features:** Weight Room, Occupancy & Daylight Sensors, Recycled Content Flooring, Operable Windows, Building Exterior, High Performance Enclosure (90% Glass and 70% Solid Wall), Restrooms, Player's Lockers, Showers & Restrooms, Water Efficient Fixtures, Coaches' Lockers, Showers & Restrooms, Water Efficient Fixtures.

**LEARN LIVE LEAD it Sustainable UMass**

See CP Green Building Resources:  
<http://www.umass.edu/cp/green-building-resources>

# Next Steps



**LEED V4**



# Version 4 Updates

## Green Building Guidelines



INTEGRATIVE PROCESS



LOCATION & TRANSPORTATION



SUSTAINABLE SITES



WATER EFFICIENCY



ENERGY & ATMOSPHERE



MATERIALS & RESOURCES



INDOOR ENVIRONMENTAL QUALITY



INNOVATION



REGIONAL PRIORITY



BEYOND LEED

WE NEED YOUR INPUT!

# How to get involved

- Green Building Committee
  - Draft Documents will be posted for Community Review
  - Contact [klandrey@umass.edu](mailto:klandrey@umass.edu) to be on mailing list
  
- Campus Planning and Design & Construction Management in-house staff input
  - Look for emails with dates for presentations by category
  - Lunch dates will be provided for individual green resources support

# Discussion

# Let's Celebrate MA #1 in Energy Efficiency

## Massachusetts



Massachusetts ranked 1st in the *2015 State Energy Efficiency Scorecard*, maintaining its leadership position for the fifth year in a row. The state scored 44 points out of a possible 50, two points more than it earned in 2014.

Massachusetts & The 2015 State Scorecard



How Does Massachusetts Stack Up Regionally?

