

**HBS SPANGLER HALL KITCHEN RENOVATION**  
**117 WESTERN AVENUE, BOSTON, MA 02163**  
**PROJECT PROFILE**

**LEED-CI v3**  
**LEED SILVER**  
**MAY 2017**

Spangler Hall, located in the Harvard Business School (HBS), is a 122,000 square foot, brick and limestone building that serves as the main student center. The building has 29 project rooms, a 350-seat auditorium, administrative offices, student lounges, a business center, and kitchen and dining facilities. The dining hall, located in the basement level, averages over 2,000 visitors a day. HBS identified the opportunity to renovate the existing kitchen to not only increase the overall building performance, but also to improve occupant comfort. The renovation included upgrades to HVAC, lighting, plumbing, and kitchen equipment. The HVAC systems were modified to improve occupant comfort, provide healthy indoor air quality, and perform at a high level of energy efficiency. The lighting systems were also designed to reduce energy use, while providing adequate lighting spaces for the spaces.



Photo: copyright Shepley Bullfinch, 2013

The project’s design went beyond improving energy performance and included an extensive composting program. At the Spangler kitchen all the food waste is collected on a daily basis and composted. Additionally, all unsold food items are also composted at the close of the business day. The composting program helped the dining hall achieve the Green Restaurant Association’s Green Restaurant Certificate, earning 3 Stars for sustainable restaurant management. LEED certification also played a critical role in the design of the project, which was achieved through an integrated design approach. Applying sustainable design strategies in a holistic manner ensured that all aspects of the design contributed to decreasing the environmental impact of the kitchen. All project stakeholders were involved in the decision-making process, from designing the layout of the space to selecting the new kitchen appliances. HBS is committed to reducing greenhouse gas emissions, and the renovation of the Spangler Hall kitchen is an important step in achieving this goal.

**LEED® Facts**

**Harvard Business School**  
**Spangler Hall Kitchen**



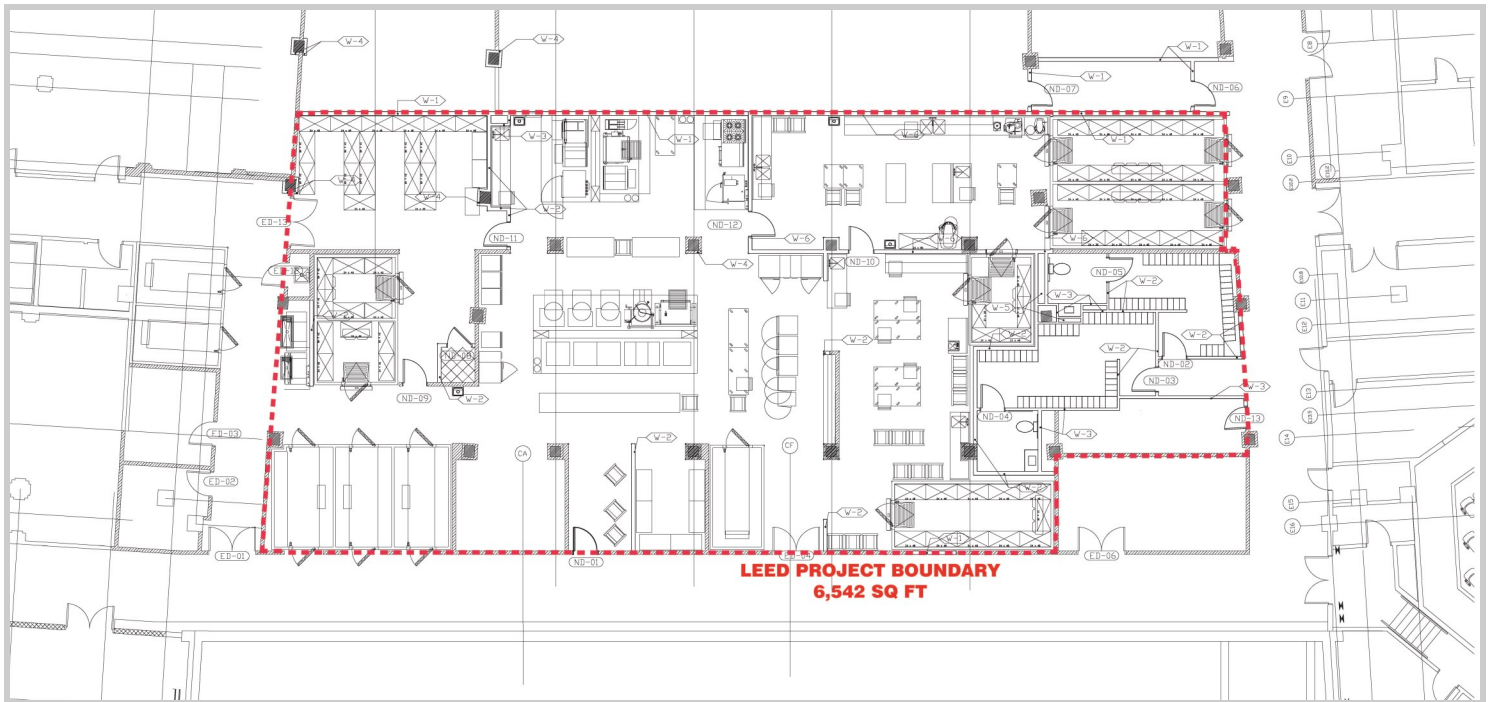
Location.....	Boston, MA
Rating System.....	LEED-CI v3
Certification Achieved.....	Gold
Total Points Achieved.....	53/110
<hr/>	
Sustainable Sites.....	16/21
Water Efficiency.....	0/11
Energy and Atmosphere.....	15/37
Materials and Resources.....	6/14
Indoor Environmental Quality.....	8/17
Innovation and Design.....	6/6
Regional Priority.....	2/4

**PROJECT HIGHLIGHTS**

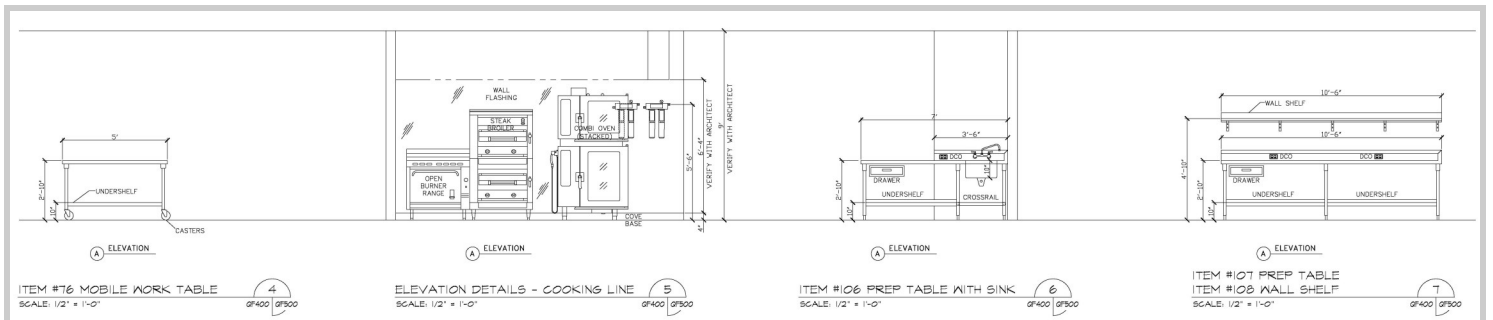
- 26%** reduction in water usage compared to an Energy Policy Act of 1992 baseline
- 13%** reduction in lighting power density
- 83%** of the on-site generated construction waste was diverted from landfills
- 19%** of the total building materials content by value have been manufactured using recycled materials
- 44%** of the total building materials value includes materials and products that have been manufactured within 500 miles of the project site



# PROJECT OVERVIEW



Site Plan: copyright Shepley Bulfinch, 2013



Kitchen Elevations: copyright Shepley Bulfinch, 2013



Photo: copyright Shepley Bullfinch, 2013

## PROJECT TEAM

<b>Owner</b>	Harvard Business School
<b>Project Manager</b>	Harvard Business School
<b>Architect</b>	Shepley Bulfinch
<b>MEP Engineer</b>	Fitzmeyer and Tocci Associates, Inc.
<b>Contractor</b>	Shawmut Design and Construction
<b>Commissioning Authority</b>	MAW Consulting
<b>Sustainability Consultant</b>	Green Building Services



## ENERGY EFFICIENCY AND INDOOR ENVIRONMENTAL QUALITY

### MECHANICAL AND ELECTRICAL SYSTEMS

**ECM 1: Melink Variable Air Volume Kitchen Hood Exhaust** - The VAV kitchen hood exhaust system, exhaust fan, and make-up AHU that serves the kitchen maximizes system efficiency by reducing energy consumption and electrical demand through demand control ventilation. Temperature, steam, and smoke are measured in the hood to control fan speed, leading to fan energy savings of up to 90%.

**ECM 2: Direct Digital Controls** - A direct digital control system capable of interfacing with and monitoring the major equipment, including the VAV kitchen hood exhaust, was installed in the kitchen. The system helps manage energy use in the space.

**ECM 3: Energy Star Rated Appliances** - The project features Energy Star Rated commercial kitchen appliances, which help reduce energy consumption in the space. For example, Energy Star rated fryers are 30% more energy efficient than standard models and offer shorter cooking times, saving about 1,100 kWh/year. Convection ovens are 20% more efficient than standard models, while refrigerator/freezers are 35% more efficient.

**ECM 4: LED Exit Signs** - The project features energy efficient LED exit signs, which on average can reduce electricity use by about 200 kWh/yr.

**ECM 5: Occupancy Sensors** - Occupancy sensors were installed in the space to control the lighting and reduce electricity consumption.

**ECM 6: Energy Efficient Lighting** - The lighting fixtures selected for the kitchen were energy efficient, super T8 or T5 fixtures.



Convection Oven: copyright Blodgett, 2013



Energy Star Refrigerator: copyright True Refrigeration, 2013



Melink VAV Kitchen Hood Exhaust: copyright Melink, 2013



Melink Kitchen Hood Exhaust Controls: copyright Melink, 2013

### INDOOR ENVIRONMENTAL QUALITY

#### Project Goals

- Provide a comfortable indoor environment for the occupants
- Maintain a high level of indoor air quality

#### Strategies

- The new kitchen equipment does not use CFCs or HCFCs for refrigeration.
- All spaces meet the requirements of the ASHRAE 55-2004 thermal comfort standard
- Provided adequate lighting levels based on space use and tasks
- Ventilation rates for the space meet the requirements of ASHRAE 62.1-2007
- All sealants, adhesives, paints, coatings, and flooring systems have VOC amounts lower than the allowable limits defined by SCAQMD Rule 1168
- VAV kitchen hood exhaust
  - Provides odor control
  - Exhausts air when only when needed
  - Monitors temperature, steam, smoke
  - Maintains a comfortable ambient temperature
  - Reduces noise levels
  - Improves fire safety conditions





## PRODUCTS AND MATERIALS

Materials for the Spangler Hall Kitchen project were selected for their high recycled content, and whenever possible, local extraction and manufacturing. Recycled materials can either be post-consumer (material that has been through the public recycling process) or pre-consumer (material that is a by-product of manufacturing). Local materials can be environmentally preferable because they reduce transportation energy and support local economies. The material selection process was also driven by the goal of creating a healthy working environment that will improve occupant productivity and well-being. The design of the building interior can significantly contribute to this project goal.



### Armstrong Prelude Plus XL Aluminum 15/16" Exposed Tee

- 23% pre-consumer recycled content
- 68% post-consumer recycled content
- Manufactured within 500 miles of project site



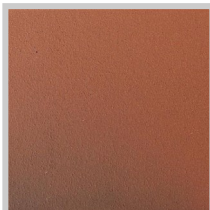
### Laticrete 254 Platinum

- 89% of product sourced within 500 miles of the project site
- GreenGuard certified
- No VOCs



### Benjamin Moore Ultra Spec 500 Interior Latex Primer

- VOC Content - 0 g/L vs. 50 g/L VOC limit



### Daltile Quarry Tile - Blaze Flash

- 26.4% pre-consumer recycled content
- No VOCs



### Prima Pro 9750 Wall Base Adhesive

- VOC Content = 41 g/L vs. 50 g/L VOC limit



### Thermafiber Sound Attenuation Fire Blankets

- 70% pre-consumer recycled content



### Johnsonite Rubber Tile

- FloorScore Certified
- Contains no phthalates or halogens



### Johnsonite 965 Flooring Adhesive

- VOC Content = 10 g/L vs. 50 g/L VOC limit



### Clark Dietrich Non-Structural Metal Framing

- 9.4% pre-consumer recycled content
- 24.3% post-consumer recycled content

*Please note that while many products are described in this project profile, these are provided for informational purposes only, to show a representative sample of what was included in this project. Harvard University and its affiliates do not specifically endorse nor recommend any of the products listed in this project profile and this profile may not be used in commercial or political materials, advertisements, emails, products, promotions that in any way suggests approval or endorsement of Harvard University.*



## PROJECT SCORECARD

### HBS Spangler Kitchen

Project ID 1000033218  
Rating system & version LEED-CI v2009  
Project registration date 06/05/2013



#### D and C Application Decision

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

## LEED 2009 COMMERCIAL INTERIORS

ATTEMPTED: 55, DENIED: 8, PENDING: 0, AWARDED: 53 OF 108 POINTS

SUSTAINABLE SITES 16 OF 21	
SSc1 Site Selection	2 / 5
SSc2 Development Density and Community Connectivity	6 / 6
SSc3.1 Alternative Transportation-Public Transportation Access	6 / 6
SSc3.2 Alternative Transportation-Bicycle Storage and Changing Room	0 / 2
SSc3.3 Alternative Transportation-Parking Availability	2 / 2

WATER EFFICIENCY 0 OF 11	
WEp1 Water Use Reduction-20% Reduction	Y
WEc1 Water Use Reduction	0 / 11

ENERGY AND ATMOSPHERE 15 OF 37	
EAp1 Fundamental Commissioning of the Building Energy Systems	Y
EAp2 Minimum Energy Performance	Y
EAp3 Fundamental Refrigerant Mgmt	Y
EAc1.1 Optimize Energy Performance-Lighting Power	0 / 5
EAc1.2 Optimize Energy Performance-Lighting Controls	0 / 3
EAc1.3 Optimize Energy Performance-HVAC	5 / 10
EAc1.4 Optimize Energy Performance-Equipment and Appliances	0 / 4
EAc2 Enhanced Commissioning	5 / 5
EAc3 Measurement and Verification	0 / 5
EAc4 Green Power	5 / 5

MATERIALS AND RESOURCES 6 OF 14	
MRp1 Storage and Collection of Recyclables	Y
MRC1.1 Tenant Space-Long-Term Commitment	1 / 1
MRC1.2 Building Reuse	0 / 2
MRC2 Construction Waste Mgmt	1 / 2
MRC3.1 Materials Reuse	0 / 2
MRC3.2 Materials Reuse-Furniture and Furnishings	0 / 1
MRC4 Recycled Content	1 / 2
MRC5 Regional Materials	2 / 2
MRC6 Rapidly Renewable Materials	0 / 1
MRC7 Certified Wood	1 / 1

INDOOR ENVIRONMENTAL QUALITY 8 OF 17	
IEQp1 Minimum IAQ Performance	Y
IEQp2 Environmental Tobacco Smoke (ETS) Control	Y
IEQc1 Outdoor Air Delivery Monitoring	0 / 1
IEQc2 Increased Ventilation	0 / 1
IEQc3.1 Construction IAQ Mgmt Plan-During Construction	1 / 1
IEQc3.2 Construction IAQ Mgmt Plan-Before Occupancy	0 / 1
IEQc4.1 Low-Emitting Materials-Adhesives and Sealants	1 / 1
IEQc4.2 Low-Emitting Materials-Paints and Coatings	1 / 1
IEQc4.3 Low-Emitting Materials-Flooring Systems	1 / 1
IEQc4.4 Low-Emitting Materials-Composite Wood and Agrifiber Products	1 / 1
IEQc4.5 Low-Emitting Materials-Systems Furniture and Seating	0 / 1
IEQc5 Indoor Chemical and Pollutant Source Control	1 / 1
IEQc6.1 Controllability of Systems-Lighting	1 / 1
IEQc6.2 Controllability of Systems-Thermal Comfort	1 / 1
IEQc7.1 Thermal Comfort-Design	0 / 1
IEQc7.2 Thermal Comfort-Verification	0 / 1
IEQc8.1 Daylight and Views-Daylight	0 / 2
IEQc8.2 Daylight and Views-Views for Seated Spaces	0 / 1

INNOVATION IN DESIGN 6 OF 6	
IDc1.1 Innovation in Design: Exemplary Performance SSc3.1	1 / 1
IDc1.1 Innovation in Design	0 / 1
IDc1.2 Innovation in Design	0 / 1
IDc1.2 Innovation in Design: Exemplary Performance MRC7	1 / 1
IDc1.3 Innovation in Design	0 / 1
IDc1.3 Innovation in Design - Exemplary Performance EAc4	1 / 1
IDc1.4 Innovation in Design: Occupant Education	1 / 1
IDc1.4 Innovation in Design	0 / 1
IDc1.5 IDc1.5 Innovation in Design: Low-Mercury Lighting	1 / 1
IDc1.5 Innovation in Design	0 / 1
IDc2 LEED® Accredited Professional	1 / 1

REGIONAL PRIORITY CREDITS 2 OF 2	
EAc1.3 Optimize Energy Performance-HVAC	1 / 1
MRC5 Regional Materials	1 / 1

**TOTAL 53 OF 108**

## MORE INFORMATION

- > Harvard Business School: <http://www.hbs.edu/Pages/default.aspx>
- > HBS Sustainability: <http://www.hbs.edu/about/campus-and-culture/Pages/commitment-to-sustainability.aspx>
- > Harvard—Green Building Resource: <http://www.energyandfacilities.harvard.edu/green-building-resource>
- > Harvard—Green Building Services: <http://www.energyandfacilities.harvard.edu/project-technical-support/capital-projects/sustainable-design-support-services>

