HARVARD
Faculty of Arts and Sciences

HARVARD UNIVERSITY | Sustainability

Science Center—Cabot Library Project
1 Oxford Street, Cambridge, MA
Project Profile

LEED CI v4.0
LEED Certified
December 2017

The Science Center—Cabot Library project was comprised of renovating the entry, common area, library, café, arcade, and courtyard in Harvard University's Science Center. These facilities represent 39,340 square feet of gross floor area combined. The primary goal of the Science Center—Cabot Library renovation was to modernize, enhance and enliven the entire first floor of the Science Center, connecting it to the courtyard and the Science Center Plaza. At the entry level, upgrades included all parts of the foyer (entry, entry ramp, and western entry ramp seating area), café (kitchen, server, and seating), main library areas, and courtyard. The lower level scope included media-heavy spaces, group study rooms, access services, a circulation desk, areas connected with HUIT, and emergency egress. The renovation included all new mechanical, lighting, power, and plumbing upgrades.

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The project team was committed to sustainability from the onset and followed the Harvard Green Building Standards to make more informed decisions. These standards led to the inclusion of a number of progressive design strategies to meet aggressive energy targets and reduced water usage without significant additional cost. The project achieved LEED-CI Version 4 certification in December 2017. The Science Center—Cabot Library project is also the second LEED-CI Version 4 project to be certified both at Harvard University and within the entire state of Massachusetts.

LEED® Facts

Harvard University
Science Center—Cabot Library

Location	Cambridge, MA
Rating System	LEED-CI v4
Certification Awarded	Certified
Total Points Awarded	40/110
Integrative Process	0/2
Location and Transportation	12/18
Water Efficiency	6/12
Energy and Atmosphere	13/38
Materials and Resources	4/13
Indoor Environmental Quality	1/17
Innovation	4/6
Regional Priority	0/4

Project Metrics

35% reduction in water use below code maximum

83% of the eligible equipment and appliances by rated power are ENERGY STAR certified

88% of the on-site generated construction waste was diverted from landfills

49% reduction in lighting power density

12% of the project's materials contain recycled content, by cost

ENERGY EFFICIENCY AND INDOOR ENVIRONMENTAL QUALITY

MECHANICAL SYSTEMS

ECM 1: High Efficiency Fans and Motors

ECM 2: Occupancy Sensors

ECM 3: High Efficiency Fan Coil Units

ECM 4: Variable Air Volume Control (VAV)

ECM 5: Temperature Sensors

As part of the renovation, a new air-handling unit (AHU) with a variable speed supply fan, heating and cooling coils, an economizer, highly efficient motors, and MERV 13 filters was installed to supply ventilation the project space. All zones are served by single duct, variable air volume units (VAV), and all perimeter spaces are provided with terminal hot water heating to account for envelope losses. This AHU is supplemented by AHU-B-1, which is an existing AHU that also serves a portion of the project space.

A new makeup-air unit (MAU) was installed in the ceiling of the kitchen/servery area and provides 100% outdoor air to the kitchen exhaust system. The unit includes heating and cooling to temper the fresh air. A glycol dosing package, including pumps, expansion tank and heat exchanger, similar to the existing systems, was provided for freeze protection. The MAU connects to an existing louver located at the adjacent courtyard for fresh air intake.

The café seating areas include a greenhouse-like façade with highly efficient fan coil units (FCUs) installed along the perimeter. FCUs can also be found near the main building entrance and along a majority of the perimeter.

All of the new mechanical equipment is capable of transferring data to the campus energy management control system for control and monitoring purposes. Occupancy sensors are installed throughout the project's entirety and are used to control the occupied and unoccupied modes of ventilation. Temperature sensors installed in the project space continuously monitor space temperature and modulate the system as needed.

Photo Copyright: Mack Scogin Merrill Elam Architects, 2017

INDOOR ENVIRONMENTAL QUALITY

The high indoor environmental quality of the Science Center — Cabot Library renovation was a significant focus of the project. An Indoor Air Quality Management Plan was enacted to ensure the protection of building systems, building occupants, construction related occupants, and interior building materials from air pollutants, excessive moisture exposure, and moisture damage during construction.

The selection of low chemical-emitting construction and finish materials was an important driving force in the design phase. The project includes low emitting flooring systems, ceilings, walls, thermal, and acoustic insulation. All wood and agrifiber products are also free of urea-formaldehyde.

ENERGY EFFICIENCY AND INDOOR ENVIRONMENTAL QUALITY

LIGHTING AND ELECTRICAL SYSTEMS

The Science Center—Cabot Library space is expected to be occupied for extended periods through-out the year, therefore, it is crucial that the energy reduction strategies also focus on reducing lighting energy. The lighting system was designed to not only reduce energy use, but also to improve the indoor environmental quality of the space and provide optimal lighting. Some of the strategies employed include:

- Reducing lighting power density by 49% below the ASHRAE 90.1 baseline standard
- High performance LED installed throughout the project space
- Ceiling mounted occupancy sensors capable of managing lighting setbacks
- Lighting controls with multiple lighting levels that provide adequate illumination for a higher indoor environmental quality

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PLUMBING SYSTEMS AND POTABLE WATER USE REDUCTION

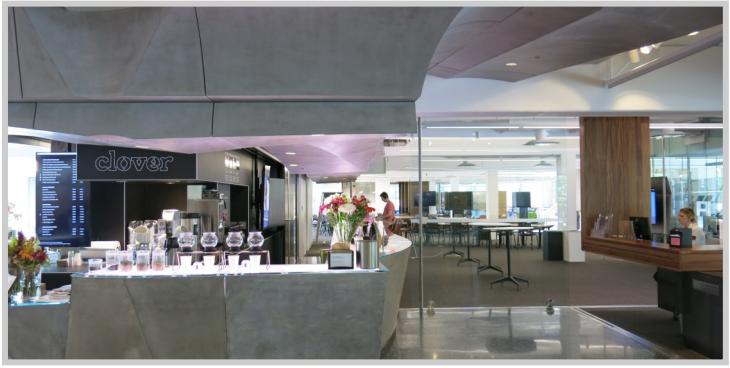

Photo Copyright: Mack Scogin Merrill Elam Architects, 2017

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Decreasing the demand for potable water is the first step towards sustainable water management. Therefore, the plumbing system for the project was designed to reduce resource consumption, specifically potable water use.

Potable water use was reduced by incorporating low-flow fixtures in the project space. The following flush and flow fixtures have been included within the LEED boundary:

- 1.28 GPF water closets
- 0.0 GPF urinals
- 0.5 GPM public lavatories

Further, the Science Center—Cabot Library project installed water-efficient commercial kitchen equipment including a 0.65 GPM pre-rinse spray valve and an ENERGY STAR certified ice machine with air cooling.

These plumbing fixtures resulted in a 35% reduction in water use below baseline.

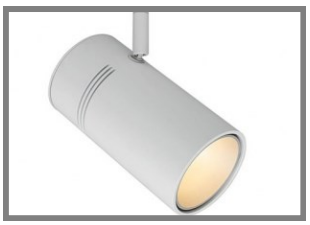
PRODUCTS AND MATERIALS

LIGHTING AND CONTROLS

- **20% reduction** in lighting power density (watts/square foot)

Silenzio Suspended LED
Luceplan
- ✓ Total fixture wattage = 30 watts
- ✓ Combines decor solutions with high sound absorption for public and private spaces.

Motion and Presence Detectors
Gamma Lighting Projects
- ✓ Uses passive infrared and ultrasonic technologies to achieve precise occupancy sensing for energy-efficient control of lighting

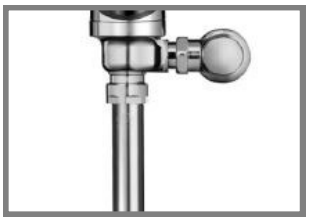


BeveLED 2.1 Downlight
USAI Lighting
- ✓ Total fixture wattage = 16 Watts
- ✓ LED fixture with dimming capabilities delivering 80+ CRI
- ✓ Industry-leading performance

ENERGY EFFICIENT APPLIANCES & WATER EFFICIENCY

- **83%** of the equipment purchased for the project is **ENERGY STAR RATED** (by rated power).
- **35% reduction** in annual water use when compared to EPAct 1992 baseline standard.

Undercounter Dishwasher
LXeH-2
Hobart
- ✓ ENERGY STAR®
- ✓ Efficient upper and lower rinse arms
- ✓ Handles up to 32 racks per hour using only 0.74 gallons of water per rack.

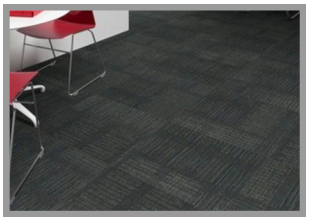


Flushometer
ECOS 8111-1.28
Sloan
- ✓ 1.28 gallons per flush (gpf) vs. EPAct baseline of 1.6 gpf.
- ✓ Installed batteries provide years of metered flushing to control the use of water and energy.

IntelliDrive Efficient Amplifier
4:2
Lab Gruppen
- ✓ ENERGY STAR®
- ✓ Combines net operating efficiency of greater than 80% with an auto-power-down feature.

LOW-EMITTING MATERIALS

- **100%** of the project's paints, coatings, adhesives, sealants, and flooring systems are **low-emitting.**



Carpet Tile Flooring
Constellation Tile 59326
Shaw
- ✓ Cradle to Cradle v2 Silver Certified
- ✓ CRI Green Label Plus Certified

Multi-Use Joint compound
Proform
National Gypsum
- ✓ Low VOC content—less than 2 g/L
- ✓ GREENGUARD certified

Interior Paint
Natura Semi Gloss
Benjamin Moore
- ✓ Zero VOCs
- ✓ Zero emissions measured

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.

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PROJECT SCORECARD

FAS Cabot Library

Project ID	1000067637
Rating system & version	LEED v4 ID+C: CI
Project registration date	02/24/2016

CERTIFIED SILVER GOLD PLATINUM

D and C Application Decision

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

LEED V4 ID+C: COMMERCIAL INTERIORS

AWARDED: 40 OF 124 POINTS

INTEGRATIVE PROCESS	OF 2
Integrative Process	0 / 2

LOCATION AND TRANSPORTATION	12 OF 36
LEED for Neighborhood Development Location	0 / 18
Surrounding Density and Diverse Uses	5 / 8
Access to Quality Transit	7 / 7
Bicycle Facilities	0 / 1
Reduced Parking Footprint	0 / 2

WATER EFFICIENCY	6 OF 12
Indoor Water Use Reduction	Y
Indoor Water Use Reduction	6 / 12

ENERGY AND ATMOSPHERE	13 OF 38
Fundamental Commissioning and Verification	Y
Minimum Energy Performance	Y
Optimize Energy Performance	7 / 25
Fundamental Refrigerant Mgmt	Y
Enhanced Commissioning	4 / 5
Advanced Energy Metering	0 / 2
Renewable Energy Production	0 / 3
Enhanced Refrigerant Mgmt	0 / 1
Green Power and Carbon Offsets	2 / 2

MATERIALS AND RESOURCES	4 OF 13
Storage and Collection of Recyclables	Y
Construction and Demolition Waste Mgmt Planning	Y
Long-Term Commitment	1 / 1
Interiors Life-Cycle Impact Reduction	0 / 4
Product disclosure & optimization - Environmental	0 / 2
Product disclosure & optimization - Sourcing of R	1 / 2
Product disclosure & optimization - Material Ingr	0 / 2
Construction and Demolition Waste Mgmt	2 / 2

INDOOR ENVIRONMENTAL QUALITY	1 OF 17
Minimum IAQ Performance	Y
Environmental Tobacco Smoke Control	Y
Enhanced IAQ Strategies	0 / 2
Low-Emitting Materials	0 / 3
Construction IAQ Mgmt Plan	1 / 1
IAQ Assessment	0 / 2
Thermal Comfort	0 / 1
Interior Lighting	0 / 2
Daylight	0 / 3
Quality Views	0 / 1
Acoustic Performance	0 / 2

INNOVATION	4 OF 6
Innovation	3 / 5
LEED Accredited Professional	1 / 1

REGIONAL PRIORITY CREDITS	OF

TOTAL	40 OF 124

MORE INFORMATION

- Harvard Faculty of Arts and Sciences: http://www.fas.harvard.edu/home/
- Cabot Library: https://cabot.library.harvard.edu/
- 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