

**FAS HUMAN EVOLUTIONARY BIOLOGY (HEB) SHARED LAB**  
**11 DIVINITY AVENUE , CAMBRIDGE, MA**  
**PROJECT PROFILE**

**LEED CI v2009**  
**LEED GOLD**  
**2017**

Laboratories are typically regarded as an energy intensive building typology. Many of these buildings have extended occupancy periods, energy intensive equipment and machinery, and in some cases, strict air quality code requirements (high air changes per hour). These factors contribute to a high average energy use intensity value (National Average EUI of 370 kBtu/SF/year). Nevertheless, there are many strategies that can be employed to make laboratories more energy efficient as well as healthy and productive spaces with minimal environmental impact. The Human Evolutionary Biology (HEB) Shared Lab is a great example of the successful implementation of these strategies.



Photo: copyright Perry & Radford, 2016

The Human Evolutionary Biology (HEB) Shared Lab project consisted of the renovation of the existing laboratory space located on the fifth floor of the Peabody Museum. The scope of work included adjusting the floor layout; upgrading HVAC, lighting, and controls; and replacing laboratory equipment for research purposes. The project’s goals were to create a high performance lab space that optimizes the indoor environment, reduces resource consumption, and reduces the overall impact on the environment.

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 reduce water use without significant additional cost. The project achieved LEED-CI v3 Gold certification in 2017.

**LEED® Facts**

**Harvard University**  
**Shared Laboratory HEB**



|                                   |               |
|-----------------------------------|---------------|
| Location.....                     | Cambridge, MA |
| Rating System.....                | LEED-CIv3     |
| Certification Anticipated.....    | Gold          |
| Total Points Anticipated.....     | 63/110        |
| <hr/>                             |               |
| Sustainable Sites.....            | 17/21         |
| Water Efficiency.....             | 0/11          |
| Energy and Atmosphere.....        | 20/37         |
| Materials and Resources.....      | 5/14          |
| Indoor Environmental Quality..... | 11/17         |
| Innovation and Design.....        | 6/6           |
| Regional Priority.....            | 4/4           |

**PROJECT METRICS**

- 30%** Expected reduction in lighting power density below ASHRAE 90.1-2007
- 100%** Lighting load controlled by occupancy sensors
- 68%** Construction materials manufactured regionally, within 500 miles of the project site
- 75%** Construction and demolition waste diverted from landfills
- 98%** Installed new wood that is from responsibly managed forests and is FSC certified



## ENERGY EFFICIENCY AND INDOOR ENVIRONMENTAL QUALITY

### ENERGY EFFICIENCY

#### ECM 1: Variable Frequency Drives

Variable frequency drives (in this case, on the air handler unit and exhaust fans) allow for ventilation to increase or decrease based on a set control (in this case, occupancy sensors). The Shared Lab space undergoes six air changes per hour in Occupied mode and four air changes per hour in Unoccupied mode, when humans are not at risk of exposure to chemicals in the air. This ability to decrease the ventilation rate when the lab is not in use is a great energy conservation measure because it not only reduces the energy needed to ventilate the space, but also reduces the energy required to heat or cool outside air to a set temperature.

#### ECM 2: Fan Coils Units with Electronically Controlled Motors

Electronically controlled motors (ECM) are more efficient than traditional PSC motors, require less maintenance due to a soft start and stop, and the life of an ECM is more than twice that of a traditional PSC motor. The fan coil units in the Human Evolutionary Biology (HEB) Shared Lab have ECMs.

#### ECM 3: Occupancy Sensors

Occupancy sensors are installed in common spaces to turn off the lights and setback room temperatures when spaces are unoccupied. This helps save lighting, heating, cooling, and ventilation energy. The Human Evolutionary Biology (HEB) Shared Lab utilizes occupancy sensors for 100% of its lighting load, including task lighting. The Shared Lab also uses occupancy sensors to control the ventilation rate for the space (6 ACH Occupied, 4 ACH Unoccupied) and heating/cooling.



Photo: copyright Perry & Radford, 2016

### PROJECT TEAM

|                                  |                                      |
|----------------------------------|--------------------------------------|
| <b>Project Manager</b>           | Harvard Faculty of Arts and Sciences |
| <b>Architect</b>                 | Perry and Radford Architects         |
| <b>MEP Engineer</b>              | Exergen Corporation                  |
| <b>Contractor</b>                | Corderman & Company                  |
| <b>Commissioning Authority</b>   | Harvard Green Building Services      |
| <b>Sustainability Consultant</b> | Harvard Green Building Services      |

### INDOOR ENVIRONMENTAL QUALITY

#### IAQ 1: Low Emitting Materials

The selection of low chemical-emitting construction and finish materials was an important driving force in the design phase. The project includes low VOC adhesives, sealants, paints, coatings, and primers. All wood and agrifiber products are also free of urea-formaldehyde.

#### IAQ 2: Access to Views

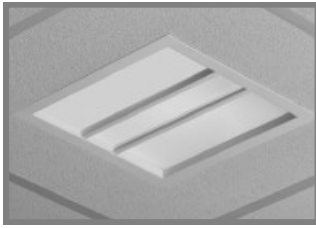
Providing access to views in regularly occupied spaces via windows allows for occupants to have a connection to the outdoors. The natural lighting provided by the windows during the daytime can also reduce the demand for electric lighting and thus, reduce energy use.



## PRODUCTS AND MATERIALS

### LIGHTING AND CONTROLS

- 30% reduction in lighting power density (watts/square foot)



**HPR-LED 1x1**  
Finelite

- ✓ LED Fixture
- ✓ Total fixture wattage = 19.8 watts
- ✓ Life: 141,000 hours



**LED Task Lighting**  
**eW Profile MX Powercore**  
Philips

- ✓ LED Fixture
- ✓ Total fixture wattage = 9 Watts
- ✓ Life: 49,000 hours
- ✓ Optional integral occupancy and/or daylight sensor



**ID 4.5" x 4.5"**  
Focal Point Lighting

- ✓ LED Fixture
- ✓ Total fixture wattage = 16 Watts
- ✓ Life: 50,000 hours

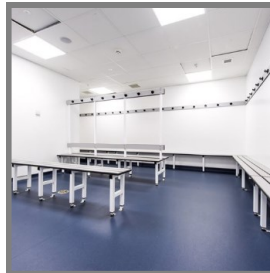
### LOW-EMITTING MATERIALS

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



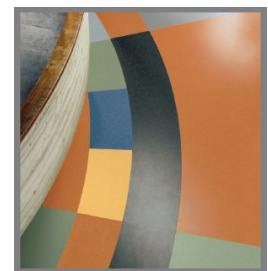
**Non-Flat Paint**  
**Ultra Spec 500**  
Benjamin Moore

- ✓ No VOCs



**Vinyl Flooring**  
**Altro Walkway 20**  
Altro

- ✓ Floorscore Certified



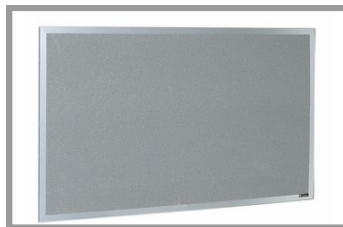
**Vinyl Flooring**  
**Medintone**  
Armstrong

- ✓ Floorscore Certified



**NC Series Casework**  
New England Lab

- ✓ No added urea-formaldehyde



**Series 800 Tackboard**  
Claridge

- ✓ No added urea-formaldehyde



**Architectural Sealant**  
**RubbaSeal**  
Kason

- ✓ Low VOCs

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

## FAS Shared Laboratory HEB

Project ID: 1000068157  
 Rating system & version: LEED-CI v2009  
 Project registration date: 03/08/2016



**Certified (Gold)**

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

[DOWNLOAD SCORECARD](#)

### LEED 2009 COMMERCIAL INTERIORS

ATTEMPTED: 63, DENIED: 0, PENDING: 0, AWARDED: 63 OF 110 POINTS

| SUSTAINABLE SITES |  | 17 OF 21 |
|-------------------|--|----------|
| SSc1              | Site Selection   | 1 / 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 | 2 / 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 |  | 20 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               | 4 / 5    |
| EAc1.2                | Optimize Energy Performance-Lighting Controls            | 1 / 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 |   | 5 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                        | 1 / 2   |
| MRc6                    | Rapidly Renewable Materials               | 0 / 1   |
| MRc7                    | Certified Wood                            | 1 / 1   |

| INDOOR ENVIRONMENTAL QUALITY |  | 11 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                                       | 1 / 1    |
| IEQc7.2                      | Thermal Comfort-Verification                                 | 1 / 1    |
| IEQc8.1                      | Daylight and Views-Daylight                                  | 0 / 2    |
| IEQc8.2                      | Daylight and Views-Views for Seated Spaces                   | 1 / 1    |

| INNOVATION IN DESIGN |                               | 6 OF 6 |
|----------------------|-------------------------------|--------|
| IDc1.1               | IDc1.1: Occupant Education    | 1 / 1  |
| IDc1.1               | Innovation In Design          | 0 / 1  |
| IDc1.2               | Low Mercury Lighting          | 1 / 1  |
| IDc1.2               | Innovation In Design          | 0 / 1  |
| IDc1.3               | Innovation In Design          | 1 / 1  |
| IDc1.3               | Innovation In Design          | 0 / 1  |
| IDc1.4               | Innovation In Design          | 1 / 1  |
| IDc1.4               | Innovation In Design          | 0 / 1  |
| IDc1.5               | Innovation In Design          | 1 / 1  |
| IDc1.5               | Innovation In Design          | 0 / 1  |
| IDc2                 | LEED® Accredited Professional | 1 / 1  |

| REGIONAL PRIORITY CREDITS |  | 4 OF 4 |
|---------------------------|--|--------|
| SSc3.2                    | Alternative Transportation-Bicycle Storage and Changing Room | 1 / 1  |
| EAc1.1                    | Optimize Energy Performance-Lighting Power                   | 1 / 1  |
| EAc1.3                    | Optimize Energy Performance-HVAC                             | 1 / 1  |
| MRc5                      | Regional Materials   | 1 / 1  |

**TOTAL** 63 OF 110

## MORE INFORMATION

- >Harvard Faculty of Arts and Sciences: <http://www.fas.harvard.edu/home/>
- >Department of Human Evolutionary Biology: <http://heb.fas.harvard.edu/>
- >Harvard - Green Building Resource: <http://green.harvard.edu/theresource>
- >Follow Harvard Sustainability: <https://twitter.com/greenharvard> and <https://www.instagram.com/greenharvard/>

