Certified LEED-CI Gold in November, 2009, Schreiber Lab is a 1,700 square foot Chemistry Lab, located on the 1st floor of the Naito Laboratory Building at 12 Oxford Street in Cambridge, MA. The Naito Laboratory building, a four-story structure constructed in 2000, is one of the four buildings housing all 278,000 sq. ft of laboratories for Harvard’s Department of Chemistry and Chemical Biology, located within the Cabot Science Complex.

The Schreiber project, completed in the summer of 2008, is a renovation of an existing lab space, previously occupied by a different professor. In order to support the research activities of Professor Schreiber and his lab group, the space was renovated to accommodate four fume hoods, island and wall benches, write-up desks, chemical storage cabinets, a solvent purification system, and mechanical and electrical tie-ins. Two adjacent offices and an instrument room were also renovated as part of the project.

Sustainability was a focus throughout the project —with Harvard’s Green Building Guidelines and the LEED-CI rating system guiding the selection of materials and the mechanical, electrical and plumbing (MEP) systems for the project.

**Schreiber Lab**

Photo: Ellenzweig. 2009

### Project Highlights

#### LEED® Facts

**Schreiber Lab**

Harvard Faculty of Arts and Sciences

2008 Renovation

- **Location:** Cambridge, Massachusetts
- **Rating System:** Commercial Interiors v2.0
- **Certification Achieved:** Gold
- **Total Points Achieved:** 34 / 57

- **Sustainable Sites:** 4/7
- **Water Efficiency:** 2/2
- **Energy and Atmosphere:** 5/12
- **Materials and Resources:** 3/14
- **Indoor Environmental Quality:** 15/17
- **Innovation and Design:** 5/5

- **79.6%** of on-site generated construction waste was diverted from landfills.
- **100%** of the equipment and appliances are Energy Star® rated
- **100%** of the Lab occupants have task lights to allow individual control of their lighting to suit individual preferences and needs
PROJECT OVERVIEW

Schreiber Lab Floor Plan & LEED Boundary

PROJECT TEAM

Owner
Harvard Faculty of Arts and Sciences

Project Manager
Harvard University Department of Chemistry and Chemical Biology

Architect
Ellenzweig

Contractor
JBM General Contractors

HVAC Engineer
BR + A Consulting Engineers, LLC

Commissioning Authority
BR + A Consulting Engineers, LLC

Sustainability Consultant
Harvard University, Office for Sustainability Green Building Services
SITE

- To encourage alternatives to driving, all occupants of the Naito Laboratory building have access to Harvard’s comprehensive CommuterChoice Program, which provides incentives and discounts for all modes of alternative transportation as well as carpooling and fuel efficient vehicles.

- The building is located within walking distance to the Harvard Square MBTA stop, several bus lines, and the Harvard University Shuttle.

- Three bicycle racks with a total capacity of 90 bicycles are located approximately 80 feet from the rear entrance of the Naito Laboratory building for use by the building’s occupants. Showers and changing facilities are located on the first floor.

- The building is located in a dense urban area, which allows occupants to walk and easily access amenities such as restaurants, banks, churches, and retail stores.

WATER EFFICIENCY

Per LEED requirements, if a project boundary does not include bathrooms, calculations must be for the fixtures in the closest bathroom. The closest bathrooms to Schreiber Lab have water efficient fixtures, which reduce domestic water consumption by 35% over standard EPAct 1992 fixtures. This is the equivalent of saving over 80,000 gallons per year.

<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Schreiber Lab Flush &amp; Flow Rates</th>
<th>EPAct 1992 Standard Flush &amp; Flow Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Closet [GPF]</td>
<td>Dual-Flush 1.6 &amp; 1.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Urinal [GPF]</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Bathroom Sink [GPM]</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Shower [GPM]</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Kitchen Sink</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

GPF - Gallons Per Flush  GPM - Gallons Per Minute

FIXTURES IN SCHREIBER PROJECT SCOPE

SLOAN UPPERCUT®
Dual-Flush Flusherometer (Up 1.1 gpf and Down 1.6 gpf)

Grohe Watercare Relexa®
Non-Adjustable Showerhead (1.5 gpm)
ENERGY EFFICIENCY

The Faculty of Arts and Sciences (FAS) has committed, along with Harvard University as a whole, to reduce greenhouse gas emissions 30% below 2006 levels by 2016, inclusive of growth. Therefore energy efficiency was a main goal of this renovation project.

MECHANICAL SYSTEMS

An existing 100% outside air, variable volume air handling unit (AHU) provides fresh air to new variable volume terminal boxes and fan coil units (FCUs) in each of the four renovated spaces, allowing each space to be controlled independently.

Occupancy and Temperature Sensors: For each room within the project boundary, occupancy sensors tied to the building’s control system modulate the supply air and maintain temperature set-points allowing both to be set back whenever spaces are unoccupied. The type of space and the activities carried out within it dictate the appropriate occupied and unoccupied set-points for temperature and ventilation.

High Performance Fume Hoods installed as part of the project include Variable Air Volume (VAV) fume hoods, which run at face velocity of 80 feet per minute instead of 100 feet per minute, thus reducing air flow by 20% and conserving the energy that would have been required to condition the air.

Real-time displays: Hood exhaust rates are displayed in real time, reminding occupants to keep hood sashes closed when not in use. “Shut the Sash”: A competition between labs aimed at reducing the extreme energy consumption due to open fume hoods.

Commissioning: The mechanical and electrical systems have been fully commissioned by a third-party Commissioning Authority, which ensured that all energy-related systems were installed as designed, and operating efficiently prior to occupancy.

Renewable Energy: Renewable Energy Certificates (RECs) have been purchased from Sterling Planet (wind power) equivalent to 100% of the anticipated electricity over two years.

ELECTRICAL SYSTEMS

Plug Loads: Energy Star equipment was selected for all equipment in the space, which includes computers and printers.

Light Fixtures: Energy-efficient and low-mercury fluorescent lighting fixtures and lamps were carefully chosen and strategically located within each space to reduce electricity consumption while maintaining adequate lighting levels for each type of space.

Lighting controls: Each space has overhead lighting controlled by multiple switches/zones and each desk has either under-counter task lights or desk lamps for multiple lighting levels based on different needs. The project’s lighting design allows 91% of the occupants to adjust the lighting to suit their individual preferences, which not only increases occupant productivity and comfort, but also decreases energy use.

Light Sensors: The two offices and the area above the student workstations have occupancy and daylight sensors that turn ceiling fixtures on and off based on the presence of people and the levels of natural light, respectively.

Task Lights at each desk in the Admin Office
Photo: Ellenzweig. 2009

Real Time Display
Photo: Jessica Parks
Harvard Office for Sustainability, 2009
**INDOOR ENVIRONMENTAL QUALITY**

FAS is committed to providing a healthy indoor environment for all occupants. The project team was careful to maintain healthy indoor air quality during construction and to also ensure the space is designed to promote healthy indoor air quality during occupancy.

**Indoor Air Quality During Construction:** The building maintained occupancy throughout construction. Thus, a comprehensive indoor air quality management plan was implemented during construction to maintain healthy indoor air quality. All grills and vents were sealed and a HEPA Filtration unit maintained negative pressure to keep any construction debris from migrating into occupied spaces.

**Thermal Comfort Survey:** Occupants will be surveyed about their thermal comfort once per season. The Operations team will adjust the heating or cooling in the project space as needed.

Only Materials with **Low or No VOC Content** were used in the Schreiber Lab project. Volatile Organic Compounds (VOCs) are chemical compounds and known carcinogens found in many construction materials that are considered detrimental to indoor air quality. Reducing the use of VOCs whenever possible improves indoor air quality and consequently occupant health and productivity.

- **Composite Wood and Laminate Adhesives** used in the renovation do not have any added Urea Formaldehyde
- **Carpet System** Karastan Contract - Quillen MacCarthy Broadloom *(Carpet and Rug Institute’s Green Label Plus)* with NU Broadlok Premium Plus Carpet Adhesive *(SCAQMD Rule #1168)*
- **Adhesives and Sealants and Paints and Coatings** Examples of the products used:

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Product &amp; Manufacturer</th>
<th>VOC Content (g/l)</th>
<th>VOC Limit (g/l)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paints &amp; Coatings</strong></td>
<td>Eco Spec Latex Flat, Benjamin Moore</td>
<td>0</td>
<td>50</td>
<td>Green Seal GS-11</td>
</tr>
<tr>
<td></td>
<td>Eco Spec Interior Latex Eggshell Enamel, Benjamin Moore</td>
<td>0</td>
<td>150</td>
<td>Green Seal GS-11</td>
</tr>
<tr>
<td></td>
<td>Fresh Start All Purpose Primer, Benjamin Moore</td>
<td>49.5</td>
<td>200</td>
<td>SCAQMD Rule #1113</td>
</tr>
<tr>
<td><strong>Adhesives &amp; Sealants</strong></td>
<td>DP 1010 Water Based Duct Sealant</td>
<td>&lt;30</td>
<td>250</td>
<td>SCAQMD Rule #1168</td>
</tr>
<tr>
<td></td>
<td>Dow Corning 732 Multi-purpose sealant</td>
<td>36</td>
<td>250</td>
<td>SCAQMD Rule #1168</td>
</tr>
</tbody>
</table>

**HVAC Protection:** Duct equipment sealed with filter

**Pathway Interruption:** Isolated work areas

**Green Housekeeping:** Schreiber Lab participates in Harvard’s Facilities and Maintenance Operations (FMO) Green Cleaning Program, which uses 100% recycled paper products and Green Seal certified cleaning solutions, among other green housekeeping practices.

**Daylight and Views:** In 96% of the regularly occupied spaces occupants have direct line of sight to the outside.
Selecting environmentally preferable materials and minimizing the amount of construction waste sent to landfill was important to the project. The project was able to use a large percentage of salvaged office and classroom furniture from storage areas within the Cabot Chemistry Complex. For the additional materials purchased, the project gave preference to low-emitting materials with recycled content and local manufacturing.

46% of the total material value consists of products salvaged or manufactured locally.

80% of the on-site generated construction waste was diverted from the landfill.

38% of the total value of materials used in the project consist of materials with recycled content.

### Environmentally Preferable Materials in Schreiber Lab, Naito Building

- **1912 Ultima Tegular Ceiling Tile** (Armstrong): 3% pre-consumer, 67% post-consumer
- **Medite II MDF** (Sierra Pine): 100% pre-consumer
- **Ultra Touch Natural Cotton Fiber Building Insulation** (John Manville): 85% post-consumer
- **Drywall** (USG): 95% pre-consumer

### Examples of regional materials used in project:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer</th>
<th>Distance between project &amp; Manufacturer (mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millwork</td>
<td>New England Lab</td>
<td>13</td>
</tr>
<tr>
<td>Fiberglass Insulation</td>
<td>Guardian Fiberglass Inc.</td>
<td>419</td>
</tr>
<tr>
<td>Drywall</td>
<td>USG</td>
<td>253</td>
</tr>
</tbody>
</table>

### ADDITIONAL RESOURCES

- Harvard FAS, Dept. of Chemistry and Chemical Biology: [http://www.chem.harvard.edu](http://www.chem.harvard.edu)
- Harvard FAS, Green Program: [http://green.harvard.edu/fas](http://green.harvard.edu/fas)
- Harvard FAS, Green Labs Program: [http://green.harvard.edu/fas/green-labs](http://green.harvard.edu/fas/green-labs)