The Harvard Faculty of Arts and Sciences (FAS) renovation of Tozzer Library involved a complete gut renovation of the existing 26,000 square foot library. The project scope also added a 10,000 square foot fourth floor which provides additional floor area for office space and new mechanical systems. The original building was designed in 1974 by Johnson and Hodvelt and served as a library for anthropology and anthropologic research. The new building’s lower two floors accommodate the Tozzer Library offices, reading rooms, library stacks, special collections area, and library support services. A skylight brings daylight into an atrium through the upper levels. The upper levels consist of classrooms, faculty offices, and graduate student offices for the Department of Anthropology. Also, alterations were completed around the building to improve stormwater management.

In setting the sustainability goals to guide the project’s design and operation, the project team utilized the Harvard University Green Building Standards and the LEED-CI v2009 Certification requirements. The main sustainability goals for the project include the following:

- **Reduce energy consumption** by 30% below ASHRAE 90.1-2007
- **Reduce energy demand** by setting up a Demand Response Program
- **Enhance occupant comfort** by providing window treatments to reduce glare and solar heat gain

### Project Metrics

<table>
<thead>
<tr>
<th>LEED® Facts</th>
<th>FAS Tozzer Anthropology Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Cambridge, MA</td>
</tr>
<tr>
<td>Rating System</td>
<td>LEED - v2009</td>
</tr>
<tr>
<td>Certification Anticipated</td>
<td>Gold</td>
</tr>
<tr>
<td>Total Points Anticipated</td>
<td>76/110</td>
</tr>
<tr>
<td>Sustainable Sites</td>
<td>21/26</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>3/10</td>
</tr>
<tr>
<td>Energy and Atmosphere</td>
<td>26/35</td>
</tr>
<tr>
<td>Materials and Resources</td>
<td>7/14</td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>10/15</td>
</tr>
<tr>
<td>Innovation and Design</td>
<td>6/6</td>
</tr>
</tbody>
</table>

- **38%** reduction in water consumption when compared to an EPAct 1992 baseline
- **53%** anticipated energy cost savings when compared to an ASHRAE 90.1-2007 Appendix G baseline energy model
- **22%** of total materials cost which consisted of recycled content
- **95%** of construction waste diverted from landfill
Project Highlights

Owner
Harvard Faculty of Arts and Sciences

Project Manager
John Hollister, FAS

Planning
Celia Kent and Nazarea Cooper, FAS

Architect
Kennedy & Violich Architecture

MEP Engineer
Buro Happold

Contractor
Consigli Construction Co.

Commissioning Authority
Harvard Green Building Services, BR+A, SGH

Sustainability Consultant
Harvard Green Building Services
Energy Efficiency and Indoor Environmental Quality

Mechanical and Electrical Systems

ECM 1: Chilled beam HVAC system
ECM 2: Enthalpy Recovery Wheel
ECM 3: Energy Efficient Lighting
ECM 4: Occupancy Sensors
ECM 5: Energy Efficient Building Envelope

The overall strategy of the HVAC system design was to reduce energy use through the installation of a more energy efficient active chilled beam system. Chilled beam systems differ from traditional HVAC systems in that these systems provide heating and cooling via water rather than air. Active chilled beam systems are able to both heat and cool a building using less energy due to the fact water is a more efficient medium of delivery energy throughout a building.

Tozzer’s lighting design and lighting controls strategy are also very energy efficient. The installed lighting power density at Tozzer is 25% below code allowance. Lighting controls were installed throughout the building including occupancy sensors in all of the office spaces and conference rooms, and daylight dimming sensors were installed in the Library reading areas.

Overall, the Tozzer Anthropology Building is expected to consume 53% less energy than a baseline energy model which is compliant with ASHRAE Standard 90.1-2007, Appendix G. Measurement and verification will be performed by Harvard Green Building Services to verify whether these energy savings are realized.

Indoor Environmental Quality

The high indoor environmental quality of the Tozzer Library was a significant focus for the project. The selection of low chemical emitting building materials and finishes was a point of emphasis during the design and procurement phase of the project in order to prevent unwanted chemicals from entering the building occupant breathing zones. Concurrent with that, appropriate construction measures to prevent mold and mildew growth within the building helped ensure a high level of indoor air quality is available once the building was occupied. All chemical mixing rooms have auto closing doors as well as required room exhaust to ensure chemical fumes do not enter into adjacent spaces.

Other strategies to enhance the indoor environment quality were implemented into the building infrastructure. These included:

- MERV 13 filters on all HVAC units providing ventilation air
- Daylight access and views
- High efficiency lighting with appropriate light levels
- Occupancy sensors and controls
Decreasing the demand for potable water is the first step towards sustainable water management. Sinks, toilets, urinals, showers, and irrigation systems designed to use less water than code compliant fixtures are widely available; and when combined with conscientious occupant use patterns and controls, can result in a large reduction in potable water consumption. Some of the water conservation strategies incorporated in the project include:

- Low-flow plumbing fixtures
  - Urinals: 0.125 GPF
  - Toilets: 1.28 GPF
  - Lavatory faucets: 0.5 GPM

These strategies led to a 38% reduction in water use when compared to the EPAct 1992 baseline.

### Key Highlights

- **22%** recycled content value as a percentage of total material cost
- **96%** certified wood value as a percentage of new wood materials cost
- **95%** total percentage of construction waste diverted from landfill
- **100%** of all paints and sealants have low VOC content
- **12%** regional materials value as a percentage of total materials cost

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 or 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.
**LEED FOR NEW CONSTRUCTION & MAJOR RENOVATIONS (V2009)**

**PROJECT SCORECARD**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points Awarded</th>
<th>Points Possible</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites</td>
<td>21/26</td>
<td>26</td>
<td>88%</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>3/10</td>
<td>10</td>
<td>30%</td>
</tr>
<tr>
<td>Energy and Atmosphere</td>
<td>26/35</td>
<td>35</td>
<td>74%</td>
</tr>
<tr>
<td>Innovation in Design</td>
<td>6/6</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>Regional Priority Credits</td>
<td>3/4</td>
<td>4</td>
<td>75%</td>
</tr>
</tbody>
</table>

**TOTAL**

76 of 110

**MATERIALS AND RESOURCES**

<table>
<thead>
<tr>
<th>Item</th>
<th>Points Awarded</th>
<th>Points Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRc1</td>
<td>1/3</td>
<td>3</td>
</tr>
<tr>
<td>MRc2</td>
<td>2/2</td>
<td>2</td>
</tr>
<tr>
<td>MRc3</td>
<td>0/2</td>
<td>2</td>
</tr>
<tr>
<td>MRc4</td>
<td>0/1</td>
<td>1</td>
</tr>
</tbody>
</table>

**More Information**

- Tozzer Library: [http://hcl.harvard.edu/libraries/tozzer/](http://hcl.harvard.edu/libraries/tozzer/)
- FAS Sustainability: [http://green.harvard.edu/schools-units/arts-sciences-fas](http://green.harvard.edu/schools-units/arts-sciences-fas)
- Harvard - Green Building Services: [http://energyandfacilities.harvard.edu/project-technical-support](http://energyandfacilities.harvard.edu/project-technical-support)

Please print this project profile only if necessary. If printing is required, please print double sided and recycle when finished. Thank you!