



Hamilton Hall project profile
LEED-NC Gold, August 2006



Summary

Hamilton Hall is a 48,000 square foot dormitory for MBA students at the Harvard Business School (HBS). The building was originally constructed in 1926. A full gut renovation began in 2005, with Boston architects Finegold Alexander and Associates leading the design team. Construction was completed in the summer of 2006, and the project achieved a LEED Gold rating in December, 2007. The project is a successful example of a green renovation project, as the project was able to implement systems with significant energy, materials, and water savings.

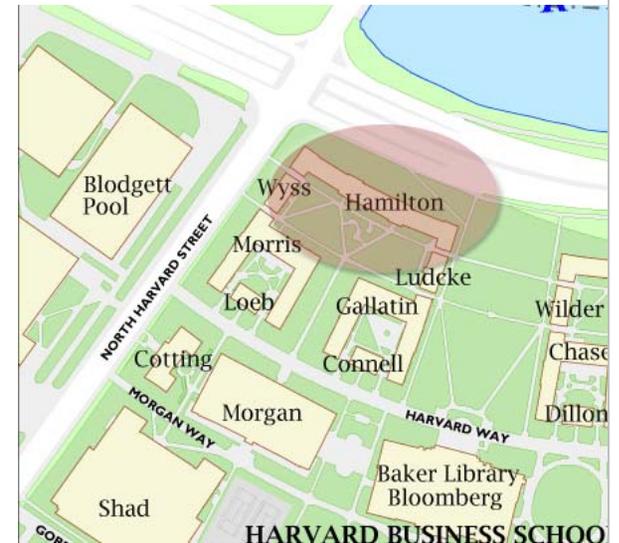
Hamilton Hall has four levels above grade and one below grade, which is connected to other buildings by a network of tunnels. The building has 72 dorm rooms, 6 kitchens and 8 lounges in addition to dedicated recycling storage areas and other support spaces. From very early in the design process it was decided the building would be an example of green residential design for Harvard University.

Location

Hamilton Hall is located in Allston at 700 Soldiers Field Road, along the Charles River and at the corner of Soldiers Field Road and North Harvard Street.

Project Team

Client: Harvard Business School
Project Manager: William A. Berry & Sons, Inc.
Architect: Finegold Alexander & Associates
Structural: Boston Building Consultants
Mechanical: BLW Engineers
Civil: Judith Nitsch Engineering, Inc.
Code /Fire Protection: Firepro Inc.
Interiors: Lucas Stefura Interiors
Hazardous Materials: Environmental Health, Inc.
Landscape: The Halvorson Company, Inc.
Construction Manager: Richard White Sons
Commissioning: Richard D Kimball Company, Inc.
Sustainability Consultant: Harvard Green Campus Initiative



Sustainable Strategies

Site

Stormwater Management: HBS included a dry well to collect all stormwater from the roof of the building and use it for groundwater recharge. This Best Management Practice (BMP) significantly reduces stormwater quantity and improves the quality by allowing stormwater to infiltrate back into the groundwater. By adding the dry well, Hamilton Hall's imperviousness was reduced from 53.98% to 31.68%. HBS located vegetated filter strips to the immediate north, east, west and south of the building. These strips contain mostly shrubs and small trees and are covered in mulch to slow stormwater runoff and improve its quality. Beyond these filter strips, in all directions, large grassy areas further slow runoff and improve quality.



61% of the 0.7 acre site is shaded to mitigate solar heat gain and heat island effect.

Alternative Transportation: Hamilton is in close proximity to several public transportation options, allowing alternatives to driving. Through a contract with ZipCar, hybrid vehicles are provided with preferred parking. Harvard affiliates have access to ZipCar discounts through **Harvard's Commuter Choice** program. Indoor and outdoor secure bicycle storage areas are provided for the inhabitants.

Water

Water use for irrigation is reduced by selecting more efficient sprinkler heads and through use of the Rain Bird system, a computer controlled irrigation system that determines irrigation rates based on data from an on-site weather station and waters plants based on actual climactic conditions. Potable water used for irrigation is reduced by 64.83% by using these efficient irrigation systems. This system prevents over-watering or excessive drying out of the soils, both of which could contribute to additional stormwater runoff quantity and poor quality. See Hamilton's Wec1 LEED submittal for detailed information on the water savings of this system.

38% Domestic Water Use Reduction: The project used Sloan UpperCut dual-flush flushometer toilets and Symmons ultra low-flow hand wash sinks and low-flow showers in all restrooms. The toilets offer a 1.6 gallon “solid” flush and a 1.1 gallon “liquid” flush to reduce water consumption and are the first dual-flush residential toilets in use at Harvard. The sinks distribute water at 0.5 gallons per minute, compared to the 2.5 gallon per minute standard. Hamilton’s design team tested a number of low-flow shower heads by using the campus gymnasium for mock-ups and soliciting user’s feedback on the different brands. The Symmons model uses 2.0 gallons per minute instead of the 2.5 gpm standard. Low-flow faucets, toilets and showerheads reduce water use by 30.88%.

Energy

Energy modeling for Hamilton was performed by BLW Engineers using Visual DOE. The building performs 22.1% better than ASHRAE 90.1-1999. The building is of masonry construction with new insulated walls on the interior, insulated ceiling at the attic level and new insulated glass for all window openings. Four constant volume air handling units provide tempered ventilation to the building while most spaces are provided with heating/cooling by four pipe fan coil units and the remaining spaces such as basement storage, basement mechanical, toilets/baths are provided with



heat by either fin-tube radiation or unit heaters. Heating hot water, cooling cold water and domestic hot water are provided from the central plant piping systems. Lighting consists mostly of fluorescent fixtures.

Occupancy Sensor Controlled Thermostats: One of the most significant improvements to occupant comfort is the addition of four-pipe fan coil units in every regularly occupied space for optimal temperature control. All rooms contain adjustable digital thermostats. To conserve energy, thermostat controls have been tied to occupancy sensors. Once rooms are unoccupied the supply fans are de-energized and the heating set point is set to 65° F and the cooling set point is reset to 80° F. After an hour without occupants the heating set point is reset to 60° F and the cooling is reset to 85° F. This project was the first to utilize the new Harvard Green Campus Loan Fund for New Construction, an innovative financing model to pay for increased capital costs from future operations budgets.

An **independent commissioning agent** was brought on the project early (before the Design Development phase) to review the design. The commissioning agent reviewed relevant contractor submittals provide a re-commissioning manual and the review building operation with staff after construction is completed.

New **insulation** was added throughout the building – on the interiors of the exterior masonry walls, and on the attic ceiling. Also, glazing with a very low U-value, was installed to reduce heat loss. The high efficiency glazing results in a window assembly with a 0.30 U-value, much lower than the 0.48 U-value suggested as a baseline in ASHRAE 90.1.

Additional energy savings comes from **reducing domestic hot water demand** by 22% better than EAct of 1992, primarily the result of low-flow sinks and showers.

Measurement and Verification: Since base year energy data is not available for the existing building, LEED Option D allows for the renovated building to access the performance of the base year energy use of the building utilizing a simulation model for energy consumption and demand. Systems being metered are: building chilled water usage, building hot water usage, building domestic hot water flow, building domestic cold water flow, building irrigation systems, and building electrical use. Energy Management Systems will provide reports.

Renewable energy certificates were purchased from Sterling Planet for 100% of projected energy use for a two-year period. The certificates are for wind energy.



The project used nearly 100% of the existing shell, reducing the need for virgin building materials. Use of materials with recycled content further reduced the use of virgin materials.

Recycled content: 10.4% of materials (by cost) consist of recycled content materials.

Rapidly renewable materials: Harvard Business School and the design team took care to select environmentally friendly building materials. Selections were evaluated based on the distance they were shipped, recycled content, durability, and the potential off-gassing of harmful chemicals. For all built-in furniture (pictured at right), Hamilton Hall used rapidly renewable Plyboo brand bamboo plywood. The product offers an interesting finished appearance and bamboo requires only 4 years to reach maturity. By cost, 15% of materials used are considered rapidly renewable.

97% C&D Waste Diversion: The Institution Recycling Network was hired as the project's Waste Management and Construction Indoor Air Quality consultant. They worked with Richard White Sons to achieve an amazing waste diversion rate. Of the 1,911 tons of C&D waste generated, only 55 tons were disposed of as solid waste in a landfill. The remaining 1,855 tons were salvaged or recycled. More than 38 tons of furnishings and used building materials such as doors, sinks, toilets and cabinets, were donated to "Food for the Poor" and shipped to Nicaragua. C&D waste management resulted in emissions reduction of 337 metric tons of carbon dioxide equivalent according to the Northeast Recycling Council's figures.

Local materials: 71% of materials (by cost) were manufactured within 500 miles, making the project eligible for an additional LEED ID credit.

Indoor Environmental Quality

During construction, Hamilton's IAQ management plan was in place to ensure the health of the workers and the eventual inhabitants. After construction, Hamilton replaced existing filters with MERV 13 filters and underwent a two week flush-out with 100% outside air.

Low-emitting paints and primers, adhesives and sealants, and carpets are used for construction, composite wood with no added urea-formaldehyde.

All of the dorm rooms receive daylight and views of the campus or the Charles river.

