



FACULTY OF ARTS AND SCIENCES

LEED-Civ2.0

BIOPHYSICS LABS - NORTHWEST LABS BUILDING

52 OXFORD STREET, CAMBRIDGE, MA 02138

The Harvard Faculty of Arts and Sciences' (FAS) Biophysics Laboratories and the Laboratory for Particle Physics and Cosmology (LPPC) in Harvard's Northwest Building was a fit-out of approximately 6,700 square feet of unoccupied shell space on level 2 North in 2009. The project meant creating spaces for three distinct labs: The Levine Lab for RNA research, led by Professor Erel Levine, the Samuel Lab with Professor Aravinthan Samuel, concentrating on the study of *C. elegans* (worms) and *Drosophila* (flies), and finally the Strominger Lab, where Professor Jack Strominger is focused on Biochemistry.

The base building, Northwest Labs, and early phase fit-outs had not pursued LEED certification, and Harvard challenged the design team to attain a LEED-CI Silver or higher certification for the project. This is part of Harvard's goal of reducing greenhouse gas emissions 30% below 2006 levels by 2016, inclusive of growth.

FAS and the project team were committed to sustainability throughout the duration of the project. In addition to making key decisions involving the mechanical and electrical systems, the team played an important role in furniture and material selection. For instance, rather than purchasing all new items, several pieces of casework and equipment were reused from the existing Strominger Lab. This dedication to sustainable design ultimately allowed the Biophysics Lab project to achieve a LEED Gold Certification under the LEED for Commercial Interiors (LEED-CI) version 2.0 rating system.



Biophysics Lab
Photo: Burt Hill Architects, 2009

PROJECT HIGHLIGHTS

LEED® Facts

Northwest Biophysics Labs
Harvard Faculty of Arts & Sciences
2009 Renovation



Location.....	Cambridge, Massachusetts
Rating System.....	Commercial Interiors v2.0
Certification Achieved.....	Gold
Total Points Achieved.....	38/57
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Sustainable Sites.....	7/7
Water Efficiency.....	2/2
Energy and Atmosphere.....	4/12
Materials and Resources.....	7/14
Indoor Environmental Quality.....	13/17
Innovation and Design.....	5/5

- 20%** of the materials contain recycled content by overall material value.
- 35%** reduction in water consumption compared to code-maximum fixtures.
- 88%** of construction waste was diverted from landfills through recycling and salvaging.
- 53%** of the materials were manufactured within 500 miles of the project, by overall material value.
- 100%** of the composite wood in the project is urea-formaldehyde free.
- 91%** of regularly occupied areas have access to exterior views.

Only low or zero-VOC materials were used in construction.



PROJECT OVERVIEW



LEED Project Boundary

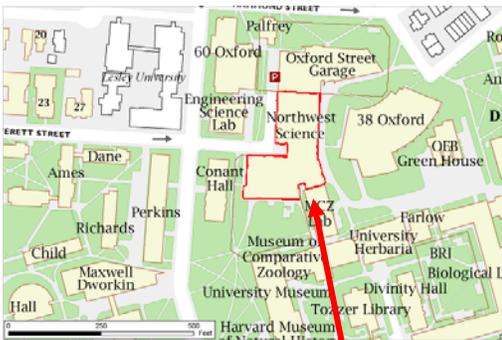
PROJECT TEAM	
Owner, Project Manager	Harvard Faculty of Arts and Sciences
Architect	Burt, Hill Architects
General Contractor	G. Green Construction CO.
HVAC Engineer	WSP Flack + Kurtz
Lighting Consultant	Lam Partners
Commissioning Authority	Energy Management Associates, Inc.
Sustainability Consultant	Harvard University, Office for Sustainability Green Building Services



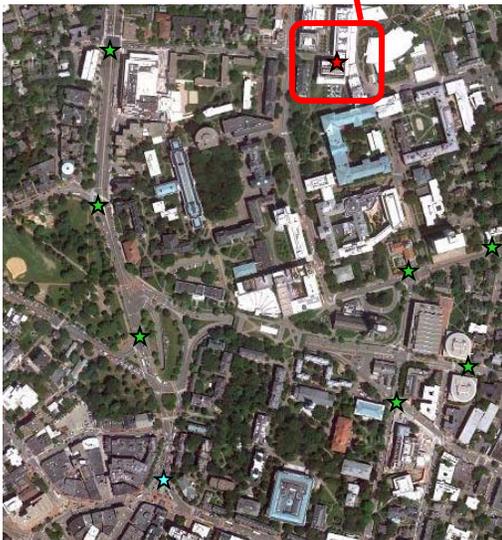
Biophysics Lab
 Photo: Burt Hill Architects, 2009



SITE



Northwest Labs
 52 Oxford Street, Cambridge, MA



- ★ Northwest Labs
- ★ MBTA Subway Station
- ★ Bus Stop Location

- To encourage alternatives to driving, all occupants of the Biophysics Lab have access to Harvard's **CommuterChoice Program**, which provides incentives, such as discounts, for all modes of alternative transportation as well as carpooling and fuel efficient vehicles.
- The Northwest Labs building is located in a dense urban area which allows occupants to easily access amenities such as restaurants, banks, churches and retail stores that are within walking distance.
- The building is located within walking distance to the Harvard Square T Station, the MBTA routes 77 and 96 bus lines, and the Harvard campus shuttle service.
- Three bicycle racks with a capacity of 70 bicycles are located adjacent to the Northwest Labs building. Seven shower and changing facilities are located within the building.



Bike Racks in East of Building
 Photo: Harvard Office for Sustainability, 2009

WATER EFFICIENCY

Per LEED requirements, if a project does not include bathrooms, calculations must be for the fixtures in the closest bathroom.

The closest bathroom to the Biophysics Labs have water efficient fixtures, which **reduce domestic water consumption by 35% over standard EPA 1992 fixtures**. This is the equivalent of saving over 13,000 gallons per year.

Differences in the Flush & Flow Rates for EPA 1992 Standard fixtures

Fixture Type	Biophysics Labs Flush & Flow Rates	EPA 1992 Standard Flush & Flow Rates
Water Closet [GPF]	Dual-Flush 1.6 & 1.1	1.6
Urinal [GPF]	1.0	1.0
Bathroom Sink [GPM]	.05	2.5
Shower [GPM]	1.6	2.5
Kitchen Sink [GPM]	2.0	2.5
GPF - Gallons Per Flush		GPM - Gallons Per Minute



SLOAN UPPERCUT®
 Dual-Flush Flushometer
 (Up: 1.1 gpf for half flush
 Down: 1.6 gpf for full flush)



ENERGY EFFICIENCY

The Harvard 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

MECHANICAL SYSTEMS

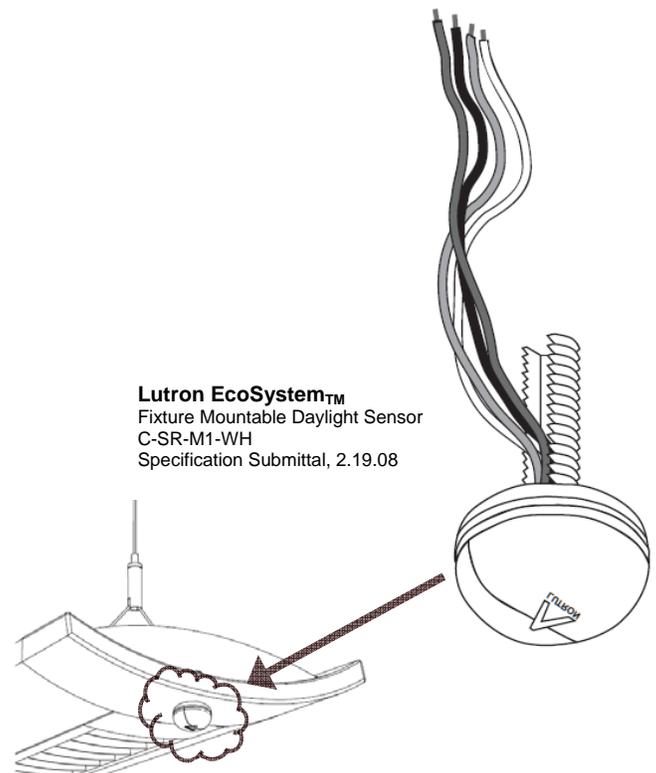
The primary source for building heat and humidification requirements is the existing campus steam plant. Steam is used for building heat, humidification (via clean steam generator) and process equipment. The primary source for building cooling requirements is the adjacent campus chiller plant. A glycol/water energy recovery loop is provided in the building to transfer sensible heat between the major laboratory supply and exhaust systems for fit-outs within the building.

- **Occupancy Sensors:** Occupancy sensors tied to the Building's Automation System (BAS) modulate the supply air and maintain temperature set-points, allowing both to be set back whenever spaces are unoccupied. Sensors are located in all spaces, except environmental rooms.
- **Building Automation System:** All automatic temperature controls are Direct Digital Control (DDC) logic, though local controllers. Automatic controls provide energy savings based on system zoning, scheduling, occupied/unoccupied setbacks and demand control ventilation.
- **Commissioning:** The mechanical and electrical systems have been fully commissioned, by a third party Commissioning Authority, ensuring that all energy-related systems were installed as designed and operate efficiently prior to occupancy.
- **Renewable Energy:** Renewable Energy Certificates (RECs) were purchased from Sterling Planet (wind power) equivalent to 100% of the anticipated electricity over 2 years, 214,000 kWh.

ELECTRICAL SYSTEMS

- **Lighting Fixtures:** Energy efficient, low-mercury lamps were chosen to reduce electricity consumption. These include a continuous linear fluorescent running over the leading edge of each bench, as well as a suspended linear fluorescent fixture hung along the corridor to illuminate interior support spaces.
- **Lighting Sensors:** Lutron's EcoSystem is used for full control of the space. Daylight sensors measure light levels from windows and reflected surfaces within the space, allowing the electric system to balance levels accordingly. The sensors in each bay dim the fixtures in that bay independently of the next, so that each aisle will dim accordingly and maintain even light levels. Dimming lags prevent rapid changes in lighting.

Occupancy sensors within the space utilized passive infrared technology to turn the lights on or off, as needed.



INDOOR ENVIRONMENTAL QUALITY

The Harvard Faculty of Arts and Sciences 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: A comprehensive indoor air quality management plan was implemented during construction to maintain healthy indoor air quality for workers and future occupants. All grills and vents were sealed and a HEPA filtration unit maintained negative pressure to keep any construction debris from migrating into occupied spaces. All ductwork remained sealed until it was installed and covered, and a flush-out of the space was completed to remove any contaminants. Additionally, Greensweep and face masks minimized the impact of air born dust to construction related personnel.

Only Materials with **Low or No VOC Content** were used in the Biophysics 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 have no added Urea Formaldehyde.
- **Carpet System** Shaw Broadloom (CIR Green Label Plus)
- **Adhesives and Sealants and Paints and Coatings** Examples of the products used:

Category	Product & Manufacturer	VOC Content (g/l)	VOC Limit (g/l)	Standard
Paints & Coatings	➤ PPG Speedhide Latex Block Filler Primer	14	150	Green Seal GS-11
	➤ PPG Acrylic Semi-Gloss Metal Finish	81	150	Green Seal GS-11
Adhesives & Sealants	➤ AAT 280 Carpet Adhesive	0	50	SCAQMD Rule 1168
	➤ Forbo L910 Linoleum Adhesive	0	60	SCAQMD Rule 1168
	➤ Mapei Eco 575 Base Adhesive	0	50	SCAQMD Rule 1168

Construction IAQ Measures Implemented During Construction

Photos: Shawmut Design & Construction 2009



Housekeeping
 Greensweep keeps air particulates to a minimum



Pathway Interruption
 Exhaust filtered and directed to outside



HVAC Protection
 Ductwork kept sealed even after installation



Views accessible from the Biophysics Labs
 Photo: Burt Hill Architects, 2009

Thermal Comfort Survey: Occupants will be surveyed about their thermal comfort once per season. When the FAS facilities staff determine that corrective response is needed, to improve occupant comfort, the survey is issued an additional time within the season to ensure effectiveness of the actions taken.

Daylight and Views: Based on square footage, 91% of regularly occupied areas have access to exterior views.



MATERIALS & WASTE

Selecting environmentally preferable materials and minimizing the amount of construction waste sent to landfill was important in the Biophysics Labs project. When selecting materials, preference was given to locally manufactured, low-emitting materials, and those with recycled content.

88% of the construction waste was diverted from landfills.

20% of the total material value consists of post-consumer and/or pre-consumer recycled content materials.

15% of the total material value consists of materials manufactured within 500 miles of the project site.

99% of the total value of new wood used in the project is Forest Stewardship Council (FSC) Certified.

ENVIRONMENTALLY PREFERABLE MATERIALS IN BIOPHYSICS LABS

- > Ultima #1911 Acoustic Ceiling Tile (Armstrong)
 Recycled Content: **6%** pre-consumer, **65%** post-consumer
- > Marmoleum Flooring (Forbo)
 Recycled Content: **45%** post-consumer
- > Gypsum Wallboard (USG)
 Recycled Content: **95%** pre-consumer, **5%** post-consumer
 Regional: **248 miles** (Montreal, Quebec)
- > Medex Urea-Formaldehyde Free Particleboard (Sierra Pine)
 Recycled Content: **100%** pre-consumer
- > Corner Guards (Forbo)
 Recycled Content: **59%** post-consumer
- > Shades (Mecho)
 Recycled Content: **20%** pre-consumer, **49%** post-consumer



Biophysics Lab
 Photo: Burt Hill Architects, 2009

STORAGE & COLLECTION OF RECYCLABLES

Throughout the Biophysics Labs space, there are SingleStream Slim Jim Containers, which are emptied each day by the

custodial staff. Harvard University uses SingleStream recycling, where cans, bottles, paper products and cardboard can all be recycled in the same units. This is consistent throughout the Northwest Labs building.

ADDITIONAL RESOURCES

- > Harvard Faculty of Arts and Sciences: <http://www.fas.harvard.edu/home/>
- > FAS Green Program: <http://www.greencampus.harvard.edu/fas/green-program>
- > Transportation Services: Commuter Choice Program: <http://www.commuterchoice.harvard.edu>
- > Harvard OFS - Green Building Services: <http://green.harvard.edu/green-building-services>
- > Harvard OFS - Green Building Resource: <http://green.harvard.edu/theresource>

