HARVARD UNIVERSITY | DEPARTMENT OF
Molecular and Cellular Biology

GREEN is the new Crimson

HARVARD FACULTY OF ARTS AND SCIENCES

LEED – CI v3.0

MESELSON LAB—BIOLOGICAL LABORATORIES

SILVER

16 Divinity Avenue, Cambridge, MA, 02138

The Meselson Laboratory was one of many renovations that occurred in the Harvard Biolabs Building in the last few years. Approximately 2,100 square feet of laboratory and office space was renovated to accommodate research personnel under the leadership of Professor Matthew Meselson. The laboratory program includes faculty offices, an administrative support area, graduate student seating, a wet lab, an imaging lab, and cold room.

Meselson Lab Renovation
Photo: Harvard Green Building Services. 2010

The Meselson Lab is part of the Department of Molecular and Cellular Biology within Harvard's Faculty of Arts and Sciences (FAS). Research areas of the department include: biochemistry, biophysics, genetics, cell biology, molecular evolution, neurobiology, gene expression, structural biology and related disciplines.

From the early stages of conceptual design, the project team was focused on achieving sustainability objectives by reducing energy use while maintaining occupant comfort. The renovation leverages a more efficient mechanical system to minimize energy waste.

As part of Harvard's goal to reduce greenhouse gas emissions 30% below 2006 levels by 2016, inclusive of growth, FAS is committed to sustainability. The Meselson Lab project is evidence of this commitment.

PROJECT HIGHLIGHTS

LEED® Facts

BioLabs – Meselson
Harvard FAS
2010 Renovation

Location	Cambridge, MA
Rating System	LEED-CI v 3.0
Certification Achieved	Silver
Total Points Achieved	58/110
Sustainable Sites	16/21
Water Efficiency	0/11
Energy and Atmosphere	17/37
Materials and Resources	8/14
Indoor Environmental Quality	10/17
Innovation and Design	4/6
Regional Priority	3/4

83% of the project waste was diverted from landfills

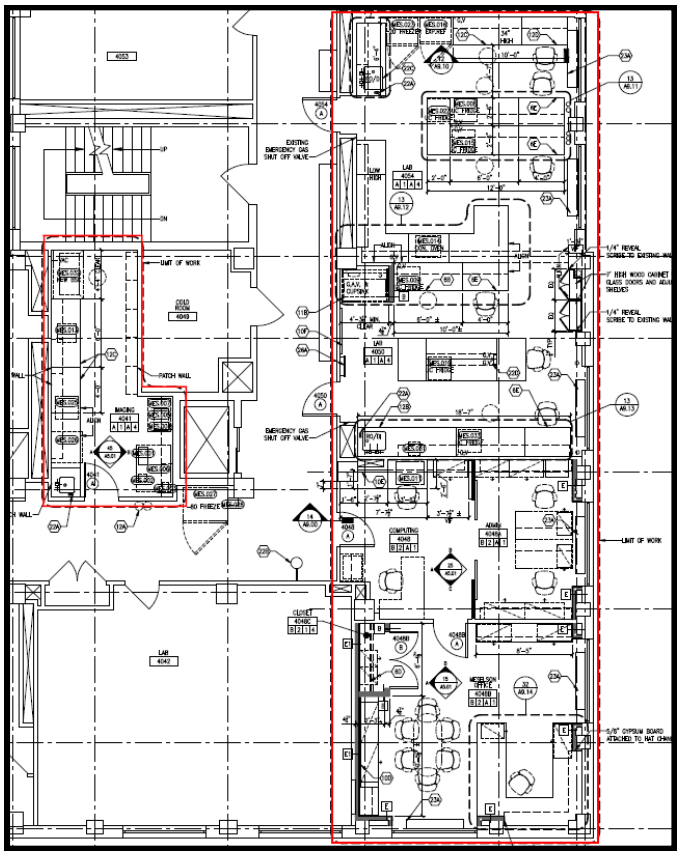
74% of electronic equipment is Energy Star rated

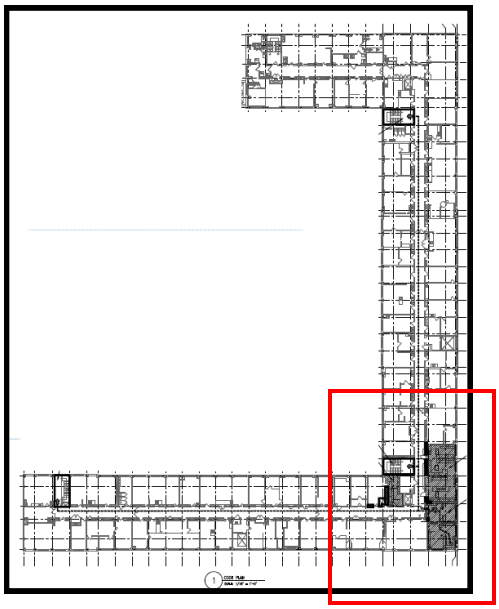
55% of the building's interior nonstructural elements were reused

98% of the lighting load is connected to occupancy sensors

PROJECT OVERVIEW

MESELSON LAB RENOVATION FLOOR PLAN & LEED BOUNDARY





Meselson LEED Boundary
Drawing: Payette Architects

Meselson Lab Office
Photo: Harvard Green Building Services, 2010

PROJECT TEAM

Owner	Department of Molecular and Cellular Biology
Project Manager	FAS Capital Projects
Architect	Payette Architects
Contractor	WISE Construction Company
HVAC Engineer	RFS Engineering
Commissioning Authority	Harvard University Green Building Services
Sustainability Consultant	Harvard University Green Building Services

PUBLIC TRANSPORTATION

The BioLabs Building is located within a quarter mile of five MBTA bus stops and two Harvard shuttle bus stops. The building footprint is within the bounds of a vibrant urban area which affords occupants plentiful access to amenities such as restaurants, banks, churches and retail stores.

BUS STOPS AND SERVICES WITHIN 1/4 MILE OF MESELSON LAB

Legend	Service Name or Bus Stop	Distance From Site	Line Name/ Number or Service type
1	Kirkland St @ Kirkland Place	0.13	86
2	Kirkland St & Summer Rd.	0.14	
3	Kirkland St & Quincy St.	0.14	
4	Kirkland St & Towbridge St.	0.22	
5	Cambridge St @ Prescott St	0.23	69
A	Memorial Hall	0.15	Quad Express and Mather Express
B	Maxwell Dworkin	0.12	
α	Harvard Yard Child Care Center	0.07	Daycare
β	Church of the New Jerusalem	0.2	Place of worship
γ	Queens Head pub	0.19	Restaurant
δ	Shady Hill Square	0.25	Park

FAS GREEN LABS

The FAS Green Labs Program works with researchers, staff, faculty, and building managers to implement sustainable practices and technologies in the FAS lab buildings. Because of the resource intensity of lab science and the unique conditions and requirements in each individual lab, lab sustainability approaches must be made from both a building-wide perspective, as well as a granular perspective aimed at identifying local opportunities at the lab level. FAS Green Labs Program initiatives, with the support of paid lab sustainability representatives, help mitigate resource intensity, while respecting the resource demands of science.

Lab Sustainability Assessments:

The Lab Sustainability Assessment program, a component of FAS Green Labs, operates under the conviction that scientific research can be conducted in more environmentally sustainable ways without adversely impacting research quality. By involving researchers in the process of assessing potential sustainability opportunities, the program aims to share best practices regarding lab energy efficiency, lab water efficiency, lab material recycling, lab material procurement, and toxic waste reduction/prevention.

Key Energy Conservation Measures (ECMs):

- Installing occupancy sensors on lights
- Setting back building temperatures and ventilation rates slightly at night
- Replacing inefficient lighting
- Converting constant volume fume hoods into variable volume fume hoods

ENERGY EFFICIENCY

Harvard Faculty Arts and Sciences 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

Building Automation System: All automatic temperature controls are direct digital control (DDC). Automatic controls provide energy savings based on system zoning, scheduling, occupied/unoccupied setbacks and demand control ventilation. This system monitors carbon dioxide ($C0_2$) sensors throughout the building and modulates the air handling unit return, exhaust and outdoor air dampers as required to maintain the $C0_2$ set-point for demand control ventilation.

Occupancy-Based Ventilation and Occupancy: Occupancy sensors are used to allow for the reduction of exhaust and makeup air rates. Ventilation fluctuates based on detected occupancy or vacancy.

Carbon Dioxide Monitor: Sensors monitor the levels of carbon dioxide in a room. If the level rises above a set point the HVAC system will increase the amount of outside air ventilation.

Plug Loads: Energy Star equipment was selected for all eligible equipment, which includes four computers, Laptops, four LCD Displays, three printers and two scanners.

Commissioning: The mechanical and electrical systems were fully commissioned by a third-party, which helps ensure that all energy-related systems were installed in accordance with the manufacturer's specifications and operating efficiently prior to occupancy.

Humidity and Temperature Sensors
Photo: Siemens Controls

ELECTRICAL SYSTEMS

DUAL TECHNOLOGY OCCUPANCY SENSORS All lighting fixtures within the project scope are capable of adjusting lighting levels based on occupancy. The sensors are motion activated and operate based on the activity levels in the space. In addition the lighting fixtures can be set on a timer so that they shut off remotely at a predetermined time every night. They are also capable of turning on at a particular time.

Light Fixtures: Energy-efficient fluorescent lighting fixtures and lamps were carefully chosen and placed to reduce electricity consumption.

Renewable Energy: In order to help offset the greenhouse gas emissions, Murthy Laboratory renovation bought 36,000 kilowatt-hours renewable energy certificates (REC). The RECs offset approximately 67,750 pounds of carbon dioxide.

DW-100 Dual Technology Wall Switch Sensor

Lighting Sensor
Photo: Watt Stoppers

INDOOR ENVIRONMENTAL QUALITY

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** The building maintained occupancy throughout construction. A comprehensive indoor air quality management plan was implemented during construction to maintain healthy indoor air quality not only for the workers in the space, but for the occupants within the building potentially impacted by operations. For example, all grills and vents were sealed and a HEPA Filtration unit maintained negative pressure to keep any construction debris from migrating outside the work area.

- **Thermal Comfort Survey** To ensure comfort, occupants will be surveyed about their thermal comfort at least once per season. FAS Operations will adjust the heating or cooling in the project space as needed.

- **Composite Wood and Laminate Adhesives** used in the renovation do not have any added Urea Formaldehyde

- **Systems Furniture** The Furniture systems were either SCS Indoor Advantage certified or Greenguard Certified

- **Adhesives and Sealants and Paints and Coatings** All interior paints used in the project have low or zero VOC content. Below are examples of products used in the project.

Product Category	Product & Manufacturer	VOC Content (g/l)	VOC Limit (g/l)	Standard
Paints & Coatings	Benjamin Moore EcoSpec Primer 372	0.0	50	GS-11
	Benjamin Moore EcoSpec Flat 373	0.0	50	GS-11
Adhesives & Sealants	Liquid Nail 903	70	70	SCAQMD Rule# 1168
	Mapei UltraBond Eco 575	0.0	50	SCAQMD Rule# 1168

Construction IAQ Measures Implemented

Good Housekeeping:
Sticky Mats control dust levels

Pathway Interruption:
Isolation areas of work to prevent contamination of clean or occupied spaces

Natural Light
Photo: Harvard Green Building Services

Daylight and Views: The laboratory architecture and fenestration provides a connection between indoor and outdoor environment by introducing daylight and views to 94% of the occupied spaces.

Health and Wellness: Recent studies have linked having access to views of nature in the workplace to the relief of boredom, anxiety, and stress[1].

[1] Ulrich, R. S. Effects of interior design on wellness: theory and recent scientific research. (Journal of Healthcare Design, Vol 3, pp. 97-109, 1992)

MATERIALS & WASTE

Selecting environmentally preferable materials and minimizing the amount of construction waste sent to landfill was important to the project team. For the additional materials purchased, the project gave preference to low-emitting materials with recycled content and local manufacturing.

34% **of the total material value consists of products manufactured locally.**

83% **of the on-site generated construction waste was diverted from the landfill.**

21% **of the total value of materials used in the project consist of materials with recycled content.**

ENVIRONMENTALLY PREFERABLE MATERIALS IN MESELSON, BIOLABS

- Metal Frames (De La Fontaine)
  25% pre-consumer, **20%** post-consumer
- Drywall (USG)
  95% pre-consumer, **4%** post-consumer
- Steel Studs (Dietrich)
  17% pre-consumer, **37%** post-consumer
- Ceiling Tiles (Armstrong)
  67% pre-consumer, **15%** post-consumer

Examples of regional materials used in project:

Material Name	Manufacturer	Distance between project & Manufacturer (mi)
Drywall	USG	378
Metal Studs	Dietrich	198

Meselson Labs | Photo: Harvard Green Building Services

ADDITIONAL RESOURCES

- Harvard FAS, Dept of Molecular and Cellular Biology: http://mcb.harvard.edu
- Harvard FAS, Green Labs Program: http://green.harvard.edu/fas/green-labs
- Harvard Green Building Services: http://green.harvard.edu/green-building-services
- Harvard Green Building Resource: http://green.harvard.edu/theresource
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