

Physical Sciences Building Overview

Designer/Project Information:

The Physical Sciences Building was designed Boston-based Koetter, Kim & Associates, whose founders are both Cornell alumni, and engineering services were provided by Burt Hill.

- The facility houses nearly 100 research and teaching laboratories, new meeting, dining and gathering spaces, a 120-seat auditorium, and a basement with some of the most noise-free, vibration-proof facilities in the world.
- Total project cost is approximately \$142,000,000.
- Ground breaking took place in September 2007, and occupancy took part in two phases:
 - Phase I: August 2010 – Basement, Ground Floor and Teaching Labs on 1st Floor
 - Phase II: December 2010 – Remainder of facility

Program Information:

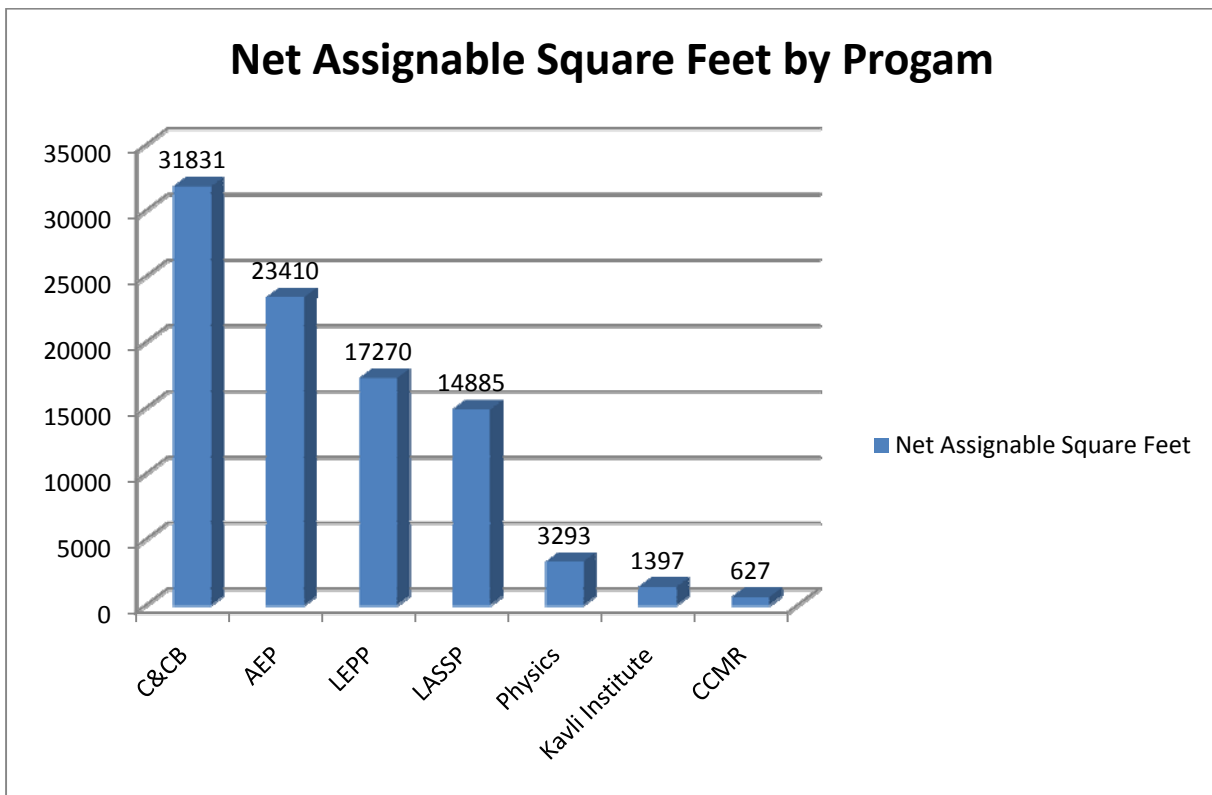
The Physical Sciences Building has been a joint effort between the College of Arts and Sciences and the College of Engineering, and it provides new research and teaching space for the following groups:

- Department of Chemistry and Chemical Biology (C&CB)
- School of Applied and Engineering Physics (AEP)
- Laboratory for Elementary-Particle Physics (LEPP)
- Laboratory of Atomic and Solid State Physics (LASSP)
- Department of Physics
- Kavli Institute at Cornell
- Cornell Center for Materials Research (CCMR)

The total Net Assignable Square Footage of the Physical Sciences Building is 177,156, which includes all areas such as corridors, atria, mechanical rooms, etc. The total Net Assignable Square Footage for program use is 92,713. Each floor has a mix of uses and groups as summarized below:

- Basement:
 - Space for LASSP, AEP, Kavli Institute and C&CB
 - 19 offices, 32 lab rooms, 2 lounges
 - 7 labs have isolated slabs for low vibration work
- Ground Floor:
 - Space for LASSP, AEP, C&CB and PSB Facilities
 - 13 offices, 17 lab rooms, 2 conference rooms, 1 lounge, 1 Stockroom
 - The building's Fire Command Center is located here

- First Floor:
 - Space for C&CB and AEP
 - 10 teaching labs, 6 lab support rooms, 120-seat auditorium, atrium and café
 - Includes a hazardous chemical storage room (H-room)
 - Includes the Rockefeller Terrace
- Second Floor:
 - Space for C&CB
 - 19 offices, 27 lab rooms, 2 conference rooms, 2 cold rooms
 - Includes 4 hazardous chemical storage rooms (H-rooms)
 - Connecting bridge to Baker Lab
- Third Floor:
 - Space for C&CB, CCMR, LEPP and Physics
 - 30 offices, 13 lab rooms, 2 conference rooms, 1 cold room, 1 computer room
 - Includes a hazardous chemical storage room (H-room)
 - Connecting bridge to Baker Lab
- Fourth Floor:
 - Space for LEPP, LASSP and Physics
 - 42 offices, 8 conference rooms, 1 lounge, 1 mail room for LEPP
 - Includes an exterior balcony overlooking the Arts Quad and Cayuga Lake
 - Connecting bridge to Clark Hall



Green Building Information Summary

The Physical Sciences Building has been awarded the Gold Level LEED Certification. This certification is provided by the U.S. Green Building Council for Leadership in Energy and Environmental Design. Total LEED credits achieved were 47 out of 69 total points possible.

Calculated Energy Savings:

Energy Modeling indicates a **43.9% energy** and **40.5% energy cost** savings versus a comparable baseline building. This includes the calculated energy savings from utilizing the central combined heat and power plant and lake-source cooling efficiencies.

Factors resulting in increased energy efficiency:

- The building was constructed as an infill project and is connected on two sides to existing buildings resulting in less exposure to the exterior environment. Additionally, a portion of the building basement extends beyond the visible aboveground building footprint resulting in a stable thermal environment for the underground portion of the building.



- The western side of the building is constructed with a double glass curtainwall system with integrated solar shading devices to control heat loss and gain.



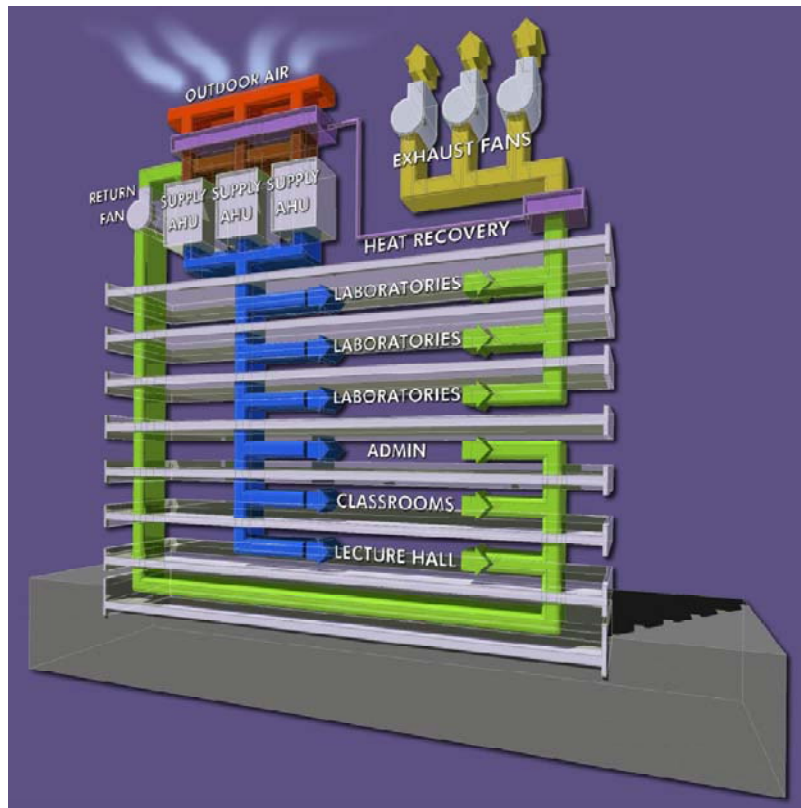
- The building roof is a highly reflective light colored membrane material resulting in lower heat gain during summer months.
- The extensive exterior and interior window glazing maximizes the use of natural light reducing the required electrical lighting demand.



Ventilation Design:

The proposed single air handling system arrangement results in a very high quality of air throughout the building while conserving energy. A principal consideration of this facility is the high rates of ventilation required for safe operation of the numerous laboratories.

To ensure that contaminants from lab areas are not recycled into the building, laboratory exhaust air cannot be mixed with supply air. However, a portion of the uncontaminated air supplied to the non-laboratory spaces (office, classrooms, and lecture halls) can be re-used to reduce the outside air requirements of the laboratories, as shown the figure below.



An interesting aspect of this “combined design” is that the exhausted air volume is governed entirely by the laboratory exhaust rates so that the absolute minimum outside air is required overall, reducing energy use to a minimum. Nonetheless, based on the balance of ventilation required to meet the laboratory air flow needs and the ventilation required for the other building spaces, the supply air is approximately 85% outdoor air under normal conditions for all spaces throughout the building. This high level of outside air, combined with a high level of air filtration (85% final filtration), results in a high air quality for both the offices and laboratory spaces without risk of cross-contamination. To reduce the energy loss from the air that is exhausted, a heat recovery loop is used.

Water Usage:

Efficient fixture selection resulted in a calculated 33% water savings.

The vast majority of the project site does not utilize permanently installed irrigation systems. Landscape irrigation is limited to a planter located on the building terrace. Irrigation water supplied to this planter comes from an entirely non-potable source. Rainwater is collected from the building roof in a sump pit, which then supplies water to the planter. No connection to the potable water supply exists for this irrigation system. The remainder of the site utilizes drought tolerant/native plantings which do not require irrigation.

Materials:

Recycled content comprises **37%** of the total materials cost.

Regional materials (harvested and extracted within 500 miles) comprises **21%** of the total materials cost.

Indoor Environmental Quality:

All paints, sealants, adhesives, flooring, and composite wood products used within the building are low-VOC emitting materials.