

# Fisher Pavilion Seattle Center

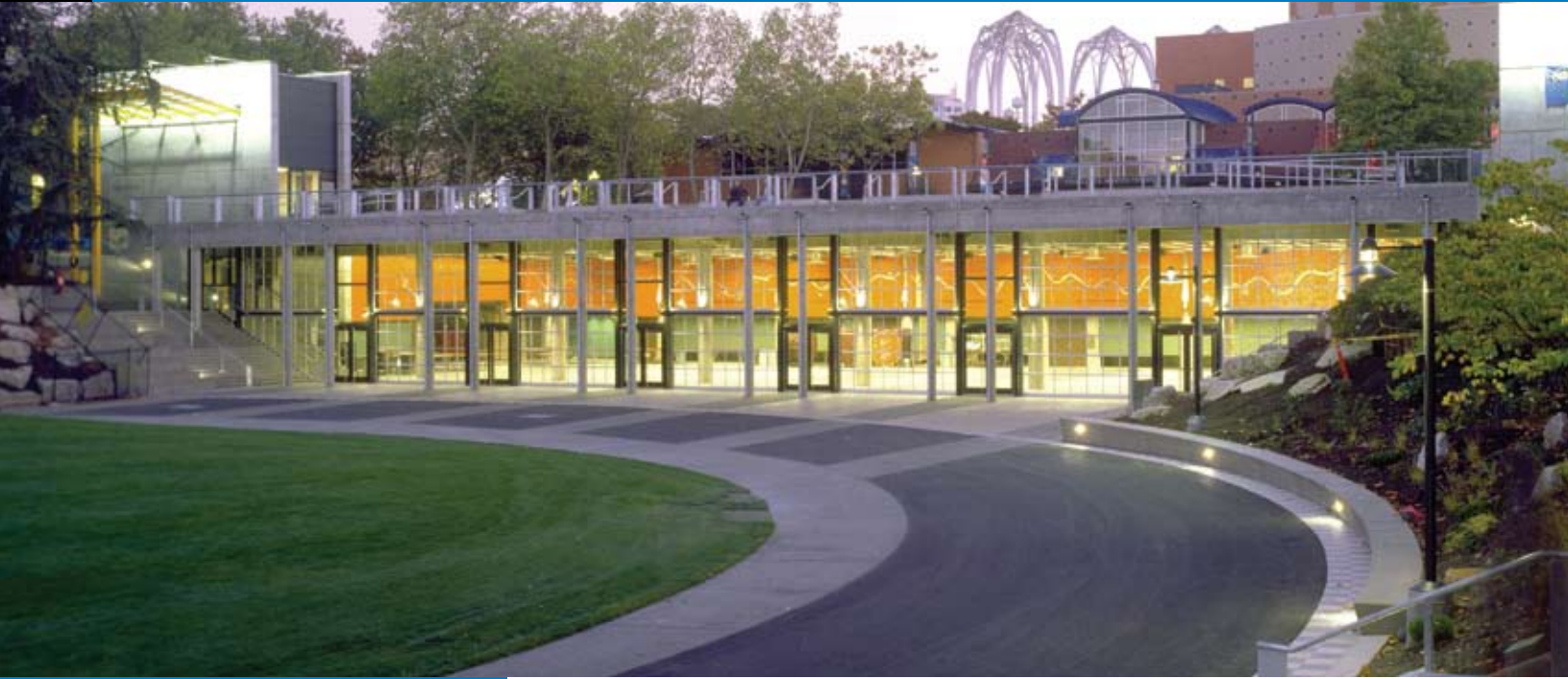


Photo by Steven Keating

**Square Feet:** 24,000, 1 story  
**Site:** 2.6 acres  
**Location:** Seattle Center  
**Construction Cost:** \$396/square feet  
**Completed:** October 2002

## LEED Facts - NC Certified



Sustainable Sites	3	14	
Water Efficiency	1	5	
Energy & Atmosphere	2	17	
Materials & Resources	6	13	
Indoor Environment	10	15	
Innovation & Design	5	5	
<b>Points Achieved</b>	<b>27</b>	<b>Points Available</b>	<b>69</b>

## Benefits

- 20% reduction in energy use
- 50% reduction in potable water use
- 25% less potable water used for irrigation
- 49% of products and materials from regional sources
- 16% decrease in impervious surface on site
- 87% reduction in waste to landfills, based on demolition and construction recycling

## Project Overview

The Fisher Pavilion is a multi-purpose exhibition hall located within the Seattle Center campus. It is a year-round venue for cultural and arts festivals, trade shows, conferences, exhibitions and privately-catered events. Every year during the winter holidays, the building converts into an indoor ice skating rink.

Twenty feet of clear height provides great flexibility for staging events. A series of floor-to-ceiling glass doors can be raised up and down. The pavilion's street-level rooftop plaza offers an additional gathering and performance space, as well as unobstructed views of the International Fountain and Seattle Center campus.



### Art at Fisher Pavilion

Art work at Fisher Pavilion is by Deborah Mersky. On the exterior is "*Biography of a Branch*," a glass and stone mosaic. The botanical images represent the waves of immigration that have occurred in Seattle history, plus plants important to the First Peoples. The interior piece is a set of sandblasted and painted panels on the south wall with imagery that suggests the melding of the human and natural worlds.

Artwork detail photos appear above and below. Full piece artwork imagery also appears in building photography on page 2 and 3.

**Title:** *Twine and Branch*

**Artist:** Deborah Mersky

**Completed:** 2002

**Commissioned:** Office of Arts & Cultural Affairs, funded by Seattle Center 1% for Art funds



Photos by Steven Keating

The 14,000-square-foot assembly room represents about half the total indoor square footage, and is accompanied by a small lobby and reception area. Mechanical and electrical systems and restrooms occupy the rest of the space. About two full-time-equivalent staff members occupy the pavilion. There is an average of 5,400 visitors each week, 250 days out of the year.

### Sustainable Sites

Located in the heart of the 74-acre Seattle Center campus, Fisher Pavilion replaces the Flag Pavilion, a temporary 1962 Worlds Fair building which blocked the view from the new Charlotte Martin Theater to the reconstructed International Fountain. It is built into a natural hillside within the same footprint as the old building, with the floor lowered approximately 20 feet. On top is a 19,000-square-foot rooftop plaza with a spectacular view of the International Fountain to the north. The inside of the building also offers a clear view of the fountain. Fisher Pavilion essentially turns the entire site into outdoor useable public space while satisfying Seattle Center's program for a new 24,000-square-foot public exhibition space.

The project opens up a major view corridor, connecting the Charlotte Martin Theater to the International Fountain, the Seattle Center Theater District and vistas of the City and Queen Anne Hill beyond. A grand, amphitheatre-like staircase completes the pedestrian connection between attractions on both sides of the building.

Five roll-up doors create a functional glass wall on the north side of the pavilion itself. The doors can be raised for an open-air

experience and provide a connection to the outdoor plaza and Fountain Lawn. A large overhang protects outdoor areas on the north side of the building from the rainy climate.

Two acres of green space, called The Green, replaced the Flag Pavilion's concrete plaza area. The Green was graded into a bowl to accommodate the large number of people that participate in festivals and gatherings at the Pavilion, and to complement the indoor space. Garden areas support a mixture of native and adapted plants suitable to the shady microclimate, similar to a woodland clearing. In addition to a garden, hardscape and lawn, there is a service roadway and pedestrian and non-motorized vehicle path.

The result is an increase in green space on the 2.6-acre site from previously 36 percent to 52 percent green space and 48 percent building or paved area.

The design footprint was carefully considered to preserve trees planted over 40 years ago. An arborist-assisted tree protection plan resulted in the protection of most of the London Planetrees on site. Three important specimen trees were also protected, including the Founders' Tree, a laurel from the southern Mediterranean region; an Atlas cedar from northern Africa; and a Zelkova from Asia.

The contractor used engineering controls during construction to retain stormwater and keep silt and other pollutants from entering the stormwater drainage system. Filters were placed in all surrounding storm drain inlets to keep silt out. Other measures included construction of on-site detention ponds and installation of silt fencing during construction.



Photos left and middle by Steven Keating, photo right courtesy of Miller|Hull Partnership

Seattle Center and Fisher Pavilion is served by local and regional bus service, and the terminus of the existing monorail line between the Center and downtown is one block away. The pavilion has no on-site parking because Seattle Center has a campus-wide parking master plan.

## Water Efficiency

All plumbing fixtures in Fisher Pavilion are low-demand fixtures which results in a 50 percent reduction in water consumption, or 479,000 gallons per year compared to the old Flag Pavilion which it replaced.

Site water is conserved through a highly efficient irrigation system combined with the planting of drought tolerant plant species. Water-efficient irrigation fixtures and a central automated weather station optimize water use over the course of the irrigation season by monitoring precipitation, wind, humidity, and soil moisture for the Seattle Center microclimate. This collective mosaic of water systems results in water consumption of 260,000 gallons per year. This represents a 25 percent reduction, or 65,000 gallons, in water use compared to a standard high-efficiency irrigation system not utilizing a weather station.

In addition to native plant species that adapt faster to the local environment and use less water, the plant palette includes non-native ornamental plants that can withstand drought in unseasonably dry periods.

## Energy & Atmosphere

The earth-seated design of Fisher Pavilion, with shell largely below grade, improves the energy performance of the building.

Heat is retained, and the east, west and south sides are protected from solar gain. A large canopy-balcony over the glazed exterior further reduces solar load.

Heating cooling and ventilation (HVAC) systems are designed to respond to highly variable occupancy and large crowds, and to special conditions in warm months, when users circulate freely between the outdoors and in. The mechanical system is a hybrid, combining a simple HVAC system with direct digital controls with a passive ventilation and conditioning approach. Heating and chilled water pumping systems are of variable volume to take advantage of reduced pumping horsepower during low heating- or cooling-load conditions. Air moving systems remain at constant volume to ensure adequate ventilation.

Outside air volumes are determined by CO<sub>2</sub> sensors located in the return ducts to reset outside air to minimum quantities required for health, and improved energy savings. Additionally, the HVAC system is capable of moving the full volume of outside air during ventilation cycle, and includes a fully integrated economizer cycle.

During months with mild weather the system can be turned off, and the building relies on natural ventilation and conditioning. To assist, the project team installed “destratification fans” in the ceiling space. As warm air rises, the fans can be operated to either push the warm air down into the space during cooler climate conditions or pull the warm air out of the building during warmer conditions. A radiant heating system was installed in the foyer to provide additional comfort in this transitional space.

The roof is finished with painted concrete pavers that reflect solar heat and maintain a cooler microclimate.

Through these combined and integrated features, energy use at Fisher Pavilion was modeled to exceed the efficiency standard of ASHRAE 90.1-1999 by 20 percent, saving a total of 21,669 British thermal units (BTUs) and 115,000 kilowatt hours of electricity per year, enough to heat over 10 typical houses.

Interior and exterior lighting fixtures are controlled with low voltage and line-level lighting controls. There is multi-light level and multi-zone control of main overhead light fixtures, resulting in increased energy savings. Exterior lighting has a low voltage control system with override capability. All exterior lighting fixtures are the “zero cutoff” type.

Fisher Pavilion project lighting design resulted in a 52 percent reduction in the amount of lighting energy used.

## Materials & Resources

For construction materials, the Fisher Pavilion project achieved 56 percent post-consumer or post-industrial content. Among the high recycled content materials used in the project are flyash (15% of cement), structural and ornamental steel (35%), rebar (100%), bituminous waterproofing (25%), steel doors (30%), aluminum canopies (26%), glazing (15%), ceramic tile (83%), wood paneling (95%), toilet compartments (40%), and walk off mats (100%), as well as many other products with lesser content. Toilet partitions are made from recycled plastic.

In addition, 49 percent of materials were manufactured within 500 miles of the site,

including concrete, concrete products, steel fabrications, lumber, aluminum storefront and canopies, glazing, and fire protection system.

A total of 87 percent of the construction, demolition, and land-clearing debris from the project was recycled, greatly exceeding the team goal of 75 percent.

## Indoor Environment

Exposed concrete, steel, and glass structure means that few finishes were needed or used, removing many potential impacts to interior air quality. Coatings, sealants, and adhesives were selected for low or no volatile organic compounds. An indoor air quality management plan, required by the owner and developed by the contractor, protected mechanical systems during construction. A two-week flush out of the heating, ventilation and air conditioning system was executed, and new filtration media replaced prior to occupancy of the building.

Occupants can control the amount of ventilation through openable garage doors along the outer wall. Ceiling fans are also controlled by occupants. All of the exhibition space inside the building has access to the view out to the grounds and fountain. The entry foyer of the building is also daylight.

Constant carbon-dioxide monitoring ensures that mechanical ventilation will run, if necessary, to ensure that enough fresh air is supplied for the occupants.

## Innovation & Design

- Exceptional Use of Regionally Manufactured Materials
- Exceptional Use of Regionally Extracted Materials
- Exceptional Landscape Design to Reduce Heat Islands
- Use of Structure as Finish Material
- LEED Accredited Professional

## Lessons Learned

- When designing an earth-based structure, natural ventilation is optimized through openings along the inside, below-grade wall. As built, these openings were eliminated in favor of full use of the rooftop plaza. As designed, the openings would have also served as light monitors, which would bring natural light into the back of the building and balance the open front.

- At the time modeling for energy savings was done, US Green Building Council (USGBC) modeling for energy savings for natural ventilation could not be calculated based upon standards an air-conditioned building. This protocol has now been revised so that the substantial savings associated with the lack of air conditioning can be claimed.

- When the building structure doubles as finish material, it can result in substantial savings in materials and resources. The design team calculated that structural concrete floors, walls and ceilings precluded tons of flooring, ceiling tiles and wall finishes that were otherwise standard in buildings at Seattle Center, and was able to convince the USGBC board to award credit on this basis.

- A concrete roof plaza will typically mitigate the heat island effect of a building, because of its high reflectivity. While cement surfaces are already more reflective than asphalt surfaces, they can be made more reflective through the use of white cement and lighter course and fine aggregates.

- Early commitment to LEED certification is important. This project was largely designed, with budget fixed and all fundamental conceptual and systems decisions made, by 1997-three years in advance of the City of Seattle's adoption of the LEED certification process as a mandate for public facilities over \$5 million. This made a Silver or higher LEED rating nearly impossible to achieve.

- Subcontracting the recycling operation to a special recycling subcontractor greatly increases the total amount of recyclables for a project. In this scenario, all waste is put in one container, and then taken to a recycling facility where recyclables were culled out into separate streams. The remainder, which was not recyclable, was sent to the landfill.

- Omitting office space on site can remove a regulatory barrier to energy savings. Because Fisher Pavilion is a unique building type, that is, not an office building, the owner is able to shut down building systems when the building is not in use.

December 2008

## Rating & Awards

U.S. Green Building Council LEED® for New Construction Certified

2004 AIA Business Week/Architectural Record Recipient

2003 National Earth Day Top Ten Project Award for Sustainable Design

2003 AIA/COTE Top Ten Green Projects

2002 Honor Award, AIA Washington Civic Design Awards

2002 Merit Award, AIA Seattle Chapter

2001 Commendation Award, City of Seattle Design Commission

## The Team

### Owner

City of Seattle/Seattle Center  
[www.seattle.gov](http://www.seattle.gov)  
[www.seattlecenter.com](http://www.seattlecenter.com)

### Architect

The Miller/Hull Partnership  
[www.millerhull.com](http://www.millerhull.com)

### Mechanical Engineer

The Greenbush® Group  
[www.greenbusch.com](http://www.greenbusch.com)

### Landscape Architect

Site WorkShop  
[www.siteworkshop.net](http://www.siteworkshop.net)

### Civil & Structural Engineer

AKB Engineers  
[www.akb-eng.com](http://www.akb-eng.com)

### Electrical Engineer

Sparling  
[www.sparling.com](http://www.sparling.com)

### Contractor

Howard S. Wright Construction Company  
[www.hswconstructors.com](http://www.hswconstructors.com)

### Commissioning Agent

Engineering Economics Incorporated  
[www.eeiseattle.com](http://www.eeiseattle.com)

### Recycling Contractor

Renu (a branch of Nuprecon)  
[www.nuprecon.com](http://www.nuprecon.com)

## To Learn More

**City Green Building** is making green building standard practice in Seattle through education, technical assistance and incentives.  
[www.seattle.gov/dpd/greenbuilding](http://www.seattle.gov/dpd/greenbuilding)

**LEED®** is the national benchmark for high performance green buildings developed by the US Green Building Council.  
[www.usgbc.org](http://www.usgbc.org)

**Office of Arts & Cultural Affairs** promotes the value of arts and culture in and of communities throughout Seattle.  
[www.seattle.gov/arts](http://www.seattle.gov/arts)

**Seattle Center** brings people together people to create thousands of extraordinary experiences that enrich millions of lives each year.  
[www.seattlecenter.com](http://www.seattlecenter.com)