

CELEBRATING A CITY'S COMMITMENT TO SUSTAINABLE DESIGN

Cambridge Public Library
Cambridge, MA



CAMBRIDGE PUBLIC LIBRARY

This new Main Public Library for the City of Cambridge includes the preservation of the existing historic library (27,000 gsf) and a major new building addition (76,700 gsf). This project also included open space enhancement and new below-grade parking, and received the largest grant in the history of Massachusetts Board of Library Commissioners (\$10.7M). Ann Beha Architects was the Associate Architect for the historic building.

SUSTAINABILITY SUMMARY

Cambridge Public Library, which is in the process of submission, demonstrates the City's commitment to sustainable building practices. The City will implement a green housekeeping program. Key components of the project's approach include:

Re-Use of an Historic Landmark:

- Rigorous restoration of the City's original Main Library, designed in 1889 by Van Brunt & Howe
- Conserves material resources and, more importantly, preserves an important cultural treasure

Maximizing Natural Light:

- Daylight and views provided to 90% of the occupied spaces in the building
- Significant natural light introduced through transparent main facade (a double-skin curtainwall), windows on the north facade and at both ends of the main circulation spine, and skylit atrium
- Large windows bring light into historic spaces
- High-efficiency light fixtures are controlled by sun sensors & zone-specific dimming system

Double-Skin Curtainwall:

A Unique High-Performance Facade:

- The first of its type in the U.S., the double-skin facade is a multi-story (full height), full depth (3'), thermal flue with 1'-0" deep movable sunshades
- Allows for complete transparency while ensuring protection from excessive heat gain, heat loss, and glare
- Energy Savings and Comfort: The facade saves energy (50% reduction compared with a conventional curtainwall) and maximizes comfort at the reading spaces.
- Natural Light: The facade brings a significant amount of balanced natural light into the library, carefully controlled by fixed & movable sunshades
- Natural Ventilation: Operable windows in the facade allow for fresh air throughout the year (even in winter) without insect screens blocking and without concern for stolen books. In the winter, spring and fall, the windows allow heat from the cavity to be brought into the building.

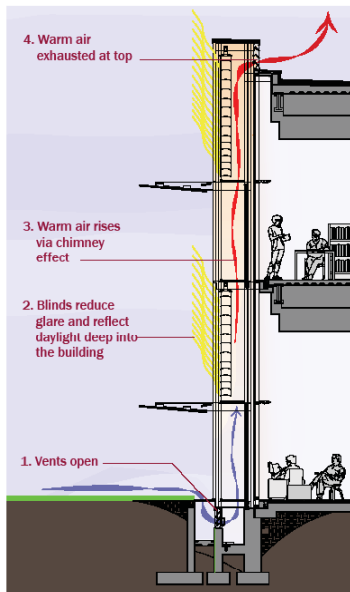
Stormwater & Construction Waste Management:

- 350,000 gallon stormwater retention tank, located under the park, provides stormwater management for a 3-square mile section of the City
- Over 95% of the waste generated from construction was diverted from landfills

DOUBLE-SKIN CURTAINWALL: HOW IT WORKS

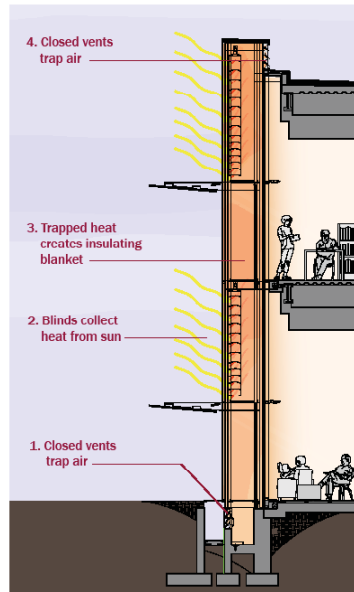
SUMMER: A Ventilated Facade

During the summer, a stack effect ventilates the facade and keeps solar heat gain out of the building.



WINTER: An Insulating Blanket

During the winter months, the double-skin curtain-wall retains heat, creating a thermal blanket.



DOUBLE-SKIN CURTAINWALL: THERMAL MODEL

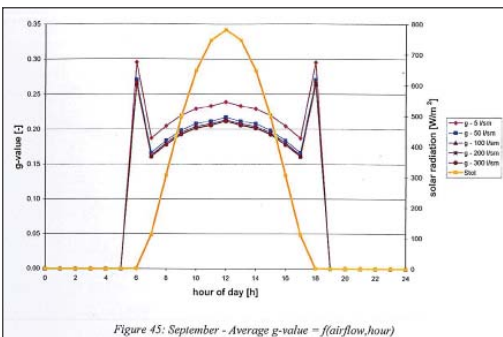


Figure 45: September - Average g -value = $f(\text{airflow, hour})$

G-Value

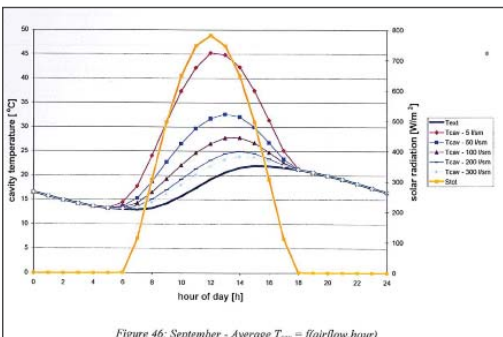


Figure 46: September - Average T_{cav} = $f(\text{airflow, hour})$

Cavity Temperature

tion for LEED certification, reflects the City of Cambridge's maintain the facility in accordance with its City-wide green approach include:

Open Space Enhancements & Underground Parking:

- Preserved a 4-acre City Park surrounding the library, creating an open space that is over six times the footprint (27,000 sf) of the 102,000 sf library
- Expansion triples the area of the original building, but the park actually grows in area by a half acre
- Underground parking expands the land available for the park, eliminating stormwater runoff from the parking lot & reducing the urban heat island effect by shading 100% of the parking area with parkscape
- Parking is covered by a 33,000 sf green roof (an intensive type with 4' of soil to allow tree planting)

Transportation:

- Dedicated parking for alternate fuel vehicles in underground garage
- Extensive bicycle storage in the park and in underground garage
- Sited on a dedicated bike lane built by the City in 2001 along Broadway Street
- Staff changing rooms and showers (for staff members riding to work)
- Located with access to 5 bus routes and a major MBTA bus and subway station (Harvard Square)

Water and Energy Conservation:

- Low flow toilets, faucets, and staff showers reduce water consumption
- Enhanced Commissioning of the mechanical systems (including the double-skin facade) ensures the equipment is operating to optimum efficiency
- CFC free refrigerants were used in the air conditioning system

Materials and Indoor Air Quality

- User-controlled natural ventilation throughout the building
- Low VOC paints, adhesives, carpets and other materials used throughout the building
- The library is comprised of 20% post-consumer recycled content



Double-skin wall ensures thermal comfort for patrons along column-free perimeter

LEED CHECKLIST: TRACKING LEED SILVER



LEED-NC

LEED-NC Version 2.2 Scorecard as of 13 March 2009

Cambridge Public Library Expansion
Cambridge, MA

Credits highlighted in yellow are to be submitted with the Construction Submission

Earned	Liberty	Less Likely			
10	1		Sustainable Sites		14 Points
			Prereq 1	Construction Activity Pollution Prevention	Required
1			Credit 1	Site Selection	1
1			Credit 2	Development Density & Community Connectivity	1
1			Credit 3	Brownfield Redevelopment	1
1			Credit 4.1	Alternative Transportation, Public Transportation Access	1
1			Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
1			Credit 4.3	Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles	1
1			Credit 4.4	Alternative Transportation, Parking Capacity	1
			Credit 5.1	Site Development, Protect or Restore Habitat	1
1			Credit 5.2	Site Development, Maximize Open Space	1
1			Credit 6.1	Stormwater Design, Quantity Control	1
			Credit 6.2	Stormwater Design, Quality Control	1
1			Credit 7.1	Heat Island Effect, Non-Roof	1
			Credit 7.2	Heat Island Effect, Roof	1
			Credit 8	Light Pollution Reduction	1
1			Water Efficiency		5 Points
			Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
			Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
			Credit 2	Innovative Wastewater Technologies	1
1			Credit 3.1	Water Use Reduction, 20% Reduction	1
			Credit 3.2	Water Use Reduction, 30% Reduction	1
1	1	1	Energy & Atmosphere		17 Points
			Prereq 1	Fundamental Commissioning of the Building Energy Systems	Required
			Prereq 2	Minimum Energy Performance	Required
			Prereq 3	Fundamental Refrigerant Management	Required
			Credit 1	Optimize Energy Performance	1 to 10
			Credit 2.1	On-Site Renewable Energy	1 to 3
			Credit 3	Enhanced Commissioning	1
1			Credit 4	Enhanced Refrigerant Management	1
			Credit 5	Measurement & Verification	1
			Credit 6	Green Power	1



Library in the Park

PROJECT FACTS

PROJECT NAME

Cambridge Public Library
Cambridge, Massachusetts

SIZE

Total: 103,900 sf
New Building: 76,700 sf
Renovation: 27,200 sf

HONORS AND AWARDS

2010 Interior Design/Interior Architecture Award,
Boston Society of Architects
2010 Integrated Design/Integrated Development
Award for Excellence in Sustainable Design,
New Hampshire American Institute of Architecture
2010 Massachusetts Historical Commission
Preservation Award
2010 Special Recognition, Cambridge Historical
Commission Preservation Recognition Program
2010 AGC Aon Build America Award

OWNER

City of Cambridge
Susan Flannery, Director of Libraries
Alan Burne, Owner's Project Manager
Richard Rossi, Deputy City Manager, Project Director

PROJECT TEAM:

Architect: William Rawn Associates, with
Ann Beha Architects
Landscape Architect: Michael Van
Valkenburgh Associates
Structural Engineer: LeMessurier
Consulting Engineers
MEP Engineer: R.G. Vanderweil Engineers
Lighting: Horton Lees Brogden
Lighting Designers
Civil Engineer: HW Moore
IT and A/V/: CCR Pyramid
Facade Consultant: Ove Arup
Facade Group

CONTRACTOR:

Consigli/ JFWhite - A Joint Venture

ARCHITECTURAL CONTACTS:

William Rawn, FAIA, LEED AP
wrawn@rawnarch.com
Clifford Gayley, AIA, LEED AP
cgayley@rawnarch.com
Ann Beha, FAIA
abeha@annbeha.com
Pamela Hawkes, FAIA, LEED AP
pwhawkes@annbeha.com



Light-filled ground floor

William Rawn Associates, Architects, Inc.

10 Post Office Square, Suite 1010, Boston, MA 02109
t) 617.423.3470 www.rawnarch.com

with

Ann Beha Architects, Inc.

33 Kingston Street, Boston, MA 02111
t) 617.338.3000 www.annbeha.com