

FREE COOLING

Because of heat gain from lab equipment lab spaces require cooling year round. At the G.G. Brown Addition the heat from lab equipment is used to preheat ventilation air in the winter using the chilled water system. After the chilled water is cooled again from the cold ventilation air it is sent back to cool the lab spaces. This cycle continues, creating a perpetual "Free Cooling" process.

FUME HOODS

The labs at G.G. Brown implement a variety of innovative fume hood technologies to save energy while maintaining a safe environment. Among these technologies are variable volume fume hoods with sash position sensors and reduced face velocity fume hoods.

LEED GOLD CERTIFIED



Sustainability Facts

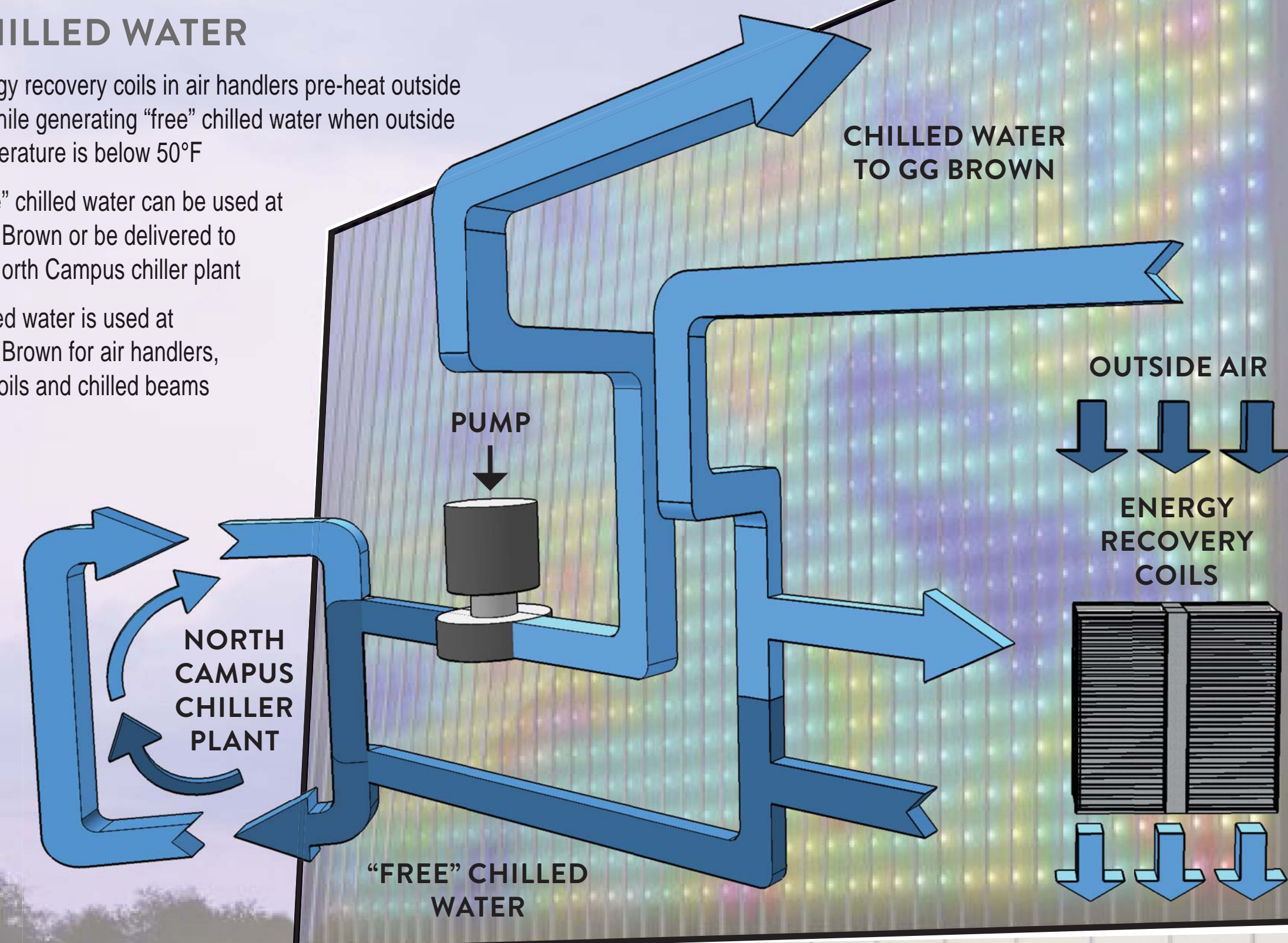
GG Brown Engineering Building / Addition			
Building Use	Engineering Lab Building		
Location	Ann Arbor, Michigan		
Size	62,500 Square Feet		
Number of Occupants	98		
LEED version	v2009		
LEED certification level	Gold		
ASHRAE 90.1 version	2007		
Energy cost savings compared to ASHRAE baseline	40.7%		
Total energy savings	\$125,168 / year		
Total electrical savings	727,252 KWh / year		
Total gas savings	77,655 Therms / year		
CO2 emissions avoided	986 tons		
Water fixture baseline	Energy Policy Act of 1992		
Total water savings	36%		
On-site renewable energy generation	1%		
Construction/Demolition waste diverted from landfill	82%		
Insulation (R-Value)*	Code	Project	
Wall assembly - above grade	15.6	46.9	
Wall assembly - below grade	8.4	23.3	
Roof assembly	20.8	58.8	
Glazing - Curtain wall system			
U-value**	0.45	0.339	
Solar Heat Gain Coefficient (SHGC)**	0.40	0.37	
Glazing - Fixed assembly			
U-value**	0.55	0.42	
Solar Heat Gain Coefficient (SHGC)**	0.40	0.35	
Glazing - Visible Light Transmittance (VT)***		0.68	
Project Team			
Owner	University of Michigan - Michigan Engineering		
Architect	Integrated Design Solutions with Perkins & Will		
Engineer	Integrated Design Solutions		
Contractor	DeMaria Building Company		
Commissioning Authority	U-M AEC		
Project Management	U-M AEC		
Design Period: 10/2009 - 02/2012			
Construction Period: 04/2012 - 08/2014			
* The higher the R-value the better the insulating quality			
** The lower the U-value and SHGC the more energy efficient the window			
*** The higher the VT value the more daylight in the space. VT is measured between 0 and 1			

CHILLED WATER

Energy recovery coils in air handlers pre-heat outside air while generating "free" chilled water when outside temperature is below 50°F

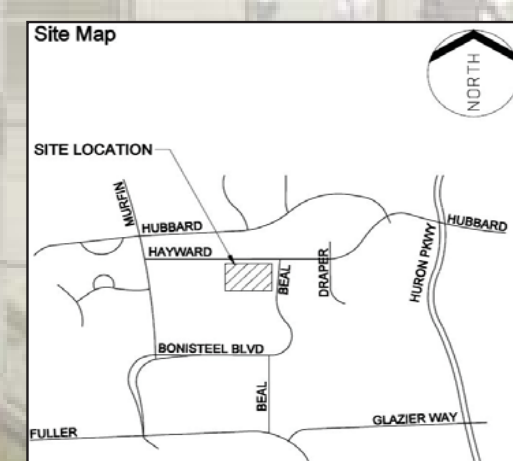
"Free" chilled water can be used at G.G. Brown or be delivered to the North Campus chiller plant

Chilled water is used at G.G. Brown for air handlers, fan coils and chilled beams



THE G.G. BROWN ADDITION

University of Michigan's next-generation nano-mechanical engineering lab complex enables researchers to study the forces at work at the smallest scales and to advance nano-technologies in energy, manufacturing, healthcare and biotechnology. It houses The Center of Excellence in Nano Mechanical Science and Engineering and includes a state-of-the-art Ultra-Low Vibration Facility. Core laboratory and collaborative spaces are extremely flexible and shared by the occupants, as well as other researchers in the building to promote synergy and interdisciplinary engineering research.



INTEGRATED DESIGN SOLUTIONS ARCHITECTS & ENGINEERS
IN ASSOCIATION WITH **PERKINS + WILL NATIONAL DESIGN PARTNER**



HIGH PERFORMANCE WINDOWS

Glass was selected that reduces the amount of solar energy transmission into the building while still providing a large amount of natural light

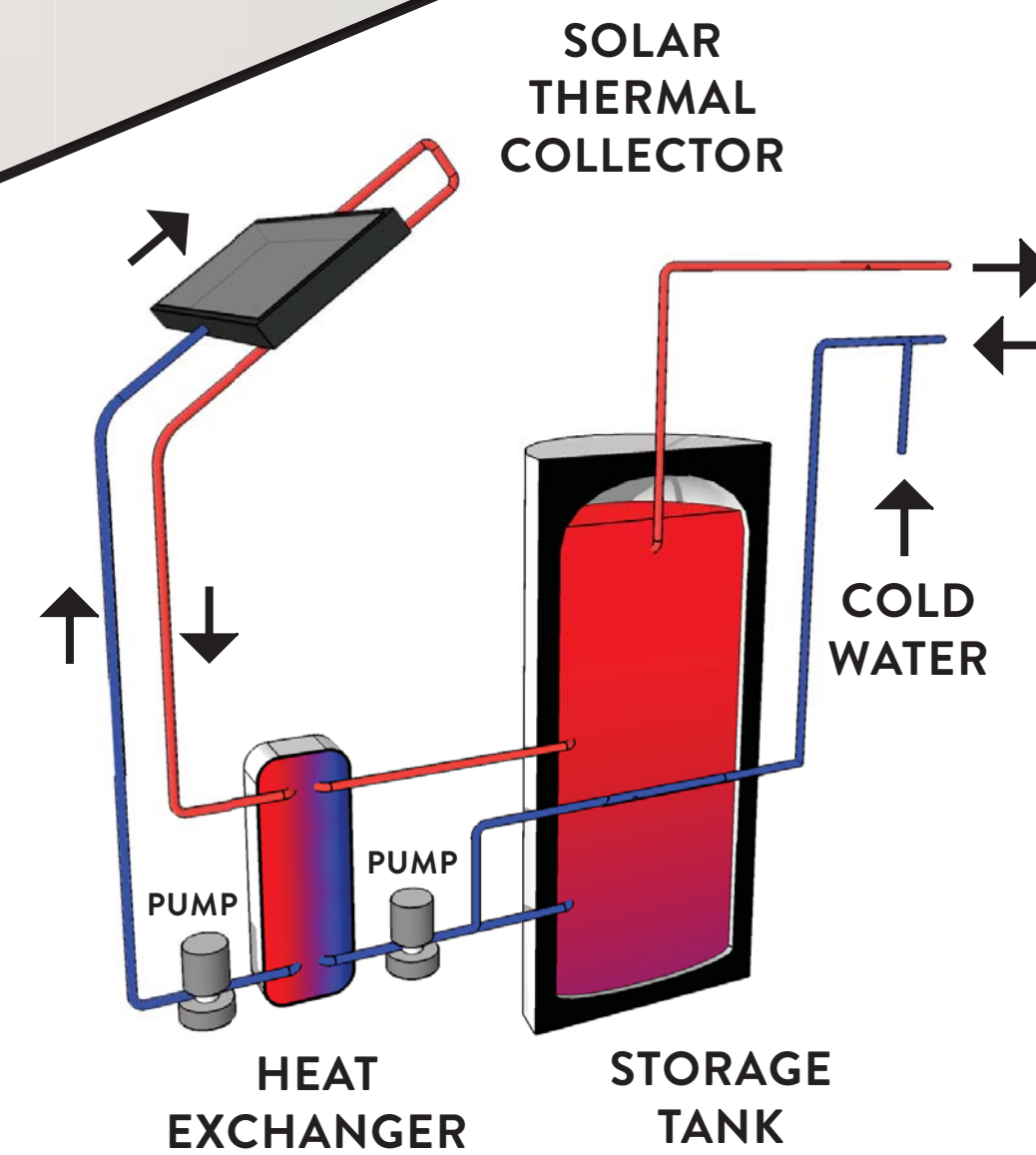
The Transparent design along with a giant LED wall showing abstract samples of active lab work creates a distinct presence on campus for the College of Engineering.



PHOTO-VOLTAIC SOLAR PANELS

Photo-Voltaic solar panels on the roof of the G.G. Brown Addition generate enough electricity to support 1% of the total building energy use. This ultimately reduces the environmental and economic impacts associated with the use of fossil fuels.

SUPPORTS 1% OF TOTAL BUILDING ENERGY USE



SOLAR WATER HEATING

Solar collectors on the roof use energy from the sun to heat domestic water for use in lavatories and sinks. This helps to reduce the consumption of steam.

OPTIMIZE ENERGY PERFORMANCE

G.G. Brown Addition avoids excessive energy use by implementing a superior building envelope to minimize heat loss and by executing modern heating, ventilation and air conditioning strategies.

G.G. Brown Addition exceeds the performance of a code minimum building by 40%.

40%

"FINDING SOLUTIONS AT THE FRONTIERS OF MECHANICAL ENGINEERING"

THE G.G. BROWN ADDITION



WATER USE REDUCTION

The use of high efficiency plumbing fixtures provides a 36% water use reduction when compared to fixture performance requirements of the Energy Policy Act of 1992.

36% WATER USE REDUCTION

DEVELOPING SUSTAINABLE SITES

The site for the G.G. Brown Addition was previously a parking lot, selected to limit the disturbance of previously undeveloped land. The project restored more than 50% of the total site to native vegetation. The conversion of the existing parking lot to vegetation also reduced the volume of storm runoff by 25%.

50% OF THE TOTAL SITE RESTORED TO NATIVE VEGETATION

25% REDUCTION OF STORMWATER RUNOFF



FACILITIES & OPERATIONS
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
UNIVERSITY OF MICHIGAN

1000407

U-M Building Number

GG Brown Engineering Building Addition

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U-M Project Number