Greening up our history -

Historic Preservation + Sustainable Design

Presented By:

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TRIVERS

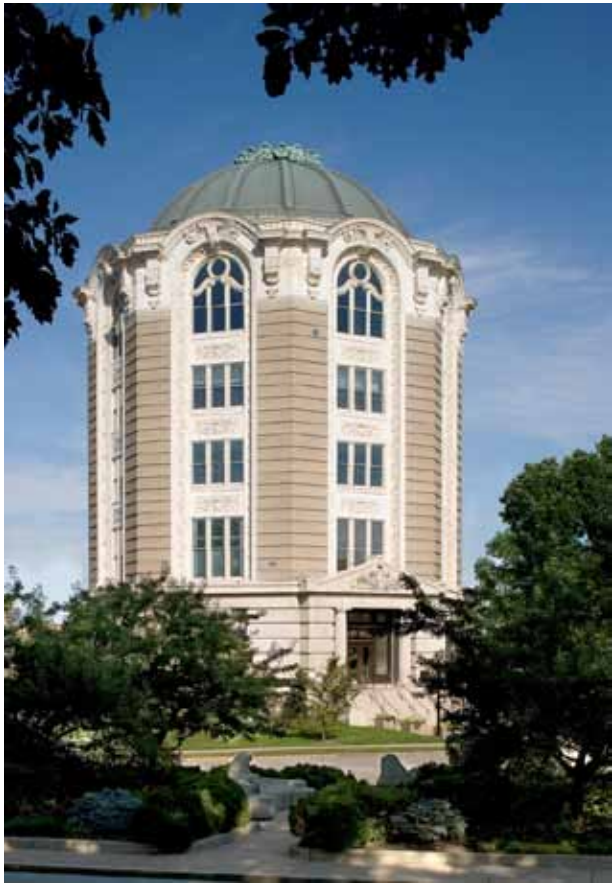
Why Recycle Buildings?

- Less cost
- Less time
- Less impact on the environment
  - Embodied energy
  - www.thegreenestbuilding.org

Embodied Energy Comparison

	Demo/ Build New	Renovate
• Existing Building	54,940,000 MBTU	54,940,000 MBTU
• Demo/ Transport to landfill	519,250 MBTU	51,925 MBTU
• Mine/ Manufacture Deliver/ Assemble	54,940,000 MBTU	5,494,000 MBTU
Total Energy Spent	110,399,250 MBTU	60,485,925 MBTU
Difference	49,913,325 MBTU, or about 50,000,000 MBTU	

Which do you prefer?



Embodied Energy Comparison

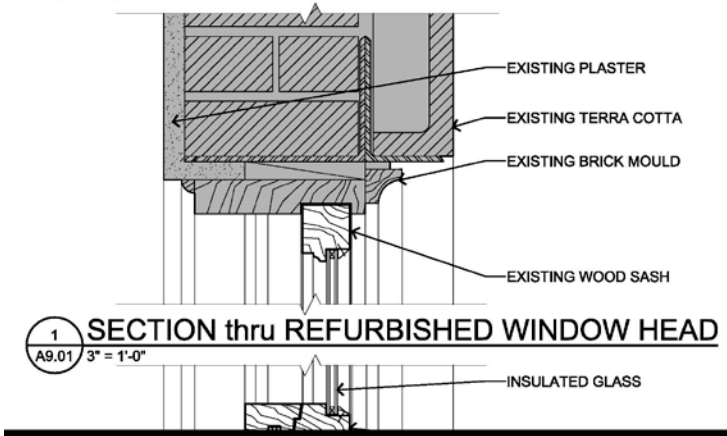
- What does this mean in everyday terms?

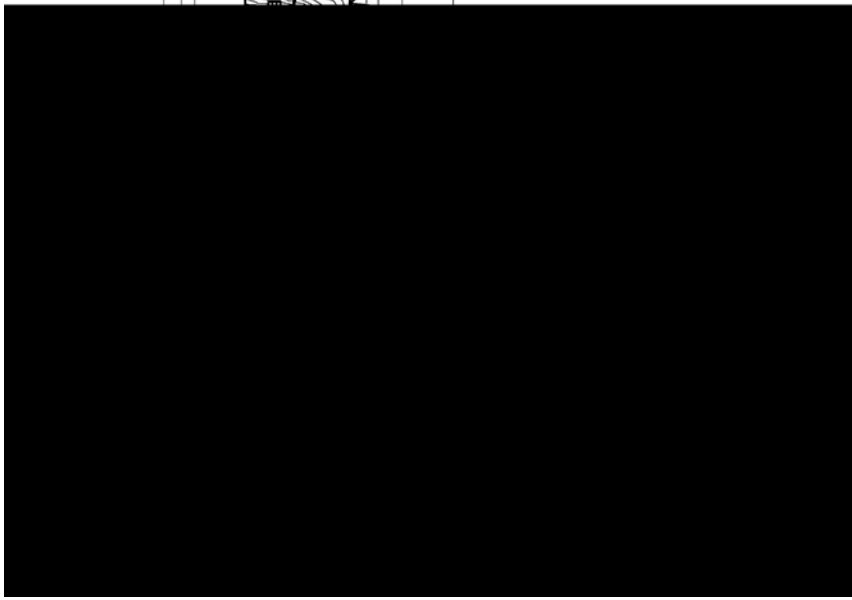
	50,000,000	MBTU
÷	115	MBTU/ gallon of gas
	434,783	gallons of gas
×	22.2	NHTSA MPG
	9,652,182	miles
÷	12,000	miles/ car/ year
	804	cars for 1 year

Sustainable Characteristics of Historic Buildings

Large windows (energy efficient)

- Ventilation
- Daylighting
- Thermal loss

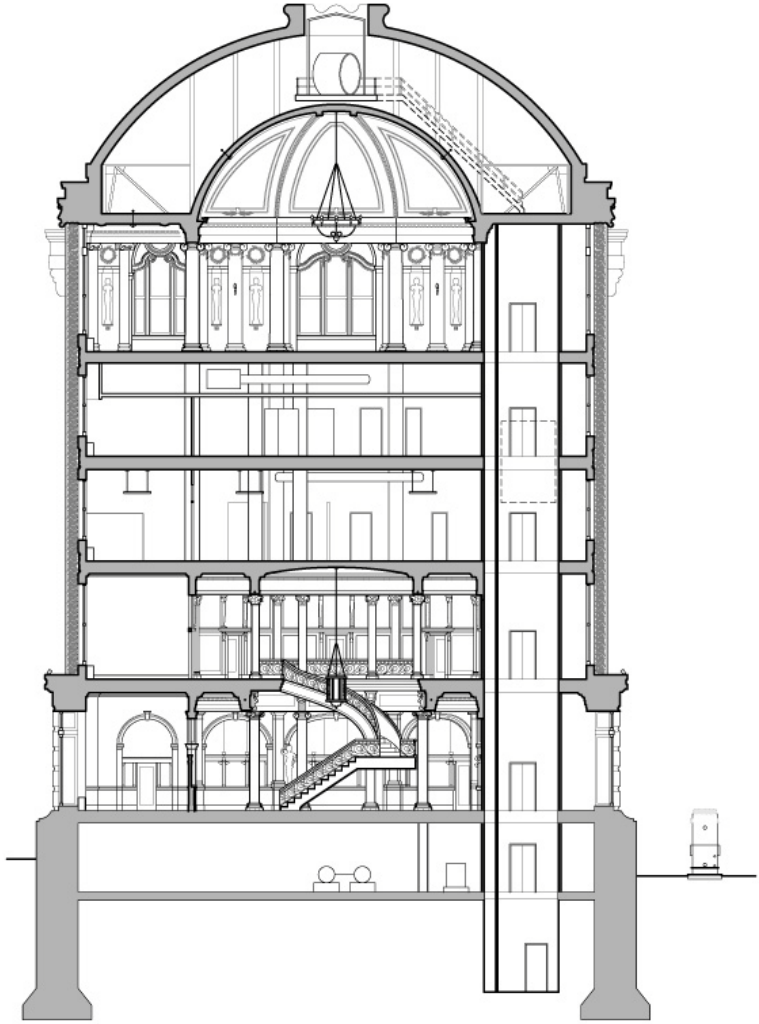




Sustainable Characteristics of Historic Buildings

Multi-wythe masonry walls (energy efficient)

- Modest R-values
- High thermal mass
- Captures heat during day
- Releases heat at night



Sustainable Characteristics of Historic Buildings

Durable materials (low life-cycle cost)

- Wall surfaces
  - Stone (limestone, marble) vs. gyp board
- Exterior envelope
  - Brick vs. polystyrene
- Ornamental details – interior and exterior
  - Cast iron vs. vinyl
- Roofing
  - Copper vs. asphalt

University City City Hall

Brief History of Magazine Building

- Completed in 1904
- Strong associations with the Louisiana Purchase Exposition
- Designed by Herbert Caleb Chivers
- Developed by Edward Gardner Lewis
- Known as the Magazine Building (was HQ of *The Woman's Magazine*)
- 84 feet in diameter and 135 feet tall
- Rusticated limestone base; buff-gray brick and light cream terra cotta walls
- Remains the area's finest Beaux Arts office building

University City City Hall

Brief History of Magazine Building

- •Elaborate bronze railing by Winslow Brothers of Chicago (also designed entrance to Louis Sullivan's Carson, Pirie, Scott Dept. Store)
- •1905 - U.S. Postmaster General issued Lewis a mail fraud order
- •Lewis incorporated University City in 1906 and took its name from Wash U
- •By 1912 – Lewis bankrupt and moved to CA to build another city, Atascadero
- •10 years later – Lewis again bankrupt, in legal difficulty with postal authorities
- •1930 – purchased by U City

University City City Hall

LEED-NC

TRIVERS

LEED-NC Version 2.1 Project Credit Checklist

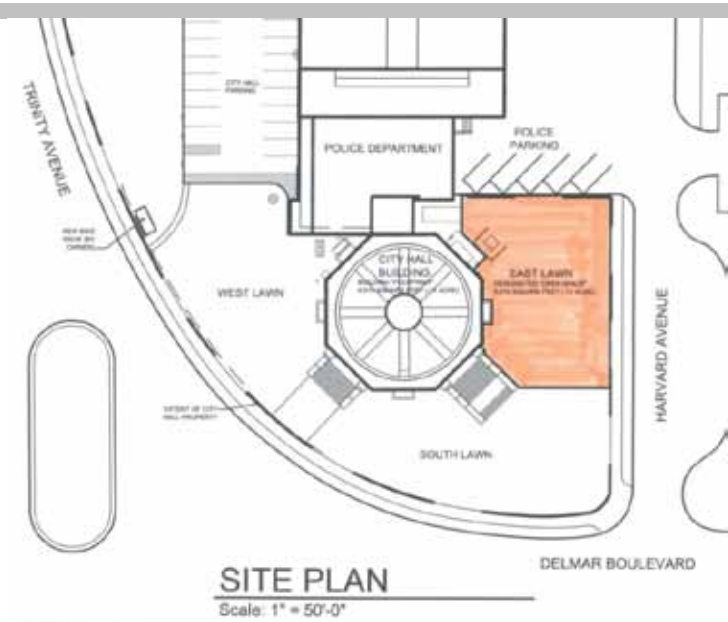
Green Building Rating System for New Construction & Major Renovations

Renovation of University City, City Hall

Certification Goal: **Certified**

March, 2008

Tally Yes	Maybe	No	Environmental Category	Points Available In Category
8			**Sustainable Sites**	14 Points
Y			Prereq 1 **Construction Activity Pollution Prevention**	Required
1			Credit 1 **Site Selection**	1
1			Credit 2 **Development Density and Community Connectivity**	1
1			Credit 4.1 **Alternative Transportation:** Public Transportation Access	1
1			Credit 4.2 **Alternative Transportation:** Bicycle Storage and 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
1			Credit 5.2 **Site Development:** Maximize Open Space	1
1			Credit 8 **Light Pollution Reduction**	1
Tally				Points Available



University City City Hall

Yes	Maybe	No	Environmental Category	Points Available In Category
2			Water Efficiency	5 Points
			Credit Number / Credit Title	Points
1			Credit 3.1 **Water Use Reduction:** 20% Reduction of Building Baseline	1
1			Credit 3.2 **Water Use Reduction:** 30% Reduction of Building Baseline	1
Tally				Points Available

University City City Hall

Yes	Maybe	No	Environmental Category	Points Available In Category
4			**Energy and Atmosphere**	**17 Points**
			Credit Number / Credit Title	Points
Y			Prereq 1 **Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2 **Minimum Energy Performance**	Required
Y			Prereq 3 **Fundamental Refrigerant Management**	Required
3			Credit 1 **Optimize Energy Performance**	1 to 10
1			Credit 6 **Green Power:** Purchase Renewable Energy Certificates	1
Tally				Points Available

Impact of using 100% American Wind™ for University City – City Hall Renovation:

1,813,648 pounds of CO_2

That's equivalent to not driving a car 1,979,965 miles…

Or effectively taking 158 commuters off the road.

It would take 247 ACRES of trees to soak up this much CO_2!

renewablechoice ENERGY

University City City Hall

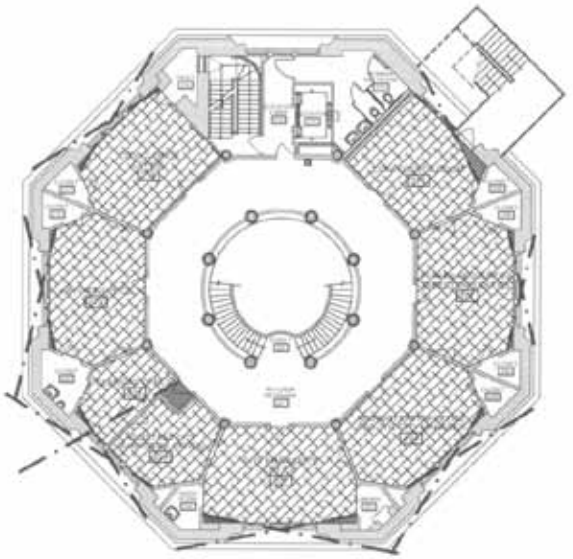
Yes	Maybe	No	Environmental Category	In Category
4			**Materials and Resources**	13 Points
			Credit Number / Credit Title	Points
Y			Prereq 1 **Storage and Collection of Owner's Daily Used Recyclables**	Required
1			Credit 1.1 **Building Reuse:** Maintain 75% of Existing Walls, Floors and Roof	1
1			Credit 1.2 **Building Reuse:** Maintain 100% of Existing Walls, Floors and Roof	1
1			Credit 1.3 **Building Reuse:** Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1 **Construction Waste Management:** Divert 50% from Disposal at Landfill	1

How and Where Waste is Diverted	Diverted Material
Scrap Metal: Sheet Metal, Grossman Iron & Steel Company in St. Louis, Missouri	23,364
Scrap Metal: ACE Scrap Metal Processors in St. Louis, Missouri	100
Scrap Metal: Fenster Metals Inc. in St. Louis, Missouri	43,006
Scrap Metal and Sheet Metal: Vince Jacks Metal Company in St. Louis, Missouri	1,804
Scrap Metal: Southern Metals Processing in St. Louis, Missouri	2,001
Cardboard: QRS Recycle Center in St. Louis, Missouri	5,040
Electric Fans: ReStore Habitat For Humanity in St. Louis, Missouri	100
Marble: Mark Santer (cut for table tops) in St. Louis, Missouri	1,200
Marble: Global Granite & Marble in St. Louis, Missouri	640
Plate Glass: Historical Wood Windows in Harrisonville, Missouri	7,000
Plate Glass: Glass Warehouse in Louisiana, Missouri	800
Brass and Copper: Vince Jacks Metals in St. Louis, Missouri	152
Asphalt Paving and Spoils: CE Bollmeier Company in St. Louis, Missouri	5,000
Carpet: Stella Lovett (for home use) in Cahokia, Illinois	400
Limestone Steps: Aggregate Recycle Centers in Mascoutah, Illinois	12,000
Wire: Vince Jacks Metal Company in St. Louis, Missouri	1,184
Glass and Brass Wall Sconce Lights: Ryan Kelly in St. Louis, Missouri	120

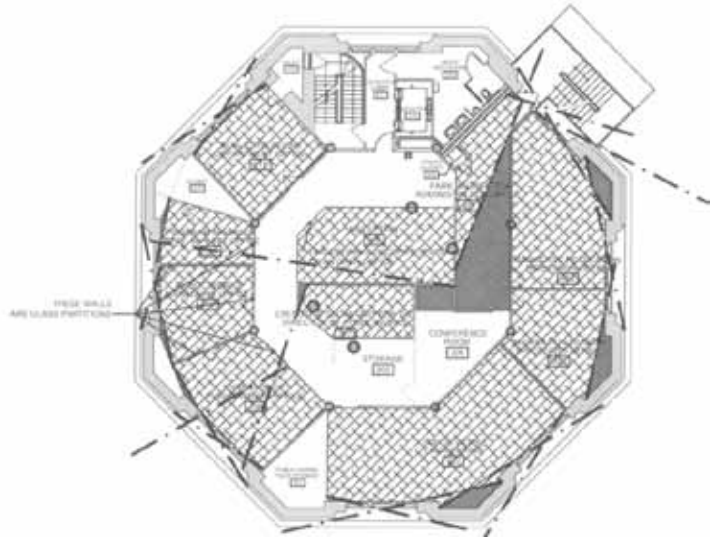
Total quantity of diverted waste	103,911
Total quantity of waste	197,451
Percentage of waste diverted	52.63

University City City Hall

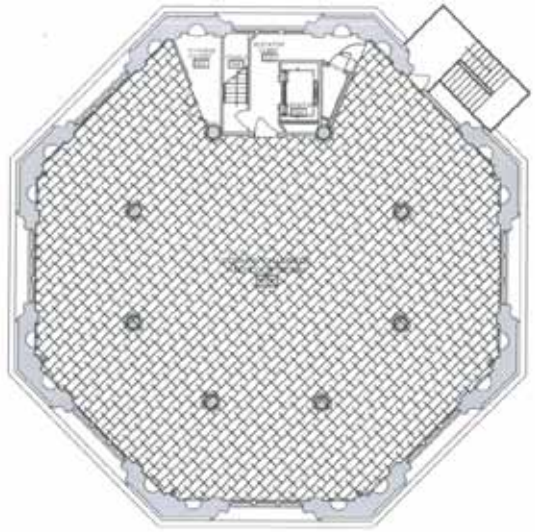
Tally Yes	Maybe	No	Environmental Category	TRIVERS	Points Available In Category
7		1	**Indoor Environmental Quality**		15 Points
			Credit Number	Credit Title	Points
Y			Prereq 1	**Minimum Indoor Air Quality Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke Control**	Required
		1	Credit 3.2	**Construction Indoor Air Quality Management Plan:** Before Occupancy	1
1			Credit 4.1	**Low VOC Emitting Adhesives and Sealants**	1
1			Credit 4.2	**Low VOC Emitting Paints and Coatings**	1
1			Credit 4.3	**Low VOC Emitting Carpet Materials**	1
1			Credit 7.1	**Thermal Comfort**: Design	1
1			Credit 7.2	**Thermal Comfort:** Verification	1
1			Credit 8.1	**Daylight and Views**: Daylighting of 75% of Building Spaces	1
1			Credit 8.2	**Daylight and Views:** Views for 90% of Building Spaces	1
Tally					Points Available



Second Floor Plan



Third Floor Plan



Fifth Floor Plan

University City City Hall

Yes	Maybe	No	Environmental Category	Points Available In Category
4			**Innovation and Design Process**	**5** Points
			Credit Number / Credit Title	Points
1			Credit 1.1 **Innovation in Design**: Green Power (Replacement of electricity use)	1
1			Credit 1.2 **Innovation in Design**: Education Program	1
1			Credit 1.3 **Innovation in Design**: Historical Building Reuse	1
1			Credit 2 **LEED® Accredited Professional is Managing the Project**	1

HISTORIC INTEGRITY AND MODIFICATIONS

The prominent five-story University City Hall, once the Lewis Publishing Company Administration Building, consists of eight 35-foot wide elevations that create a symmetrical, octagon-shaped structure. It was designed by Herbert Chivers and built in 1903 under contract to developer E.G. Lewis for the Lewis Publishing Company. The Annex (Press Building) just to the north was built one year later and enlarged with the addition of a second floor in 1909, Figures 1 and 2. Originally, an underground tunnel connected these buildings with an exterior walkway above. The 1909 work removed the bermed earth on the east and west sides and arched windows were installed, Figure 2. A major renovation occurred when University City purchased the building for its City Hall in 1930. A 1951 bond issue allowed a second major renovation which added the exterior fire stair and other modifications in 1952. A one-story addition was built in 1973, which enlarged the connection to the Annex. This report focuses on the City Hall building and more specifically the exterior along with the interior spaces of the first, second and fifth floors.

Figure 1 The University City Hall in circa 1904 with original Press Annex and Conservatory to the north.

The City Hall Building is constructed of concrete and wood with a steel frame structure. The exterior consists of a widened limestone base that extends to just below the second floor windows. The stonework is rusticated with deep, profiled recessed joints and a smooth finish. The buff colored brick follows the same banded design by recessing courses in a regular pattern. The windows are bordered in a continuous terra cotta surround. Between floors are terra cotta spandrels. Overall, the building has retained most of its original fabric and configuration with the exception of the items discussed in this section.

Figure 2 The University City Hall in 1910 following the 1908 modifications to the Press Building (Annex).

Energy savings = $$$

Comparison of Electrical Costs - 2003 and 2006

	2003	2006	Difference
Consumption (kWh)	861,000	664,000	-23 %
Average Cost / kWh	$ 0.0803	$ 0.0946	18 %
Electricity Expense	$ 69,165	$ 62,795	-9 %

Not to mention the reduction in emissions.

Energy savings = $$$

Comparison of Natural Gas Costs - 2003 and 2006

	2003	2006	Difference
Consumption (kWh)	3,273	2,665	-19 %
Average Cost / 1,000 cf	$ 8.59	$ 12.94	51 %
Natural Gas Expense	$ 28,115	$ 34,487	23 %

Not to mention the reduction in emissions.

Energy savings = $$$

Holding the Line on Energy Expenditures

2003	$ 97,281.01	
2006	$ 97,282.59	
Increase	$ 1.58	!!!!!!