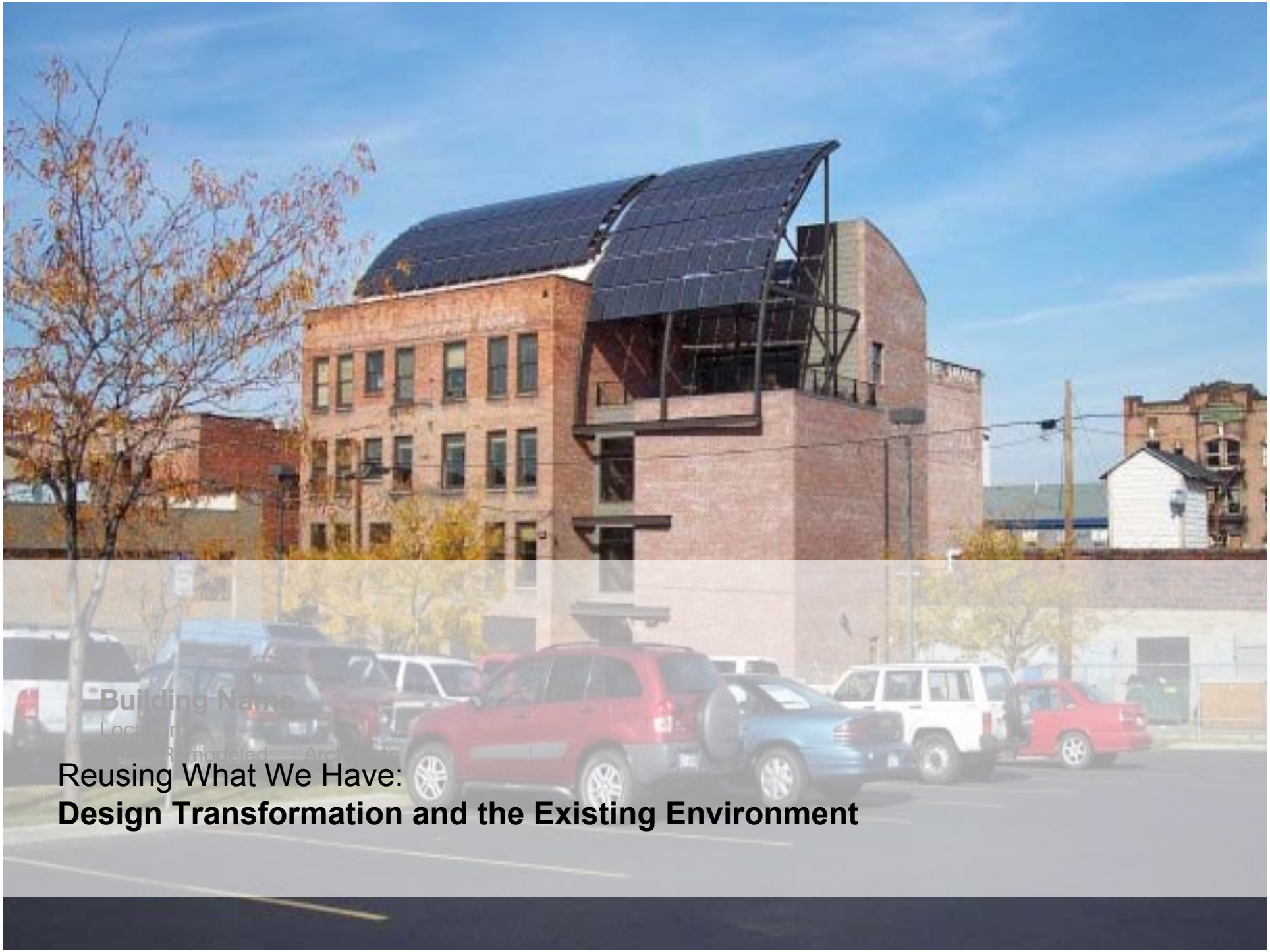
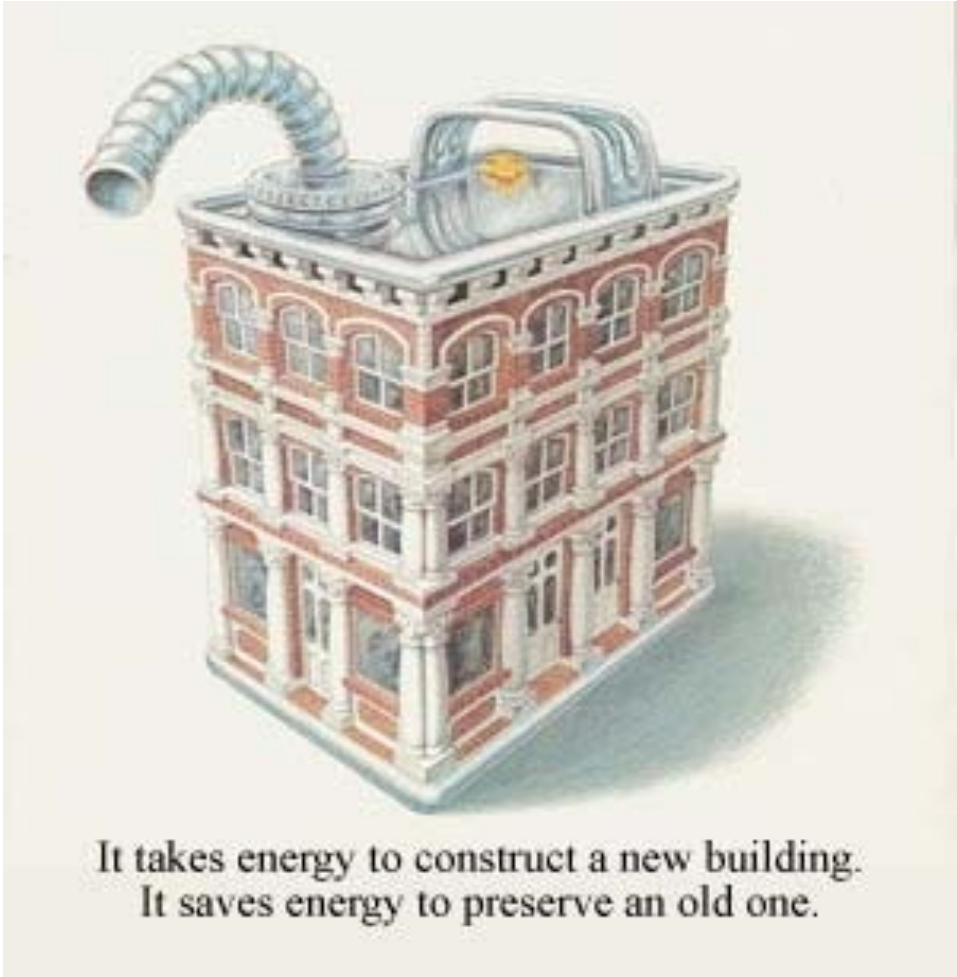


Reusing What We Have:
Design Transformation and the Existing Environment



"We can't build our way out of climate change"

-The Sustainability Initiative, National Trustfor Historic Preservation

The **Reuse** of our existing buildings reduces the amount of demolition and construction waste deposited in landfills, lessons the demaind for new energy and other natural resources needed to construct new buildings, and conserves the energy originally expended to create the structures.

Reinvestment in older and historic communities has numeral environmental benefits such as walkabilty and livablity, density, and mass transit accessible.

Retrofits of historic and existing buildings can and should be undertraken to extend building life and better capture the energy savings available through newer technologies.

Repair of non-working buildings the best solution through design solutions to create higher performing structures, workable programs and spaces, and building components that can be maintained.

Respect for our existing environment is an important human component to create cultural continuity, community enrichment, and historic records of our community.

Reuse and Repair of our existing environment is a creative and challenging design aspect of our discipline

The United States is responsible for 22% of the world's greenhouse gas emissions, though we have only 5% of the world's population. According to the Pew Center on Climate Change, the operation of buildings accounts for 43% of carbon emissions in the United States. **The environmental impact of buildings is even more significant when we take into consideration the greenhouse gas emissions associated with manufacturing building materials and products.**

.

The average embodied energy in existing buildings is five to 15 gallons of gasoline per square foot. The average embodied energy in a 250,000 square-foot office building is 3.75 million gallons of gasoline.

.

Recent calculations indicate that it takes **35-50 years for an energy efficient new building to save the amount of energy lost in demolishing an existing** building.

It would take an individual
to throw away
Into a landfill

46 aluminum cans
every day
for 80 years

to create the same volume
of landfill one average ten
story commercial building
measuring approximately
25 feet by 100.

It will take as much energy to demolish and reconstruct 82 billion square feet of space (as predicted by the Brookings study) as it would to power the entire state of California – *the 10th largest economy in the world with a population of about 36 million people* – for 10 years.

If we were to rehab even 10% of this 82 billion square feet, we would save enough energy to power the state of New York for well over a year.

A 2004 report from the Brookings Institution projects that **by 2030, we will have demolished and replaced 82 billion square feet of our current building stock**. Since it is estimated that there are about 300 billion square feet of space in the United States today, that means we anticipate demolishing nearly **1/3 of our building stock in the next 20-25 years**.

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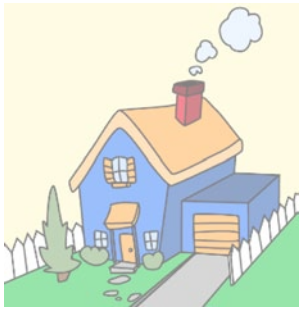
The **average home size** in the United States has increased 105% between 1950 and 1999.



In terms of waste, construction of an average 2,000-square-foot home generates 3,000 pounds of wood, 2,000 pounds of drywall and 600 pounds of cardboard.

Moreover, the construction of an average single-family home generates four pounds of waste per square foot. On average, only about **20%-30% of that waste is recycled or reused**.

WASTE + LANDFILLS

•Construction and demolition (C&D) debris currently accounts for an estimated 30% of the municipal waste stream nationally.

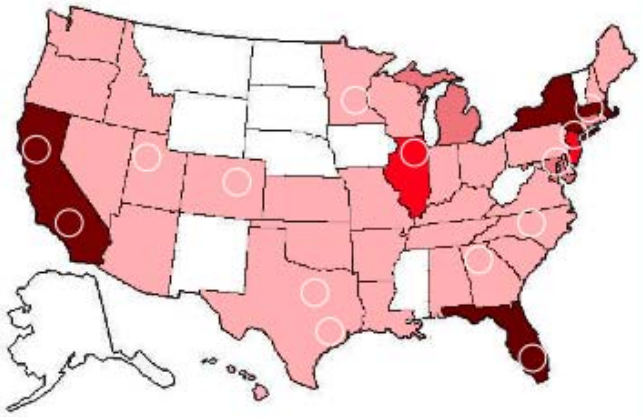
•According to the EPA the US has about 1,800 active municipal solid waste landfills, 1,900 operating C&D landfills, and more than 10,000 old municipal landfills.

•Waste generation per person has almost doubled since 1960, from 2.6 pounds per person to 4.6 pounds per person, **per day**.


McMansion
THERE GOES THE NEIGHBORHOOD!

TEARDOWNS BY STATE & COMMUNITY

NATIONAL TRUST FOR HISTORIC PRESERVATION®



- States with 10 or less communities experiencing teardowns
- States with 11-30 communities experiencing teardowns
- States with 31-50 communities experiencing teardowns
- States with 50 or more communities experiencing teardowns.
- Concentrations of teardowns

In 2002, the National Trust for Historic Preservation identified 100 communities in 20 states that were experiencing teardowns in historic neighborhoods. In May, 2006, the National Trust then identified 300 communities in 33 states. By March, 2008, that number is climbing fast with the National Trust for Historic Preservation now documenting over 500 communities in 40 states.

The New York metropolitan area is the epicenter of the teardown epidemic, with New Jersey ranking first in the nation in the number of places experiencing significant numbers of teardowns.

Major concentrations of teardowns are occurring in and around Atlanta, Austin, Boston, Chicago, Dallas, Denver, Los Angeles, Minneapolis, New York City, Raleigh, Salt Lake City, San Francisco, Tulsa and Washington, D.C.

* ( ) denotes neighborhood when known

Alabama (1)

Fairhope

Arizona (7)

Arcadia, Glendale, Peoria, Phoenix (Arcadia, Northeast Phoenix), Scottsdale (Sundown Ranch), Tempe, Youngtown

Making Way for the New. **In Denver, CO, more than 1,000 teardowns have occurred in a dozen historic neighborhoods since 2003.**

Arkansas (1)

Little Rock

California (48)

Alhambra, Arcadia, Atherton, Berkeley, Beverly Hills, Burlingame, Carmel, Carson, Coronado, Cupertino, Encino, Laguna Beach, Lawndale, Los Altos, Los Angeles (Brentwood, Brentwood Flats, Brentwood Park, Crestwood Hills, Hancock Park, Sunland-Tujunga, Windsor Square), Los Gatos, Manhattan Beach, Mar Vista, Menlo Park, Mountain View, Napa, Newport Beach, Northbrook, Pacific Palisades, Palm Springs, Palo Alto, Pasadena, Pomona, Portola Valley, Rancho Mirage, Redondo Beach, Sacramento (Arden Oaks, Carmichael Colony, Carmichael Creek, East Sacramento, Fair Oaks Village, North Sacramento), San Francisco (Richmond District), San Gabriel, Santa Barbara, Santa Clara, Santa Monica, Saratoga, Seal Beach (Old Town), Sherman Oaks, Sonoma Valley, Temple City, Tiburon, Valley Glen, Van Nuys, Venice, West Hollywood, Willow Glen, Woodside

Colorado (7)

Aspen, Boulder, Boulder County, Denver (Bonnie Brae, Cherry Creek, Cory-Merrill, Highlands, Hilltop, Park Hill, Platt Park, Sloan's Lake, University Park, Washington Park), Durango, Lakewood, Littleton,

Connecticut (28)

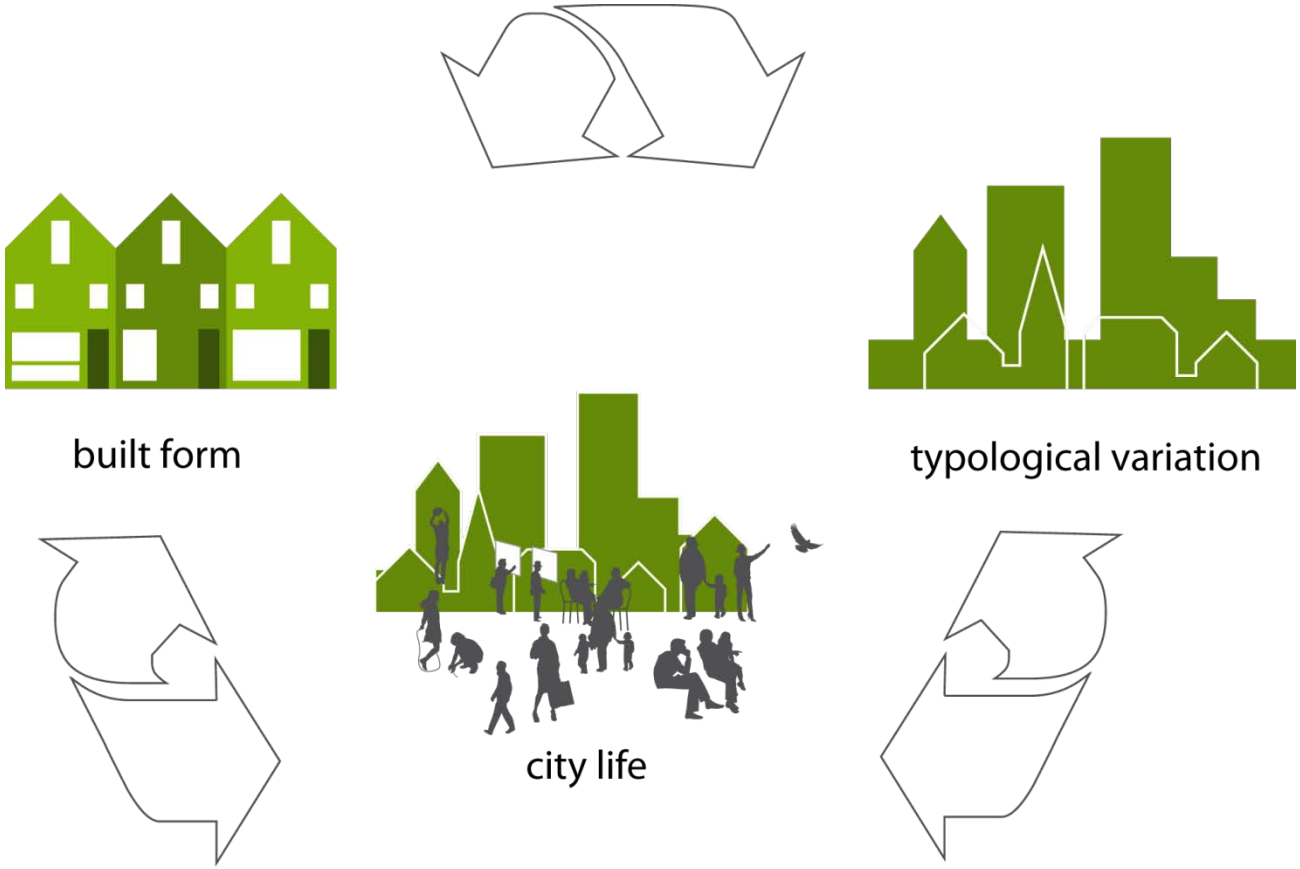
Chester, Darien, Deep River, East Haddam, Enfield, Essex, Fairfield, Greenwich, Griswold, Guilford, Haddam, Harwinton, Lyme, New Canaan, New Milford, Norwalk, Norwich, Old Lyme, Old Saybrook, Ridgefield, Riverside, Stoneyton, Westport, Weston, Wethersfield, Willington, Wilton, Woodstock

Delaware (6)

Bethany Beach, Lewes, New Castle, Rehoboth Beach, South Bethany, Ocean View

District of Columbia (1)

FLEXIBILITY



Varied Building Sizes and Spatial Conditions on the Plot allow Different Functions

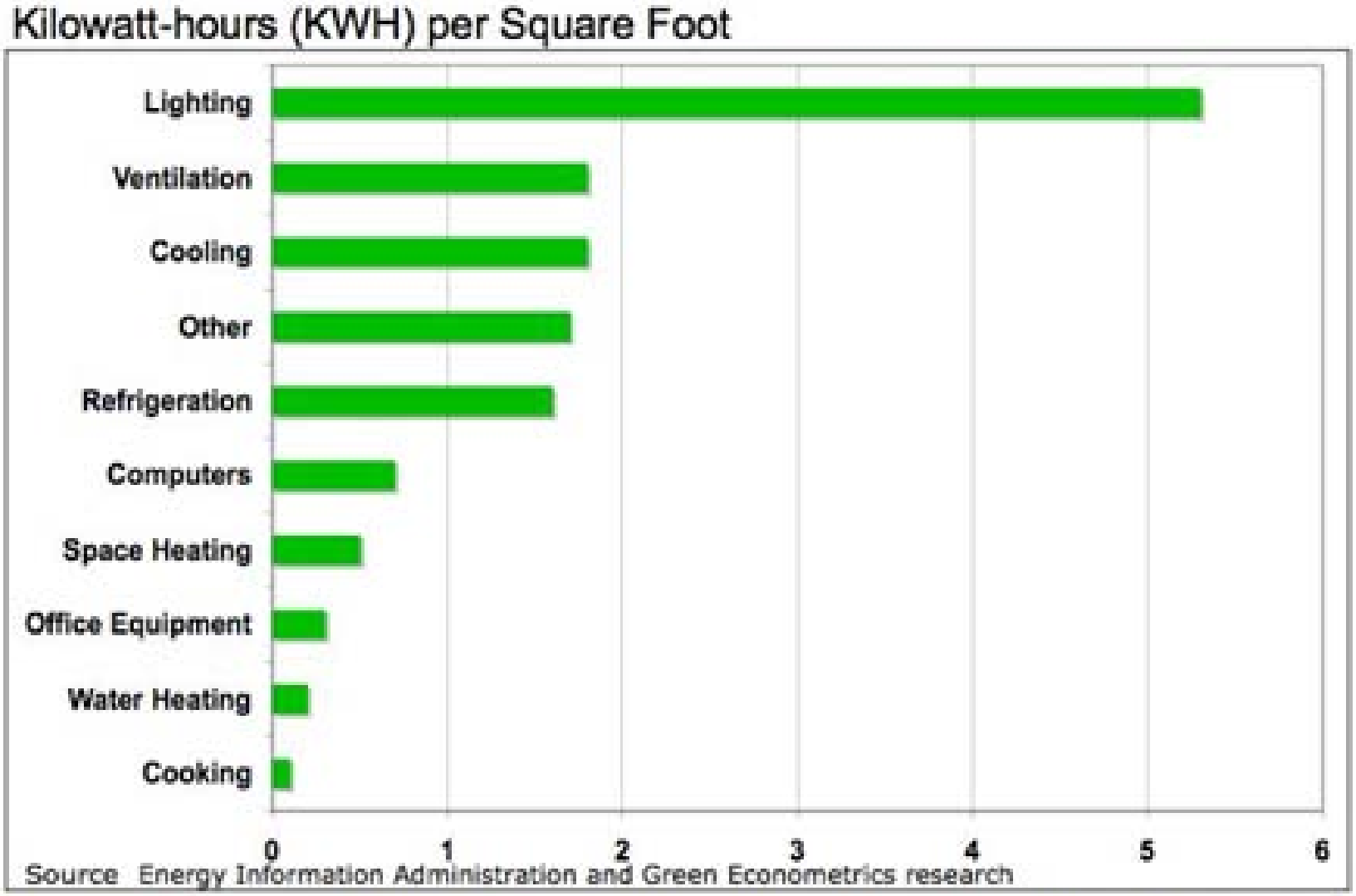
typological variation

It takes a lot of energy to just to **construct a building** – for example, building a 50,000 square foot commercial building requires the same amount of energy needed to drive a car 20,000 miles a year for 730 years

=

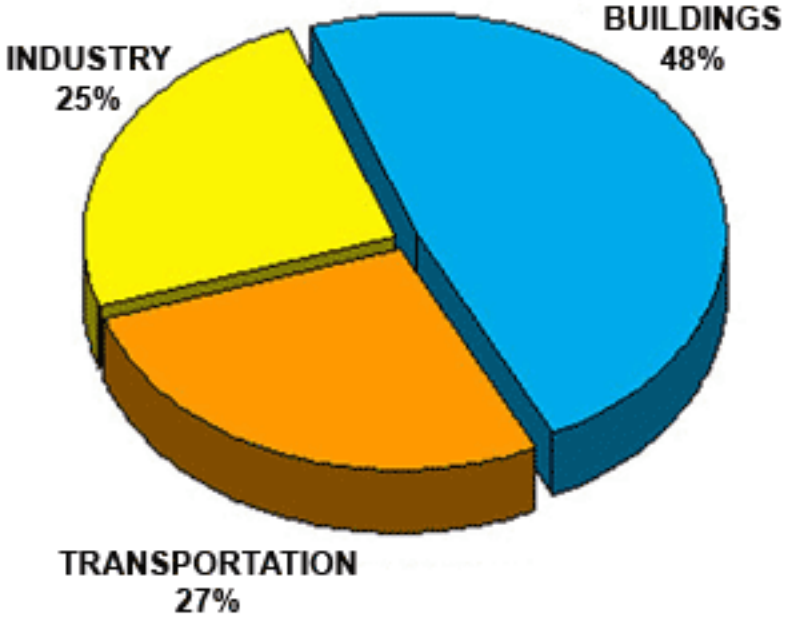
= **driving a car 20,000 miles a year for 730 years**
= **540,740 gallons of gas**
= **4,807 metric tons of Co2**
= The **electricity consumed for 624 homes for a year**

Energy Consumption Buildings

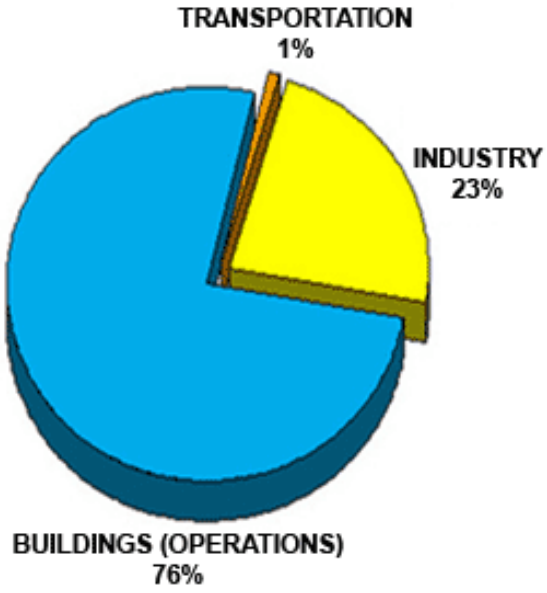


Lighting fixtures consume the largest amount of electric energy in commercial buildings, three times the energy consumption of air conditioning.

Fact: Buildings in the US are responsible for almost half of all energy consumption and greenhouse gasses annuals. Globally, this is even greater. 76% of all power plant generated electricity is used just to operate buildings.



US- NATIONALLY



GLOBALLY

Source: Commercial Building Energy Consumption Survey, 2003
http://www.eia.doe.gov/emeu/cbecs

Average energy consumption Btu/sq. ft
Commercial Buildings (non malls)

Before 1920	**80,127**
1920 – 1945	**90,234**
1946 – 1959	**80,198**
1960 – 1969	**90,976**
1970 – 1979	**94,968**
1980 – 1989	**100,077**
1990 – 1999	**88,834**
2000 – 2003	**79,703**

PERCEIVED ENERGY INEFFICIENCY


metrics for building reuse
how do we *quantify*?

metrics for building reuse

How do we measure the physical energy in a building and make it understandable to use in decision making?

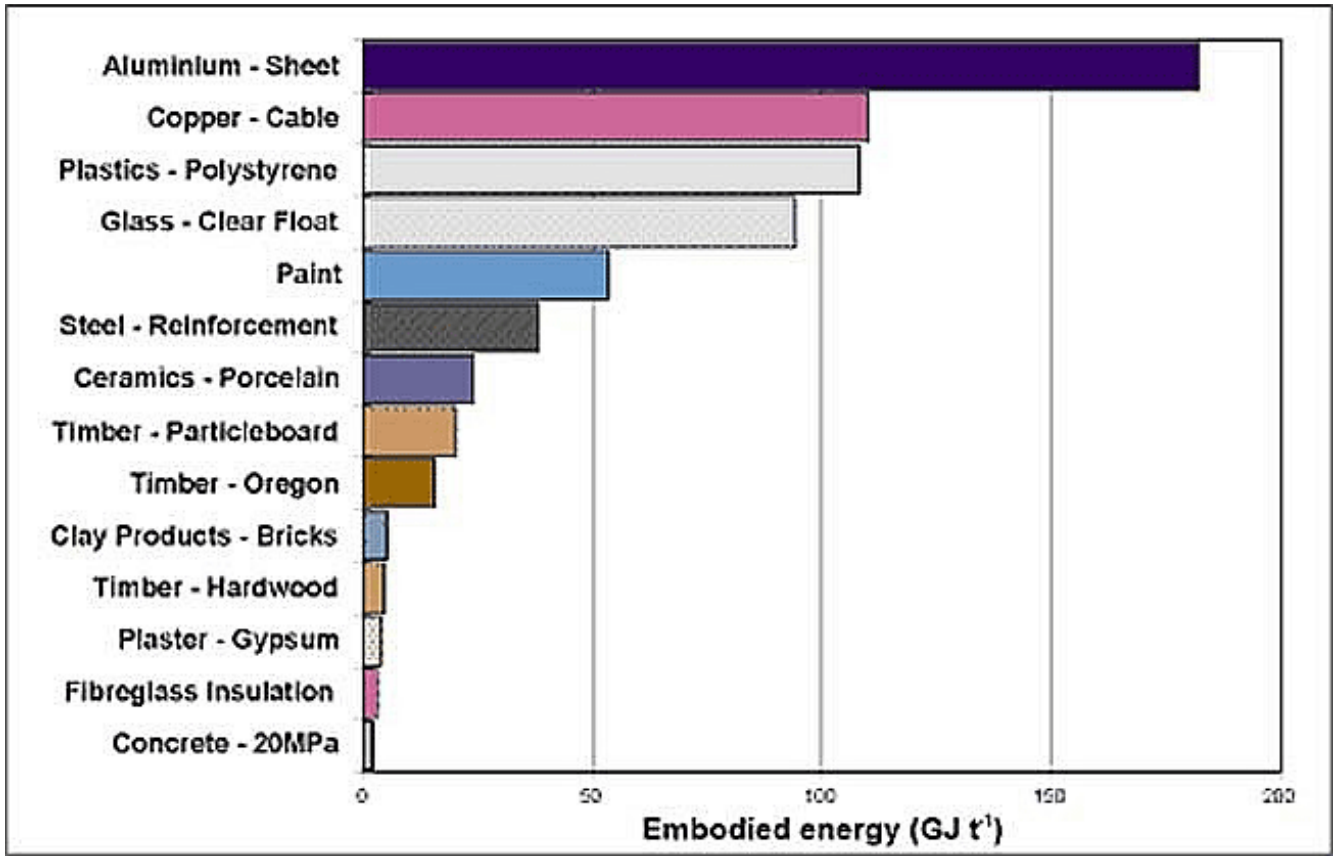
How do we understand the total effect that new construction, adaptive reuse and tearing down buildings have on the environment?

How do we measure the unseen values such as social, cultural and emotional worth of place?

How can these ideas create a model for best practices to be used to inform decision making?

How can this model become understandable and practical to the non-designers (owners, developers, investors, government officials, etc) as a tool for advocacy?

Embodied-energy content (EEC) is the sum of energy required to extract or harvest a raw material, manufacture and fabricate that material into a useful form, and transport it to its place of use.



Life-cycle assessment (LCA) is defined by the Society of Environmental Toxi- cology and Chemistry as "an objective process to evaluate environmental bur- dens associated with a product process or activity by quantifying energy and materials used and wastes released to the environment, to assess the impact of those energy and material uses, and to evaluate and implement opportunities to affect environmental improvements."

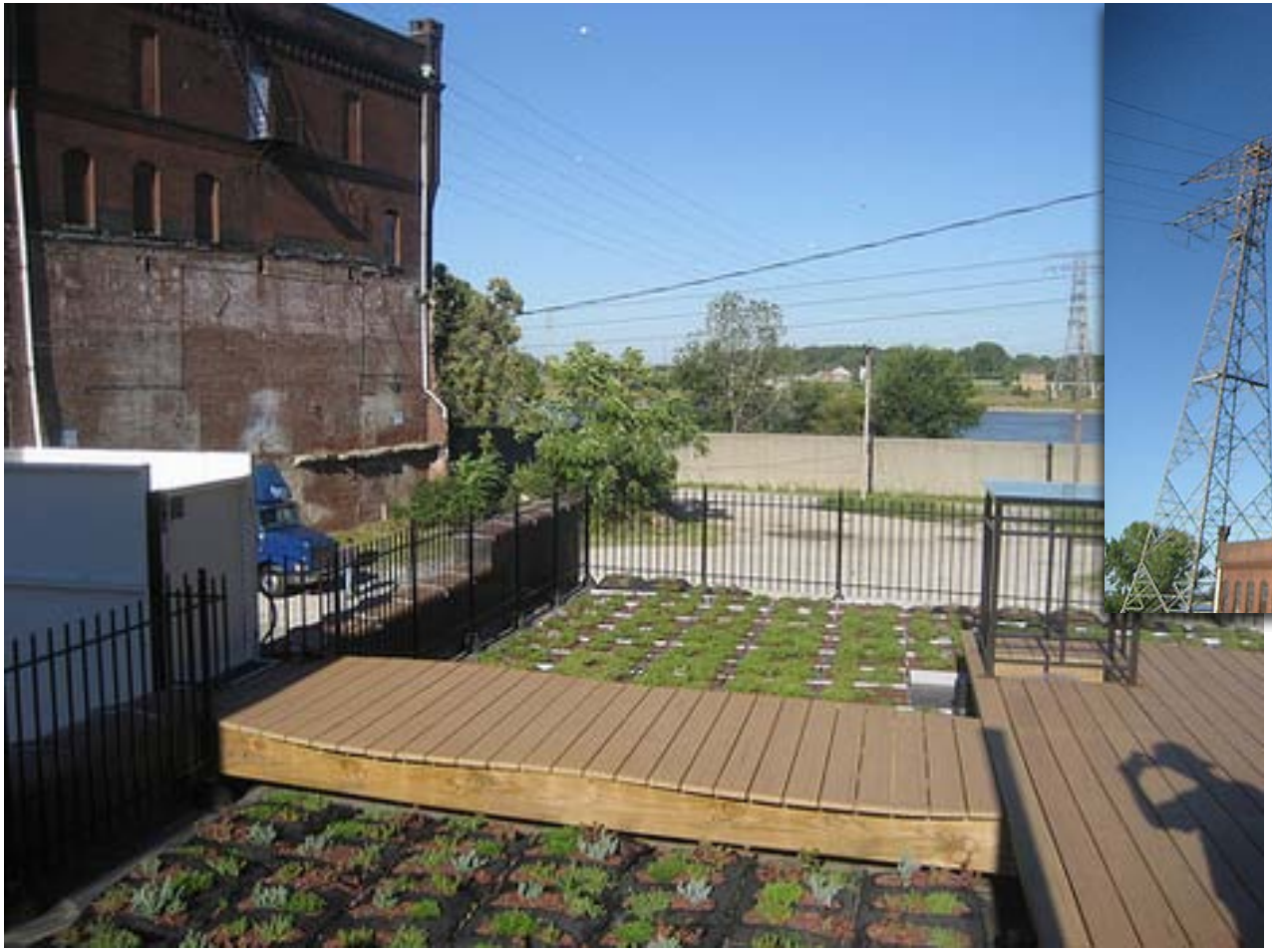
Recycled building material is collected, reprocessed, and made into a new prod- uct. This product can be identical in value to the original material, as is the case with steel, or it can be "down- cycled" into a material of lesser value, which is the case with most plastics. Re- cycling reuses material that would other- wise be waste and reduces the burden on virgin source material. However, the energy demands of reprocessing must be considered, and down-cycling should be minimized.

Salvaged building materials are useable products that have been collected from the deconstruction or demolition of a structure. Reusing material in its original form is preferable to recycling.

“Solartube” skylight

Located in a formerly desolate area of downtown St. Louis, the **William A. Kerr Foundation** building is a showcase for sustainable renovation strategies. It started out in the late 1800's as a bathhouse (it sits above a natural mineral spring), and thereafter as a paint warehouse -- over time, it fell into disrepair. The neighborhood was blighted when it was acquired by the owners, and they wanted to restore the building for the foundation's offices and educational activities. Subsequent to remediation and renovation, it received LEED Platinum certification.

Kerr Building, St. Louis



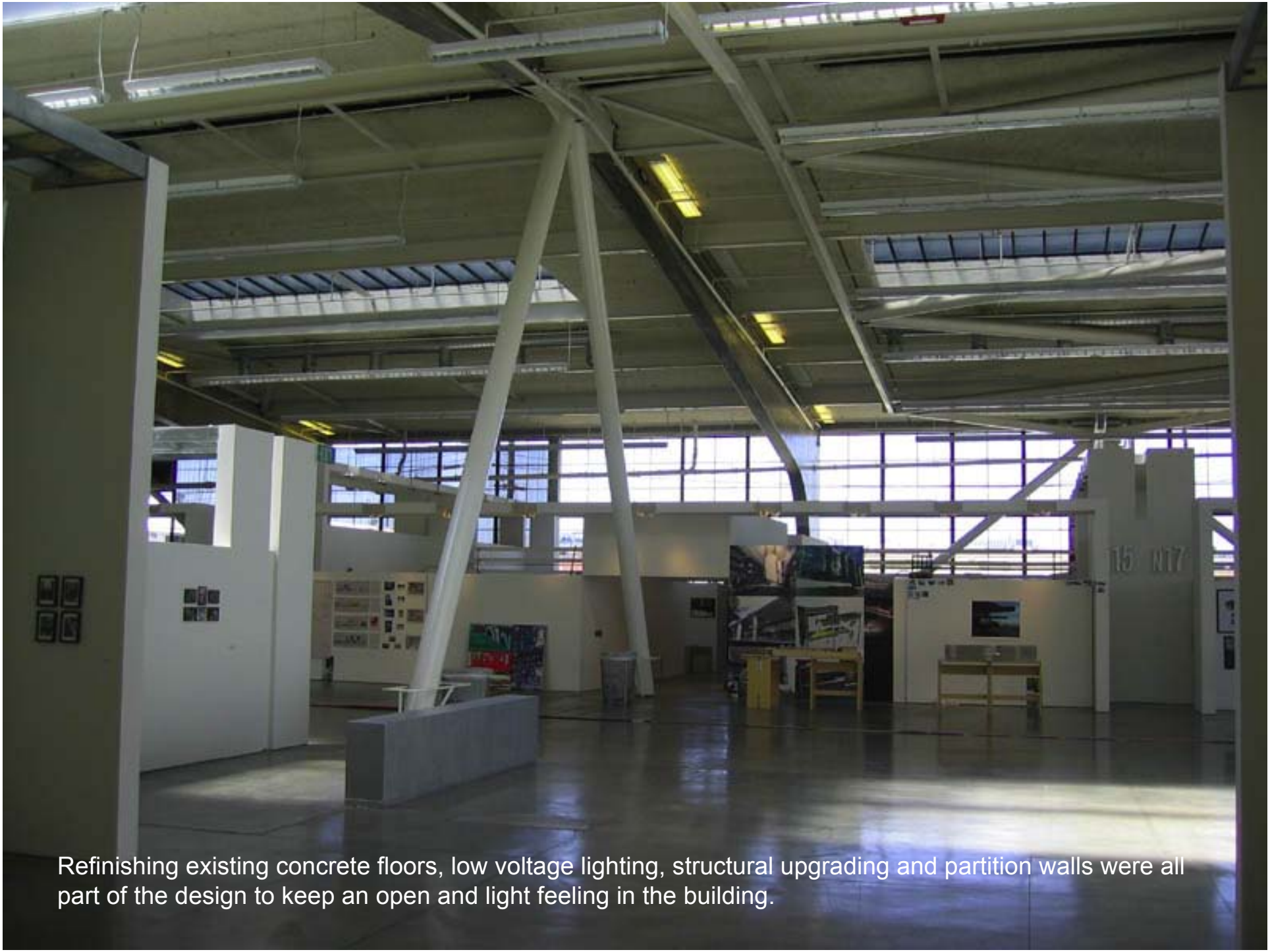
Project Highlights on top of re-using the building:

1. The first wind turbine in the city of St. Louis
2. solar hot water heating
3. A green roof, bioswales, and rain barrels
4. Bicycle racks and interior showers
5. Low-flow plumbing fixtures
6. Solatube Light tubes for natural lighting
7. Rapidly renewable materials such as bamboo, cork, and Marmoleum

Kerr Building, St. Louis

California College of the Arts
San Francisco
(1951) 1997
An industrial storage facility elegantly converted to arts college.

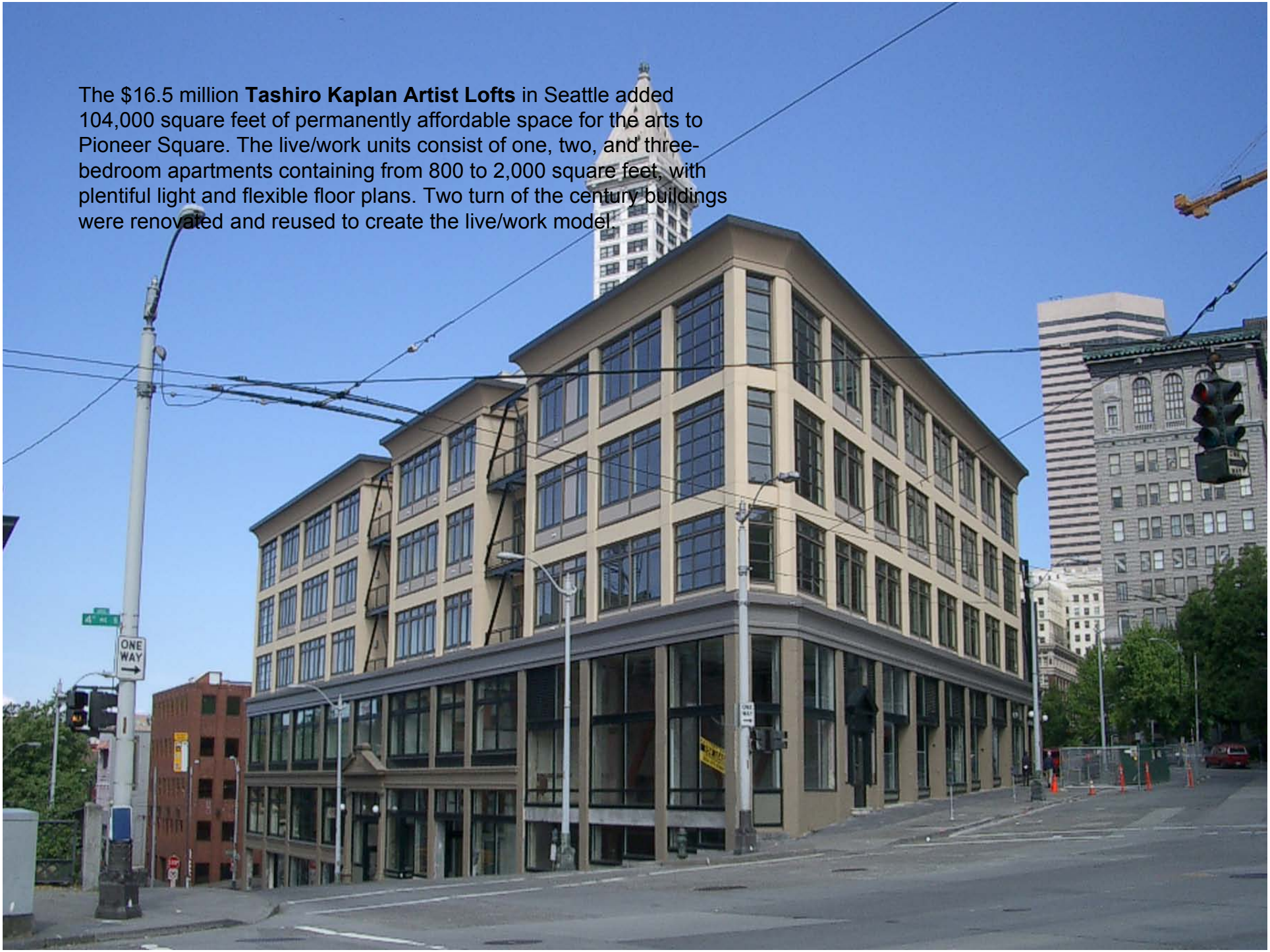
Design focused on things such as keeping the natural daylighting, using the operable windows for fresh air and natural cooling, were used where many college facilities do not have these simple amenities.



Refinishing existing concrete floors, low voltage lighting, structural upgrading and partition walls were all part of the design to keep an open and light feeling in the building.

Solar panels on roof

Interior shot with view to industrial landscape

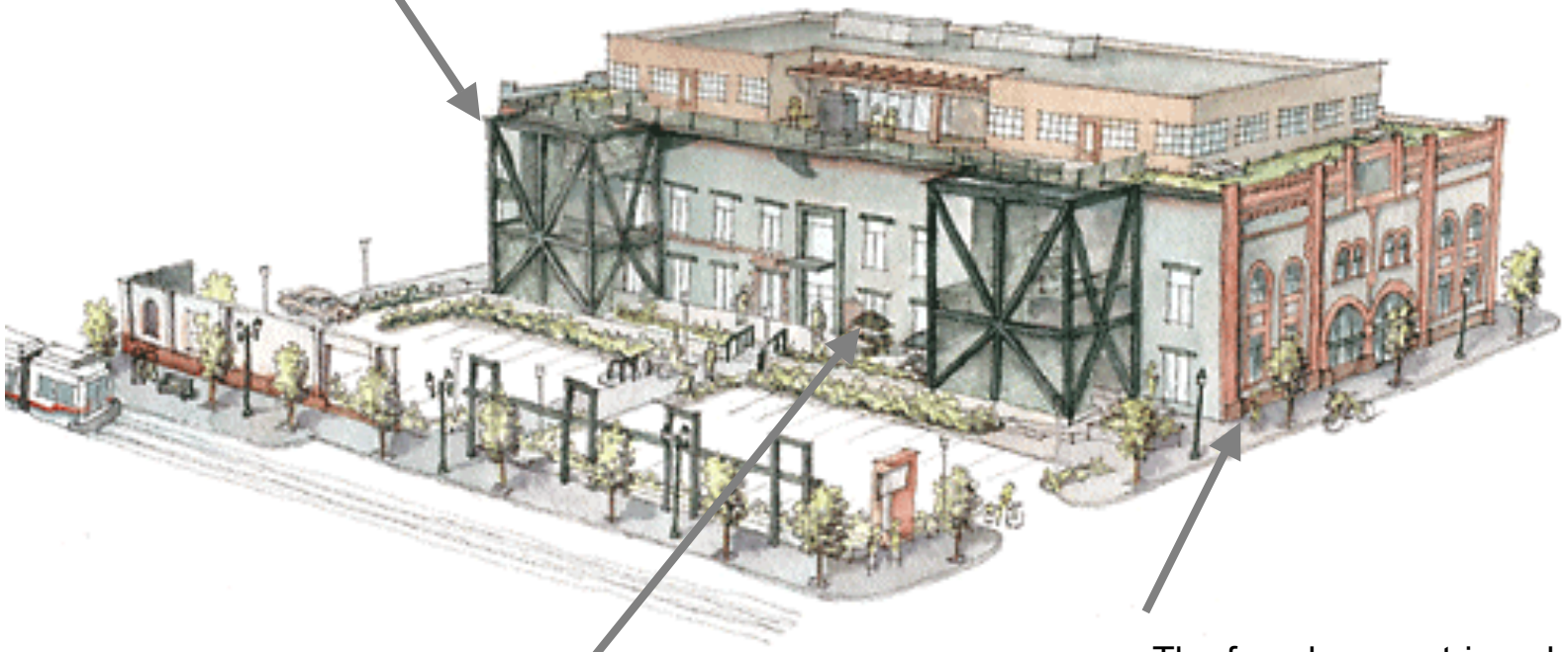


The $16.5 million **Tashiro Kaplan Artist Lofts** in Seattle added 104,000 square feet of permanently affordable space for the arts to Pioneer Square. The live/work units consist of one, two, and three-bedroom apartments containing from 800 to 2,000 square feet, with plentiful light and flexible floor plans. Two turn of the century buildings were renovated and reused to create the live/work model.

ECOTRUST,
The Jean Vollem Capital Trust Building
Portland's Pearl District

10,000sf third floor was added

Steel towers provide
Structural and seismic
Reinforcement and are
tied to interior posts and beams



New windows and doors were cut
Into the back facade

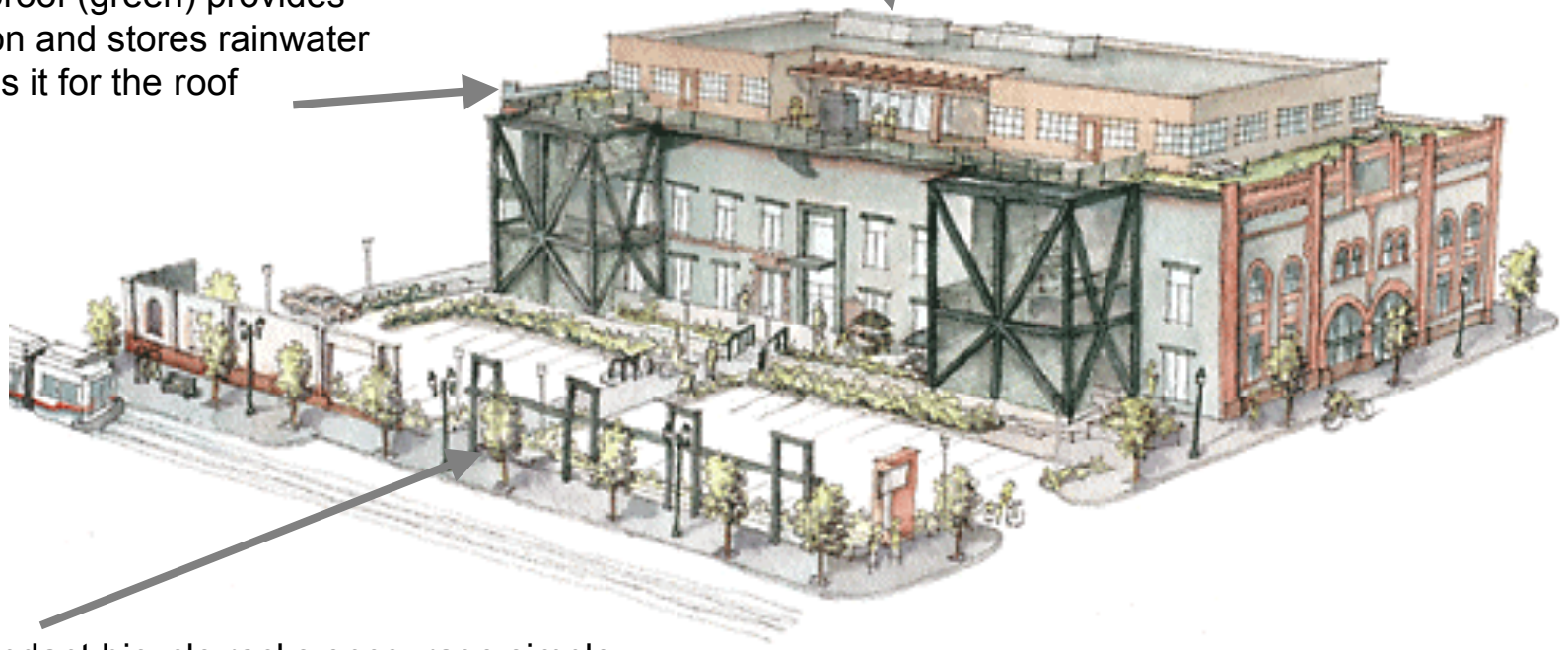
The façade was stripped of
paint layers and carefully
restored; original windows
and doors restored and
replaced back

ARCHITECTURAL STRATEGIES

New windows are highly energy efficient and operable, increasing tnant flexibility and control

Skylights add natural light reducing the need for electric lighting and improving productivity

The ecoroof (green) provides insulation and stores rainwater and uses it for the roof



Abundant bicycle racks encourage simple transportation

Light sensors evaluate the amount of daylight and turn lights on and off as necessary

SUSTAINABLE STRATEGIES

Building retains original appearance
District keeps bulk and scale of warehouse district
Businesses brought in; building very popular
Story of building revealed throughout

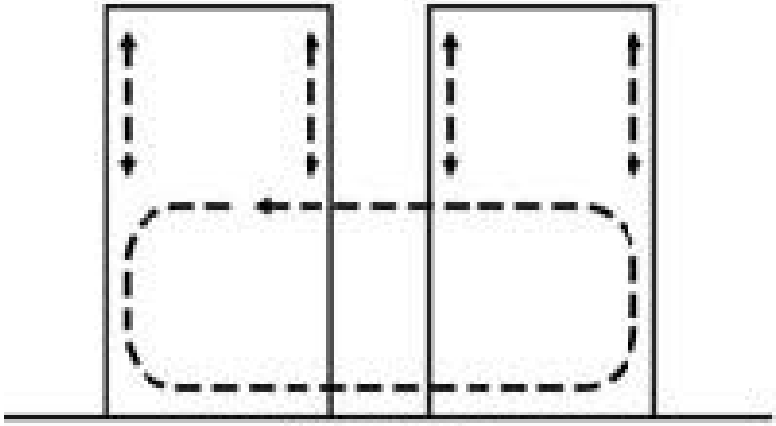
HISTORIC PRESERVATION STRATEGIES

Green roofs reduce excess water going into the main sewer system, contribute to better air quality, and provide green views from the upper deck. The parking lot has a bioswale (upper left picture) that not only creates a green buffer in between outside useable space and the parking lot, but filters water onsite, maintaining healthy plant life and eliminating off site water treatment.

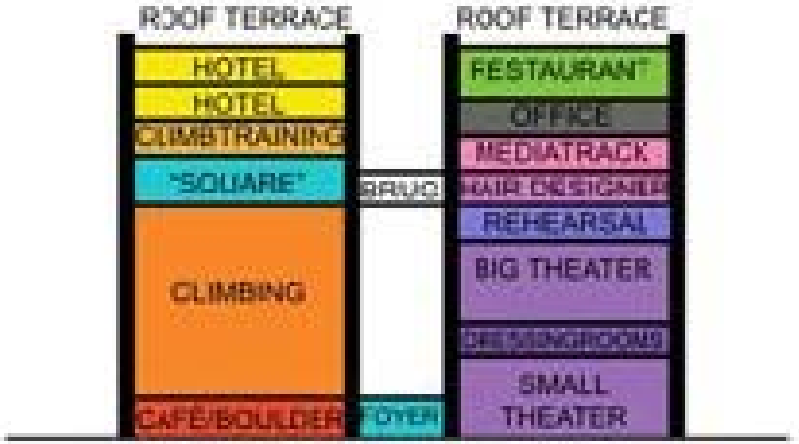
Ecotrust

Entrance and Patagonia Store

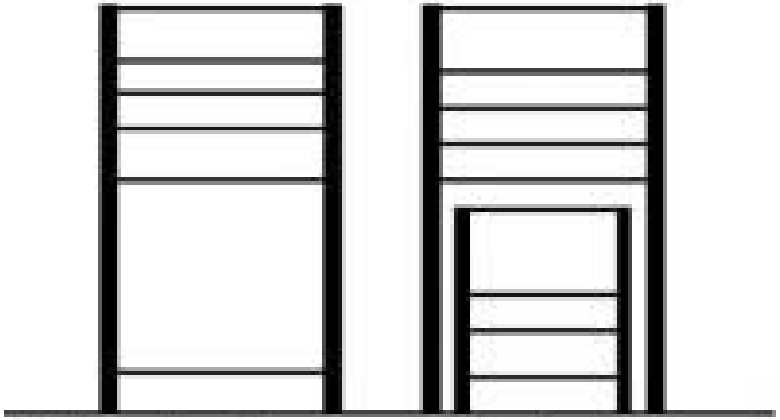
The Interior of the **Ecotrust** building, showing original columns unfinished and left rough, the stair (straight ahead) in light steel allowing lots of natural light.



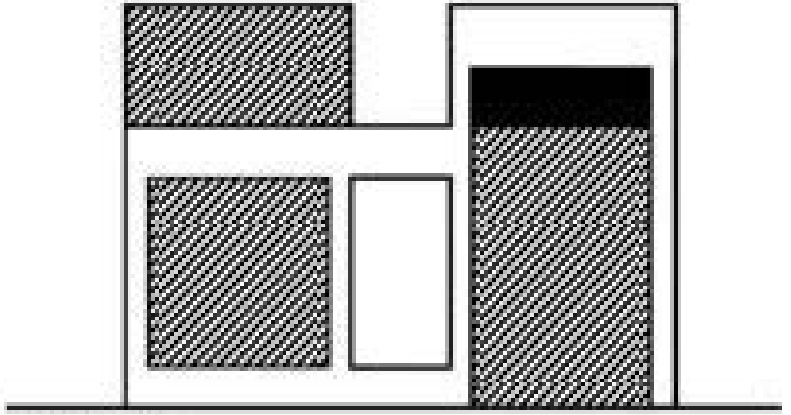
Circulation



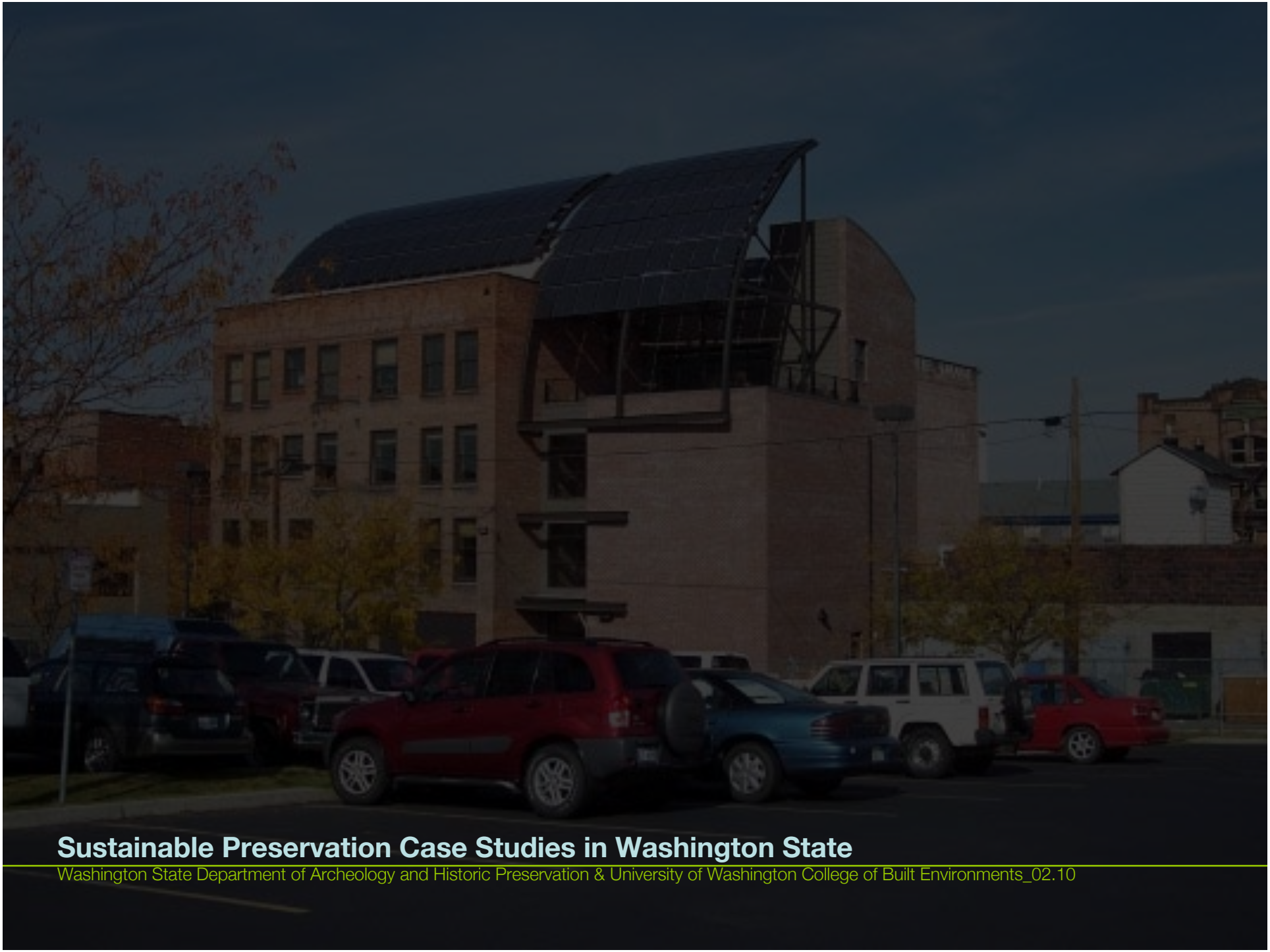
Program



Existing structure supports extension
Additional "table' in culture silo

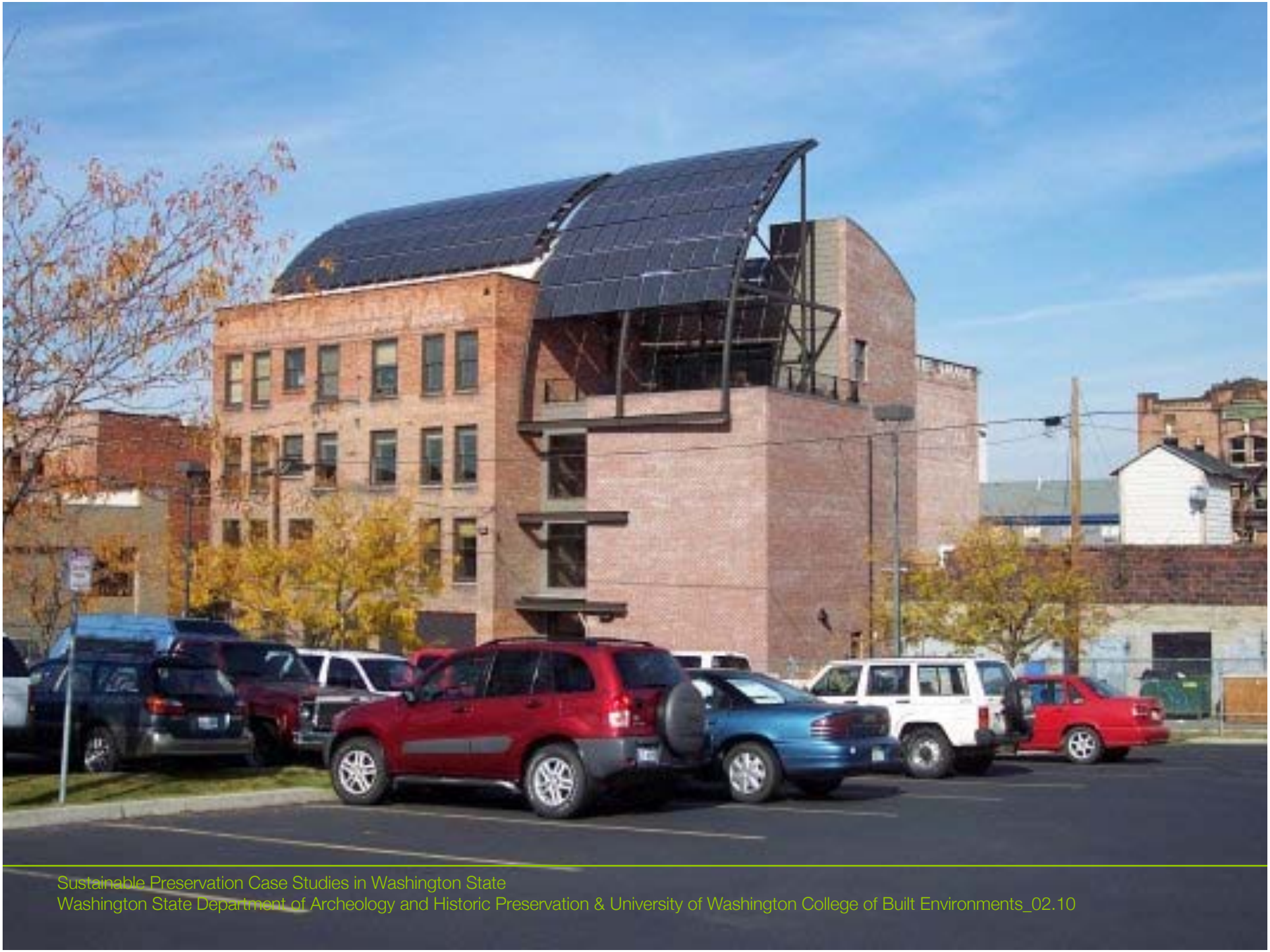


Public
Semi public
Private



Sustainable Preservation Case Studies in Washington State

Washington State Department of Archeology and Historic Preservation & University of Washington College of Built Environments_02.10



Sustainable Preservation Case Studies in Washington State
Washington State Department of Archeology and Historic Preservation & University of Washington College of Built Environments_02.10

Floyd & Delores Jones Playhouse

University of Washington, Seattle Campus

Built: 1925 Renovated 2009, LMN

The Playhouse Story:

Originally built in 1925 as a tile warehouse, the building was purchased in 1930 by Florence and Burton James, cofounders of Seattle Repertory Theatre Playhouse Company and in 1931 converted and expanded into the Seattle Repertory Theater by Architect Arthur Loveless

In 1936 the building was a part of the WPA Federal Theatre Project, housing one the few 'negro units' In 1950, the theatre acquired by the University of Washington for use as an experimental laboratory theatre for UW School of Drama. The theatre was was remodeled (1958-1968) converted the proscenium style theater to a thrust stage orientation, filled in the courtyard for an addition as a new lobby.

In 2005, funds were allocated through UW's Restore the Core program (concentrates on seismic upgrades and basic infrastructure). A donation from Floyd Jones in memory of his wife, Dolores, allowed for a more intensive renovation. In 2007, construction began on the newly renamed Floyd and Delores Jones Playhouse Theatre, with LMN Architects and concluded with the grand opening in October, 2009.

Floyd & Delores Jones Playhouse

University of Washington, Seattle Campus
Built: 1925 Renovated 2009, LMN

Sustainable Highlights:

Reused existing building, reclaimed elm tree, & recycled construction waste

Use of regional materials

Naturally ventilated lobby, displacement ventilation in theatre

Low emissive roof

Energy rated windows

Energy efficient lighting and controls

Water conservation fixtures

Low VOC finishes, “green” housekeeping operations

Water, gas, and electrical metering to measure use

10 month post occupancy follow up to confirm building performance

LEED Gold

Floyd & Delores Jones Playhouse

University of Washington, Seattle Campus
Built: 1925 Renovated 2009, LMN

Wing Luke Asian Museum

Chinatown International District, Seattle

Built: 1910 Renovated 2008, OSKA

The Wing Luke Story:

The Wing Luke Asian Museum opened Saturday, May 31, 2008 to the public after a decade of planning by the Asian American community. Formerly known as the East Kong Yick Building, a rooming house, mercantile, and association building dating to 1910, the museum is designed to be both a tourist destination and a place for locals to connect with the cultural heritage hub of the Asian community.

The East Kong Yick Building was already significant to the community because it was community-owned by between 300 and 500 investors. The Wing Luke Foundation purchased it from the investors to make it into a museum. Upon further investigation of the program and several community meetings, the design team discovered that the community wanted the primary emphasis to be as a community center. The building was in poor condition when OSKA took on the project. An earthquake in the 1960s had badly damaged the building so that the top floors could not be legally occupied until the building had been seismically upgraded. Lacking the money to make the top floors safe, the top floors remained unoccupied until the building's conversion into the Wing Luke Museum.

Wing Luke Asian Museum

Chinatown International District, Seattle
Built: 1910 Renovated 2008, OSKA

Sustainable Highlights:

Windows and doors repaired and reinstalled

Fir joists recycled as stair treads

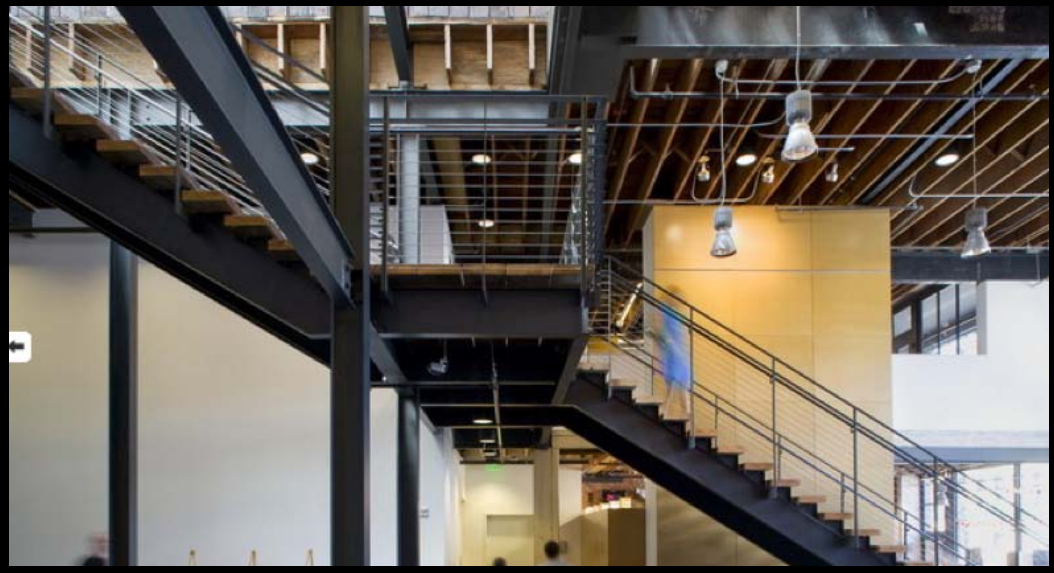
Fire doors and no longer functional components inspired furniture and pieces of art

Original doors used upstairs in the immersion exhibits

New materials were sensitive to local origin and sustainability.

Light wells and strategic transparency allow for naturally lit spaces

Operable windows and 2-story light wells encourage natural air-flow



Wing Luke Asian Museum

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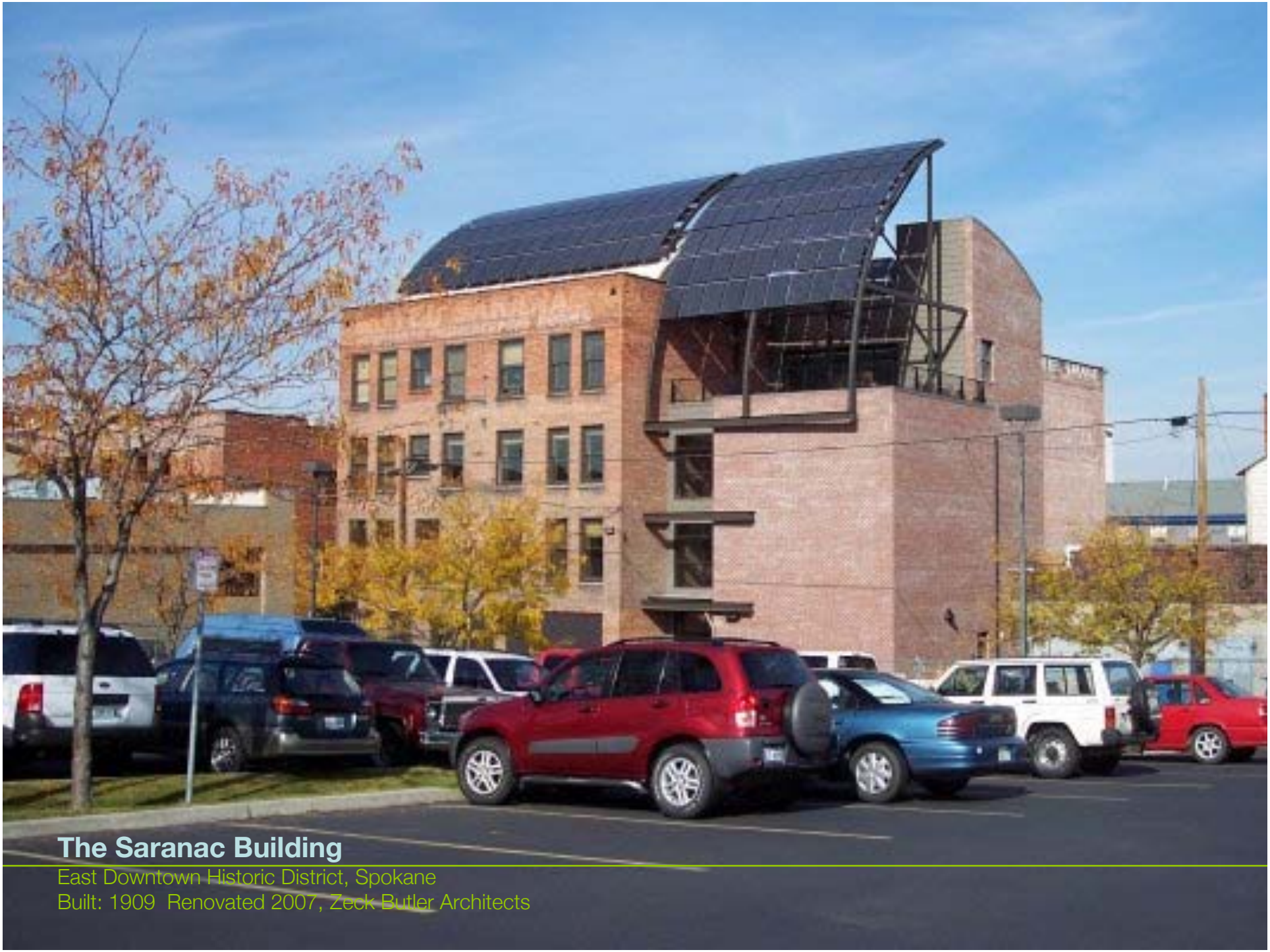

The Saranac Building

East Downtown Historic District, Spokane

Built: 1909 Renovated 2007, Zeck Butler Architects

The Saranac Story:

Built in 1909 by owner H. H. Hutton, as the Saranac Hotel, it is a good example of Single Room Occupancy Hotels (SRO) in the Spokane's Central Business District. Though always known as the Saranac, it was also listed under furnished rooms as the Hotel Margurett in the 1910 directory. The ground floor commercial spaces had a variety of occupants over the years.

The Saranac is a contributing building to Spokane's East Downtown Historic District (approximately twenty-seven square blocks), containing commercial, mixed-use, SROs, and warehouse buildings anchored by the Northern Pacific Railway Depot. The district's significance dates from the 1890s, following the great fire of 1889, supporting Spokane's pronounced growth between 1900 and 1910 with housing and businesses.

The current owner, Jim Sheehan, purchased the building to expand his West Main Street Community Building complex, a collection of community-oriented businesses. After sitting vacant for sometime, the newly renovated Saranac Building had it's grand re-opening in September 2007

The Saranac Building

East Downtown Historic District, Spokane
Built: 1909 Renovated 2007, Zeck Butler Architects

Sustainable Highlights:

85% of the original building was re-used, eliminating the need for all new materials.

90% of construction waste was diverted from landfills through recycling and re-use.

Construction incorporated 20% recycled materials, including steel, acoustical ceiling panels, carpeting and denim insulation.

Locally sourced new materials
FSC-certified wood

Green roof

Ground-source heat pump

100 feet Photo-Voltaic (PV) Array

Occupancy sensors control light fixtures

A rooftop garden uses a catchment system for recycling rain water and cooling the building with vegetation

Waterless urinals, low flow fixtures, and dual-flush toilets

The Saranac Building

East Downtown Historic District, Spokane
Built: 1909 Renovated 2007, Zeck Butler Architects

Park 90-5, A&C

SODO neighborhood, Seattle
Built: 1944 & 1985 Renovated 2004, DKA

The Park 90-5 Story:

Building A was built in 1944 in the area south of downtown on tidal flats filled by soil from Denny Regrade. Originally, Fry's Cold Storage and Slaughterhouse, the building was re-modeled in 1984 into an office building. The renovation replaced the existing windows, and EIFS was applied over the brick masonry structure. In 1996, the Property was acquired by City of Seattle. In 2004 the building was remodeled to transform it from an industrial/office campus to the headquarters for Seattle Police Special Forces along with building C by DKA, which substantially alternated the interior.

Building C was constructed in 1985 as a warehouse by David Sabey, also in the area south of downtown on tidal flats filled by soil from Denny Regrade. The building was remodeled twice (1990 & 1995) becoming a Starbucks Headquarters and Roasting Plant before being acquired by the City of Seattle in 1996. In 2001, the Nisqually earthquake caused $10 million damage to the building due to improper or missing welds on the tilt up plates. This damage was addressed by the 2004 remodel by DKA: roof replaced, welds installed, gut interior except for mezzanine structure.

Park 90-5, A&C

SODO neighborhood, Seattle
Built: 1944 & 1985 Renovated 2004, DKA

Sustainable Highlights:

Retain much of the existing building

95% of construction waste recycled

20% fly ash concrete added to strengthen the foundation in Bldg C

Recycled and local products whenever possible, Certified lumber

Salvageable bldg materials included in the new design

Recycled parking lot as base layer for new

Existing asphalt was reduced and native plants, bioswales and retention ponds reduced the storm water runoff store and reuse water to wash vehicles increase urban habitat

Natural lighting, replace all of the windows with more energy efficient windows

Bike racks and showers encourage bike commuters

LEED Gold & Silver

Park 90-5, A&C

SODO neighborhood, Seattle
Built: 1944 & 1985 Renovated 2004, DKA

This building is a candidate for demolition this summer.

As of 2002, $60K was in the Parks budget for a new roof. This would have preserved the building for decades, even while people worked to renovate and repurpose. Sadly, the decision was made somewhere within the City to divert the $60K to another part of the budget, and the existing roof began caving in after the winter of 2004. In 2005, the city received a second bid of $200K for a new roof, as structural damage from the decrepit roof continued to grow. Again, **investment and maintenance in the historic structure was put aside**.

At least two non-profit groups have shown serious interest in renovating Building 18. **Sand Point Arts and Cultural Exchange (SPACE)**, has received over $100K in grant monies to study feasibility of various buildings on campus, and identified Building 18 as a prime candidate for renovation. Negotiations on a lease with the City fell through in 2002, making the building ineligible for fundraising on the part of a 501c3. **Cascade Bicycle Club** also stood ready to renovate the building for over $1.5 million, even committing thousands of dollars to an architect for plans. Not long after, due to the roof collapse, the building was determined to be beyond repair and Cascade Bicycle Club was forced to abandon their plans.

As of today, the building is scheduled for demolition this summer at a cost to taxpayers of $200K. If you are one of many who protest this gross and public example of poor stewardship and tax payer waste on the part of the City of Seattle, please contact your City officials and voice your opinion. City Council, Parks and the Mayor's office have heard continually about this situation but need to hear from you.

Visit www.seattle.gov, for contact information.

www.spaceatmagnuson.org will post updates as available.


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= the recycling efforts of **1,972,830 aluminum cans**

=carbon sequestered by either 427 tree seedlings
for a decade or 3.8 acres of pine forest annually

= YOU landfilling 4.6 pounds of trash per day for 1,444 years

=1212 tons of construction and demolition (c&d)waste in a landfill

= the gasoine burned driving a (fuel efficient) car every day, 365 days a year, for over 200 year

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18

The **Reuse** of our existing buildings reduces the amount of demolition and construction waste deposited in landfills, lessons the demaind for new energy and other natural resources needed to construct new buildings, and conserves the energy originally expended to create the structures.

Reinvestment in older and historic communities has numeral environmental benefits such as walkabilty and livablity, density, and mass transit accessible.

Retrofits of historic and existing buildings can and should be undertraken to extend building life and better capture the energy savings available through newer technologies.

Repair of non-working buildings the best solution through design solutions to create higher performing structures, workable programs and spaces, and building components that can be maintained.

Respect for our existing environment is an important human component to create cultural continuity, community enrichment, and historic records of our community.

Reuse and Repair of our existing environment is a creative and challenging design aspect of our discipline

Observe existing buildings and understand their spatial configuration, materials and qualities.

Evaluate the building for reuse, repair, adaptibility and change.

Weigh decisions for reuse. Is it adaptable? Could your program go elsewhere if it doesn't fit in the existing space? How much can you do with the least amount of energy expenditure to ensure a vibrant space for life in and outside of buildings?

Design buildings and their public space for historical and cultural continuity, environmental responsibility and vibrancy and a vibrant, successful human space.

FLEXIBILITY