WEAVING ARCHITECTURE

AN EXPLORATION OF OLD AND NEW MATERIALS AND CONSTRUCTION METHODS IN WASHINGTON, D.C.

JOSHUA JAMES KEITH HOUSDAN
This is an architectural thesis on weaving. The city is a massive textile, a patchwork of buildings, infrastructure and people. We alter the urban environment within the confines established by lot lines, streets and zoning similar to the weft on a loom, conforming to the rules of the warp. The proposed design aims to incorporate the demands of a globalized world while retaining the identity and scale of the traditional Washington building type – the rowhouse.

The architectural project, located near Fourteenth and U Streets, Northwest, in Washington, DC is a hybrid of programs - a textile school, a gallery and bar for the Textile Museum, artist studios, a restaurant, leaseable space for offices and residences as well as a public garden. This complex design reflects the evolving nature of cities and a building’s ability to adapt to new demands and technology; similar to the ancient art of weaving's ability to transcend centuries of evolution while retaining its inherent qualities.
WEAVING ARCHITECTURE
AN EXPLORATION OF OLD AND NEW MATERIALS AND CONSTRUCTION METHODS IN WASHINGTON, D.C.

JOSHUA HOUSDAN
MASTER OF ARCHITECTURE
THESIS DEFENSE

Typical rain screen wall sections
SCALE: 1/2" = 1'-0"

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Joshua Housdan

This thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of Master of Architecture.

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This thesis would not be possible without the support from countless individuals. My architectural education began many years ago and coming back to school for my Master of Architecture degree was an exciting decision. Returning from the professional world, the WAAC embraced me with open arms. The program gave me more than I could ever give back, and I am forever indebted to the center for its love and wisdom.

I would like to thank my thesis committee - Paul Emmons, Susan Piedmont-Palladino and Jaan Holt - for believing in my little project on Fourteenth Street and all its details that somehow turned into a building.

A special thanks to Henry Hollander for keeping the center afloat - somehow.

To my friends and colleagues - Lesley Golenor, Beth Barnett, Sarah Mallent, Dave Nastro, Andrew McBrine, Megan Lazzeri, Ellen Sullivan, Carolina Dayes, Leo Salom, Steven Steiber, Elizabeth Walas and Nick Jessoe - who kept architecture imaginative, engaging and, most importantly, entertaining.

And to my friends outside of the WAAC for getting me out of the studio as a reminder there is a world beyond 1001 Prince Street.

And lastly, but most importantly, to my parents and family for their love and support of my endeavors - however silly they may be.
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WEAVING ARCHITECTURE

This is an architectural thesis on weaving. It is a study on the influence of the world’s most ancient craft and its relationship to the craft of building. As skilled labor decreases and demand for efficiency increases, what is lost in the process? Through global markets and the simplicity of purchasing through the click of a mouse, what is happening to local and regional architectural identities? Just as automated high-speed looms produce flawless duplicates, mass-produced building materials leave no mark of human creation while imitating and oftentimes insulting their crafted neighbors.

The city is a massive textile, a patchwork of buildings, infrastructure and people—both historic and contemporary. We alter the urban environment within the confines established by lot lines, streets and zoning requirements similar to the weft on a loom—conforming to the rules of the warp.

This thesis aims to incorporate the demands of a globalized world while retaining the identity and scale of the traditional Washington building type—the rowhouse.

The architectural project, located near Fourteenth and U Streets, Northwest, in Washington, DC, is a hybrid of programs—a textile school, a gallery and bar for the Textile Museum, artist studios, a restaurant, leaseable space for offices and residences as well as a public garden. This complex design reflects the evolving nature of cities and a building’s ability to adapt to new demands and technology similar to the ancient art of weaving’s ability to transcend centuries of evolution while retaining its inherent qualities.
knots as changes in material / program
WEAVING - SETTING UP THE RIGID HEDDLE LOOM

WEAVING - PLAIN WEAVES USING THE RIGID HEDDLE LOOM

scarf woven on the rigid-heddle loom

shibori pocket square

shibori scarf

shibori scarf
A major professional goal and part of my thesis is researching local and regional materials. While LEED currently requires the majority of materials originate within 500 miles of the construction site, my goal was to find the majority within 100 miles. Historically, development has occurred near abundant natural resources; building materials were found adjacent to their homes and businesses.

Through technological advances and subsequent globalization, we have moved farther away from our resources. While we can’t strive to live in the past and return to an old way of living, there are plenty of local and regional resources that are easily found through online searches and consultants, such as the following:

- www.buildsite.com
- www.ecobusinesslinks.com
- www.greendepot.com, and
- www.natureneutral.com

The Washington, D.C. metropolitan area also has a number of architectural salvage warehouse as well as recycled lumber and other materials yards. A few examples are the following:

- Community Forklift in Hyattsville, MD
- Caravel’s Architectural Salvage in Richmond, VA
- Recycled Aggregates in Washington, DC

While not every material in the following list can be located within the 100 mile goal I initially set, the majority are local and regional. I expanded the search to three categories: 100, 250 and 500 miles. This list is certainly not complete, however, as a professional goal, this spreadsheet will only continue to expand as my experience increases.

<table>
<thead>
<tr>
<th>Category</th>
<th>Materials</th>
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<tbody>
<tr>
<td>Masonry / Stone</td>
<td>Concrete Block - Gray Block, Ground Face Concrete Block, Terra Cotta, Brick, Slate Tiles, Precast</td>
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<tr>
<td>Aggregates / Crushed Stone</td>
<td>Local Stone</td>
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<td>Glazing</td>
<td>Float Glass, Channel Glass, Cast Glass, Laminated Glass</td>
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<td>Woods</td>
<td>Recycled Lumber, Blocking/Shims</td>
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<tr>
<td>Metals</td>
<td>Copper, Rebar, Steel, Nails, bolts, fasteners</td>
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<tr>
<td></td>
<td>Cables, Aluminum Storefront Systems, Metal Screens</td>
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<tr>
<td>Membranes / Synthetics</td>
<td>Filter Fabric, Drainage Boards, Waterproofing Membranes, Roofing Membranes, Vapor Barriers, Sand, Foam Insulation, PVC Piping, Gypsum Board, Insulation others, Conduit</td>
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<td>Masonry Ties, Tension Rods</td>
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<td>Caulks / Sealants</td>
<td>Grouts</td>
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<td></td>
<td>Gold, Solid Surface Counter, Ornamental metal</td>
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<td>Lath, framing, studs, trim</td>
<td>Lath, framing, studs, trim</td>
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<td>Hagerstown Building Products</td>
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<td>Gray Block</td>
<td>York Building Products</td>
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<tr>
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<td>Terra Cotta</td>
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<td>Brick</td>
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<td>Mooresville, NC</td>
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<td>Blondheim Glass</td>
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<td>Clopay Fiberlite</td>
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<td>Laminated Glass</td>
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<td>New Lumber</td>
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Through researching craft and weaving, the program automatically lent itself to textiles and galleries. While also researching local versus global building materials and construction methods, the program expanded into a relatively recent building typology: the blurring of public and private spaces through museums and embassies attaching condos and other private functions in order to finance their projects. Two recent examples in Washington are the Swedish Embassy in Georgetown as well as the Newseum in the Pennsylvania Avenue corridor just blocks from the Capitol Building.

As the research further developed a site was chosen, the program expanded exponentially into several different programs meshed into indistinct zones: a gallery/bar for the Textile Museum to display and pay for exhibitions; a craft school/studio spaces for local artists to interact with the community; a public garden/courtyard for the aforementioned programs to interact with the city as a whole; a restaurant with leaseable office space above; a residence/studio for a visiting artist associated with the Textile Museum; and finally a series of duplex apartment units to afford the museum further income.

The evolution of the program was similar to that of weaving, where, though chronologically there is a structure - the warp attached to the loom, the resulting object or program varies and is oftentimes blurred as the weft conceals the structure snaking through its perpendicular guides.
To provide housing and studio space for a visiting master textile artist. The artist would come to Washington, D.C. through a grant from the Textile Museum located at 23rd and S Streets, Northwest. The Facility provides a direct link between the museum, its archives and research initiatives and the planned arts corridor along Fourteenth Street between P and U Streets.

The functions link the busy nighttime activities associated with the Dupont Circle neighborhood, Fourteenth and U Street corridors. Textiles are all about the touch. Galleries are all about the do not touch; this is an attempt to blur the lines between the two.

The garden/courtyard provides a visual break from the hustle and bustle of the Fourteenth and U Street corridors. Since there are currently no public parks or gardens along the Fourteenth Street corridor, the garden provides a place for the community and artists to interact outdoors. It allows for direct access from the street into the classrooms.

The artist studios located on the upper levels provide work space and facilities for artists who otherwise would not have a place or resources to master weaving techniques.

These classrooms and studios would also be open to the public through monthly gallery openings commonly found along the Fourteenth Street arts corridor.
NEIGHBORHOOD WALK

I chose to examine this stretch of Washington from Dupont Circle heading East on P Street, then North on Fourteenth Street and East on U Street for several reasons. Firstly, I am interested in the ways cities change from one neighborhood to another and how cities evolve over time. I was curious to explore the transitions from one extremely successful neighborhood center (Dupont Circle) crossing into a transitional neighborhood (the Fourteenth Street corridor) then continuing onto a vibrant, historically African American neighborhood (U Street-Cardozo).

This journey revealed a few clues into what works and what does not on an urban design scale. Having lived in the Washington, DC area for several years, I am familiar with these neighborhoods but had not examined them under the same microscope until now. Also, my thesis site is located along the walk at the intersection of Fourteenth Street and Wallach Place, Northwest.

This walk takes you through several very distinct districts. Dupont Circle has very well defined zones, from the inner and outer tree-lined rings of the circle itself, to the peripheral buildings that frame the park. Continuing East along P Street from Dupont Circle, there is a distinct tree canopy and the scale of buildings is clearly dominated by residential structures. When you reach 16th Street, the scale becomes larger and the tree canopy is less defined. The construction in this area is also newer than most closer to Dupont Circle. There, the facades of the buildings are mostly curtain walls over concrete structural systems as opposed to parti walls with brick facades and smaller, punched openings for windows and doors.
On the 1400 block of P Street, Whole Foods becomes a neighborhood-defining anchor. The Studio Theater, at the corner of 14th and P streets, re-enforces this intersection as a neighborhood center. The DC Planning Office has designated the 14th Street corridor and U Street as arts districts and is encouraging rapid gentrification along this thoroughfare.

As a quickly evolving neighborhood, there are some positive elements as well as some failing parts. The sidewalks are relatively wide, at about 20 feet deep, they encourage heavy pedestrian traffic. Unfortunately the street is wider since it is a major thoroughfare and it also lacks consistent street lighting as well as a consistent, mature tree canopy.

Another observation along U Street is the narrowness of the sidewalks. While they measure twenty feet at their widest, they are eaten up by steps up to shops that were previously row houses and by planting boxes for threes or bike racks. While these obstacles can be a nuisance late at night when the sidewalks are crowded, they also contribute to the vibrance and life associated with this nightlife district. I would encourage the city to develop a more distinctive paving pattern or other street element to establish an identity for the neighborhood.

Scanning the sidewalks, it becomes obvious why. The sidewalks are not consistent. While some streets have a mature tree canopy, I would also encourage people to linger just a little bit longer and provide a more inviting introduction of warmer materials, such as wood or even recycled plastic, for seating or at such a low scale they allow the street wall to disintegrate. Hopefully, these vacant or under utilized lots will be built up in recent years to come.

As a planning student, I was taught that subtle clues like these help orient visitors and also help strengthen the continuity of the streetscape. This helps to establish an identity for the neighborhood. Being an arts corridor, I would also encourage the city to develop a more distinctive tree canopy. While public service buildings like the Whitman-Walker Clinic and the Central Union Mission are essential to the city, the buildings around them are either abandoned or at such a low scale they allow the street wall to disintegrate. Hopefully, these vacant or under utilized lots will be built up in recent years to come.

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Continuing East along U street, the street wall begins to rapidly disintegrate. Finishing the walk at the African-American Civil War Memorial, the scale of the buildings is two to three-story row homes and a b trail grade school. Having lived in the city for seven years, I had never actually examined this memorial. The plaza where it lies is largely eaten up by the Metro Street entrance to the city’s Metro rail system. I observed people walking around this area and all but a handful went immediately in or out of the station entrance.

Those who did linger were either waiting to make a phone call or were waiting to meet friends to head into the station or to venture elsewhere in the neighborhood.

I would propose a few design changes to this plaza. The first would be to provide a more established green wall of plantings to help frame this triangular space. Currently, there is a low berm and small plantings, completely exposing this space to the wide span of Vermont Avenue and the modest row homes across the street.

While the West side of the plaza, however is nicely anchored by a monolithic building housing a CVS (a typical neighborhood anchor store) at the ground level, with offices above. I would also encourage the city to develop a more distinct paving pattern on the sidewalks to link this corridor back to Fourteenth Street.

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Those who did linger were either waiting to make a phone call or were waiting to meet friends to head into the station or to venture elsewhere in the neighborhood.
Like all big cities, it consisted of irregularity, change, sliding forward, not keeping in step, collisions of things and affairs, and fathomless points of silence in between, of paved ways and wilderness, of one great rhythmic
throb and the perpetual discord and dislocation of all opposing rhythms, and as a whole resembled a seething,
bubbling fluid in a vessel consisting of the solid materials
of buildings, laws, regulation, and historical traditions.

-Robert Musil

The location of the project site is along the east side of
Fourteenth Street, Northwest between Wallach Place and U
Street. While currently along the DC Planning Commission’s
Arts Corridor initiative, the site is at a historical crossroads.

With Fourteenth Street a historical automobile service
corridor and U Street a traditionally black neighborhood
and the epicenter of DC's early 1900's jazz renaissance, the
area is now under threat of gentrification and privatization.
Another factor is the significance that the intersection
of Fourteenth and U Streets marks the beginning of the
infamous riots in response to the assassination of Martin
Luther King, Jr.

Given the rapid gentrification of the neighborhood, the
project theoretically snatched up one of the few remaining
lots available as an attempt to blur the lines between public
versus private, desires versus codes, and traditions versus
trends.
site archaeology model - evolution of the site from 1884 to 2008
DESIGN PROCESS

My research began with a seemingly simple concern involving truth in materials. How did we as a society find it acceptable to mimic the past through cheap imitations? From architecture’s origins in the ancient craft of weaving, to stacked stones, to masonry cavity walls, we’ve transitioned into an architecture of veneers: skins.

This thesis never attacked the idea of thinness, in fact, it embraced it. Rather, the process focused on details revealing the thinness of today’s exposed materials.

Focusing on Washington, D.C., the project explored the city’s most iconic building typology - the row house. As described earlier, the project is situated between two historic structures. While in need of repair, the adjacent properties represent an older method of building: of bearing walls, short spans and masonry cavity walls, versus the precast concrete, curtain walls and shelf-angle-supported brick walls of today.

The aim was to explore the craft of building rather than printing a copy of the older neighbor nextdoor.
CONCRETE BLOCK AND BRICK CAVITY WALL CONSTRUCTION

CAST IN PLACE AND PANEL RAINSCREEN CONSTRUCTION

METAL STUD AND CEMENTITIOUS BOARD CONSTRUCTION

METAL STUD AND TERRA COTTA RAINSCREEN CONSTRUCTION
WEAVING
PROGRAMS | MATERIALS | CONSTRUCTION METHODS
building section one - gallery/bar and visiting artist residence/studio

building section two - school/studios and duplex apartments
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hand drawings and manipulation by Joshua Housdan

knots as changes in material / program
hand drawings and manipulation by Joshua Housdan

knots as changes in material / program
drawings are by Joshua Housdan

setting up the rigid-heddle loom - weaving on the rigid-heddle loom series
photographs by Joshua Housdan and courtesy of David Nath

knots series woven on the rigid-heddle loom and course through various silkscreen techniques
screen prints by Joshua Housdan

500-mile radius map; map courtesy google®, digital manipulation by Joshua Housdan

neighborhood walk: knot drawing of a quagmire, digital manipulation by Joshua Housdan

bustle street floor plan; digital manipulation by Joshua Housdan

14th street drawing with digital manipulation by Joshua Housdan

site map: map based on historical sanborn maps of the site block by Joshua Housdan

site digital collage of research and design; drafting, renderings and most photographs by Joshua Housdan; other photographs used are free use.

section drawings and digital manipulation by Joshua Housdan with help from David Nath

wall section drawing and digital manipulation by Joshua Housdan with help from Leo Salom

fourteenth street elevation drawing and photos by Joshua Housdan

floor plan drawings and digital manipulation by Joshua Housdan with help from Carolina Dayer

final model by Joshua Housdan with help from Sarah Mailhot, Andrew McBride, Nick Jessee, Megan Lazzeri, Adrianna Torres and Jessica Turrin.
analytique - weaving the entry sequence of the gallery / bar; drafting and digital manipulation by Joshua Housdan

mid-defense presentation; photo courtesy of David Nath

thesis presentation layout; photomontages by Joshua Housdan

c the sampler; woven by Joshua Housdan