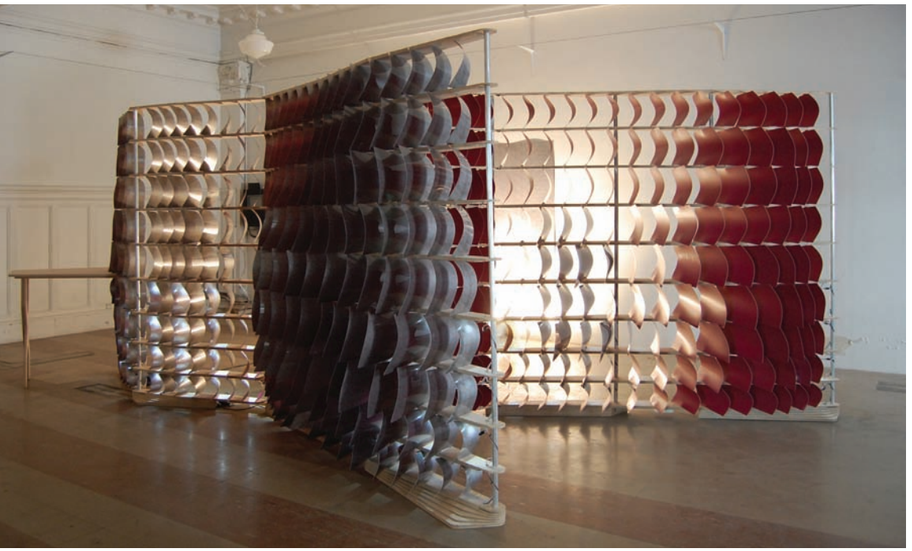
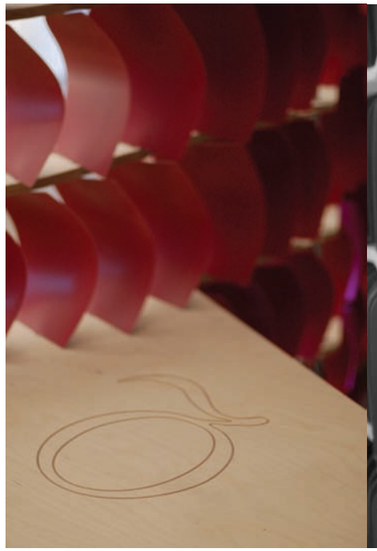
SECTION 2:

SELECTED PORTFOLIO OF CREATIVE WORK
(reverse chronological order)





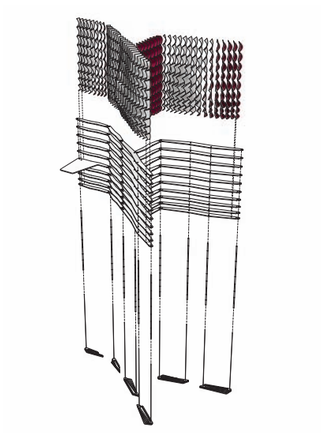
1 2 4
3 5

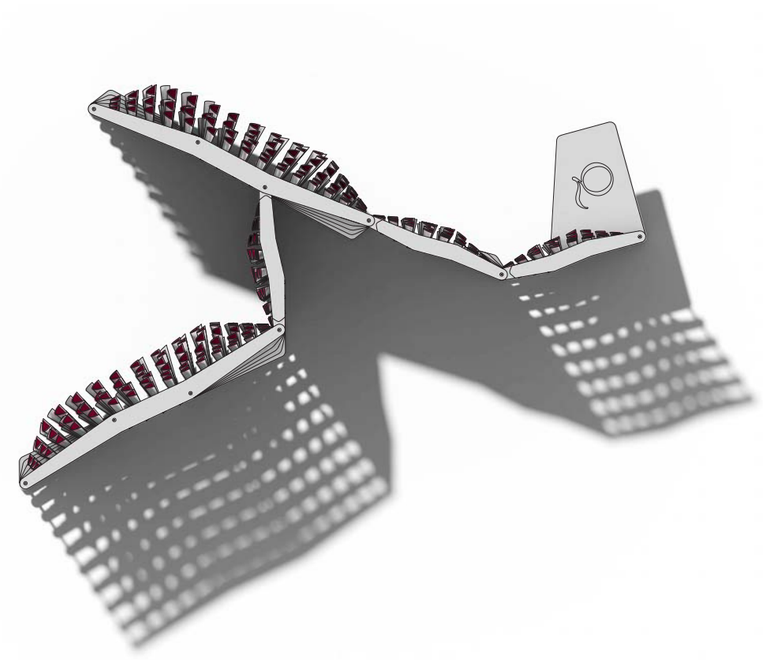
1| View through pavilion
2| Detail at ticketing desk
3| Assembly diagram
4| View through pavilion
5| Plan

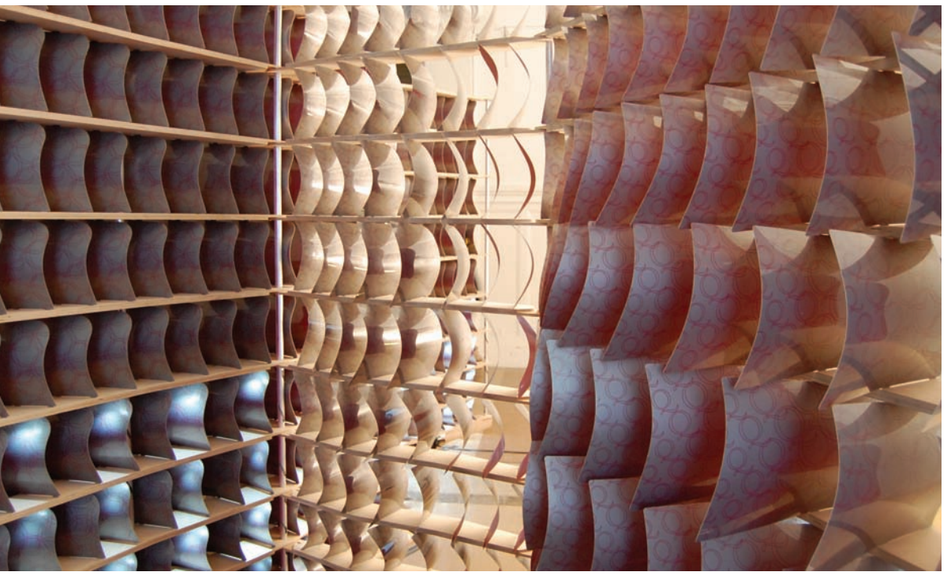
Quantum Theater is a small avant-garde theater company that is "interested in real life and how it intersects with a theatrical experience". To this end, Quantum does not utilize a permanent "home" for theatrical performances but rather stages performances at various indoor and outdoor venues throughout the city of Pittsburgh. In this context, be it an abandoned steel mill, a vacant YMCA or a city park, Quantum utilizes the particularities of a given place to inform the staging of the performance and subsequently, the experience of the audience.

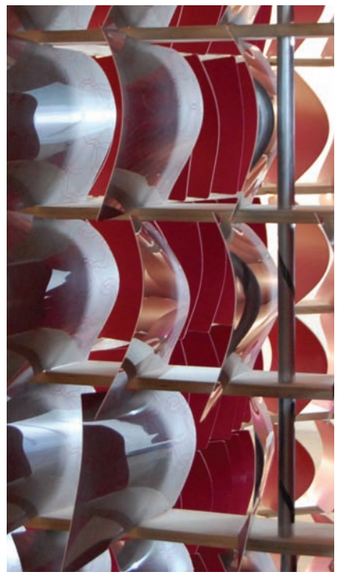
A consequence of this "nomadic" circumstance is the fact the theater company does not have an identity associated with a fixed venue. The discreet nature of many of the locations produces a sense of intrigue and anticipation that is bolstered through the unusual and at times uncomfortable conditions of a given venue. It is in this "friction" that Quantum seeks to operate.

Quantum Pavilion was commissioned as a mobile and highly reconfigurable device that marks the moment of arrival and introduces a physical constant in the midst of ever changing venues. In light of the fact venues are not re-occurring, one could not anticipate the size and spatial organization of future venues. As a result, the device needed to be dimensionally, spatially and programmatically adaptable while functioning as the threshold for ticketing and orienting guests through potentially confusing spaces.



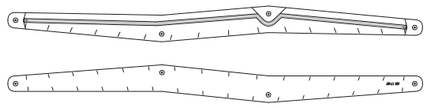






Requirements for the pavilion included: hand assembly by a small number of individuals; a manageable size and number of pieces that when broken down are easily stored; durability to withstand assembly and disassembly over the span of 3 years (4 performances per year); a total construction budget of $1200. Given the extremely tight budget, a Quantum Theater patron and PVC gift card manufacturer was engaged during the design process to explore the potential for material donation. As discussions with the manufacturer progressed, interest was focused on the potential to leverage the printing and laminating processes that are intrinsic to gift card manufacturing.

The Quantum Pavilion is a mechanism to produce distinct ocular effects through parallax views, reflectivity and the modulation of natural and artificial light. It invites guests to draw closer and move along its periphery establishing an aggregate of social interactions along and through its surfaces. The laminated PVC is deployed through an array of deformed fins that are positioned between a series of Baltic-birch plywood ‘propellers’. These two elements act as the primary visual devices and establish dynamic conditions in response to one’s movement around the pavilion.



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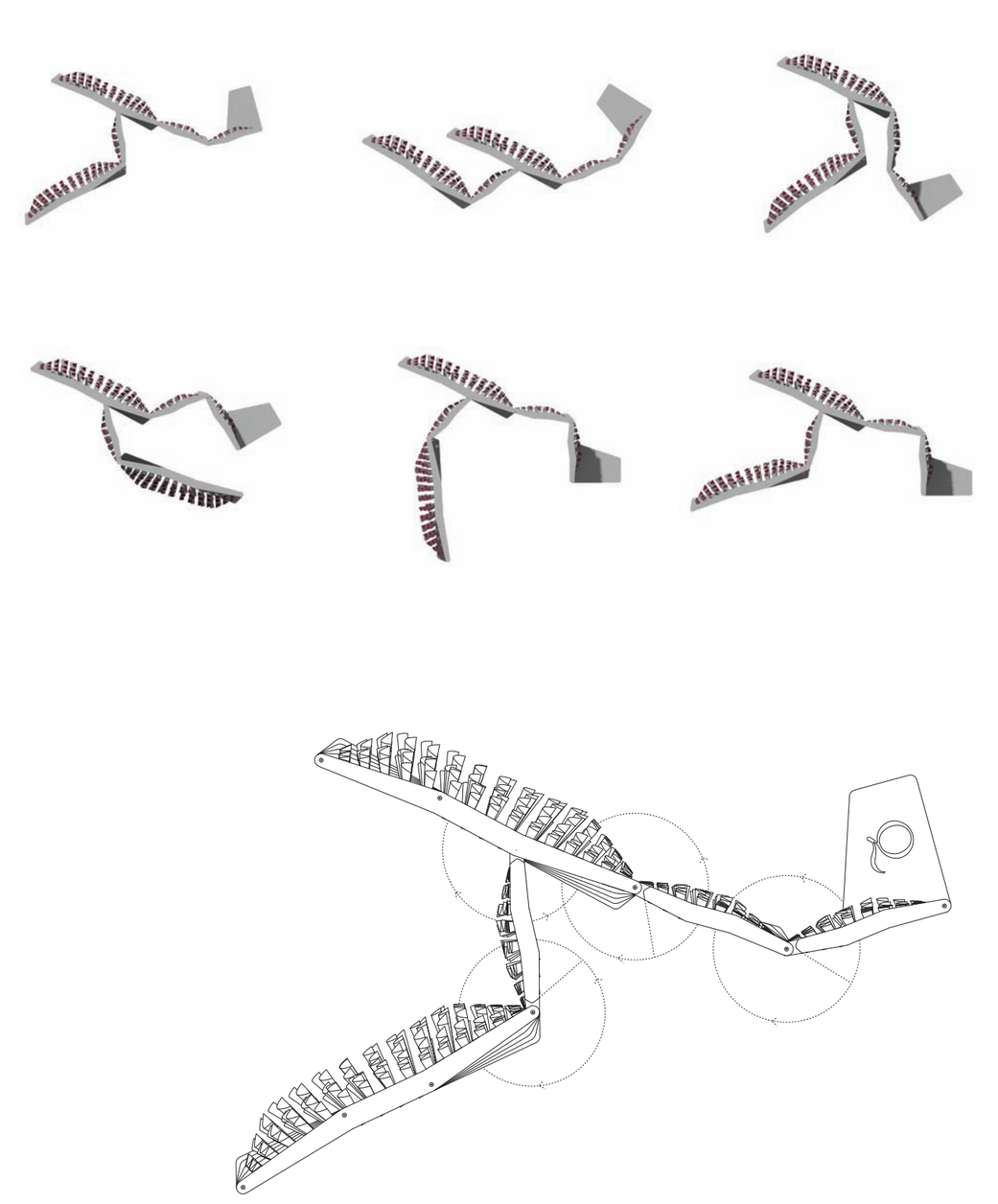
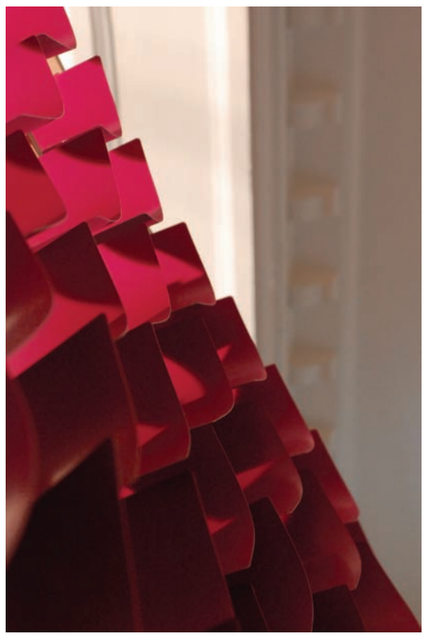
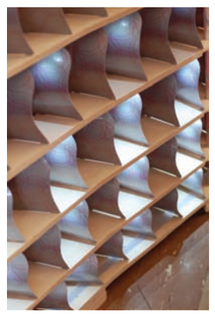
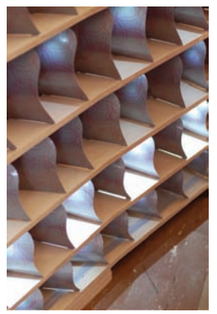
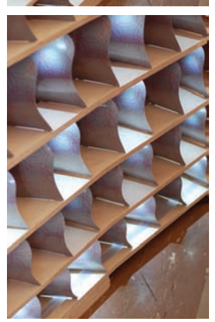
1| View through pavilion
2| Detail of printed PVC insert panels
3| Top and bottom of plywood fin
4| Assembly variations
5| Plan with pivot points

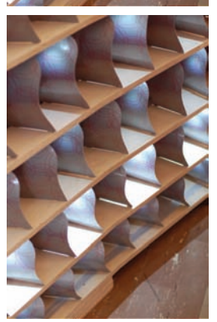






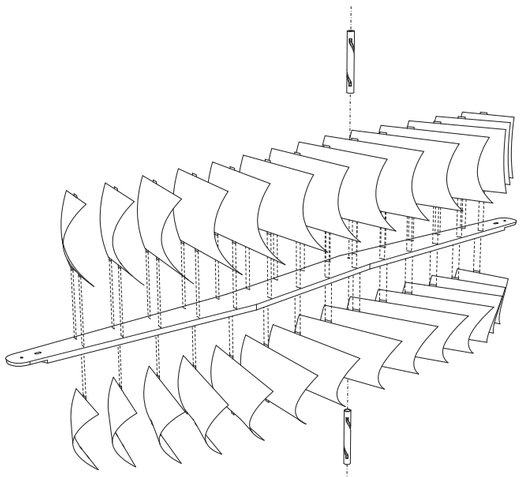






In order to serve as both a gathering space and circulation corridor, the lighting implies movement while drawing people around the project and into the more enclosed 'interior' spaces. Furthermore, it pays homage to the dramatic lighting of theatrical productions and the bright lights of the marquee. Our lighting design reinforces the horizontality of the screen using subtle glowing pulses of light which seem to move rhythmically across the piece. LED lights embedded in the plywood propellers illuminate the bottom four rows of bent plastic fins. Each of the 112 individually controlled lights fade in and out sending those pulses of light across the surface.

The cool white LED's are embedded in sign-grade acrylic strips which bolt to the underside of the plywood propellers. The wiring for each row follows a channel beneath the acrylic and wraps around helical cut aluminum tubes at the ends of those rows. The aluminum tube routes the control wires down to the bottom propeller where a 3D printed project box contains our control circuit. The control circuit consists of an 'off the shelf' micro-controller, a voltage regulator, decoupling capacitors, and two pulse width modulating (PWM) chips. The circuit boards are milled on a desktop CNC router using Eagle 5.11 for circuit schematic and board design, and the PCB-GCode plug-in to convert the files into G Code.



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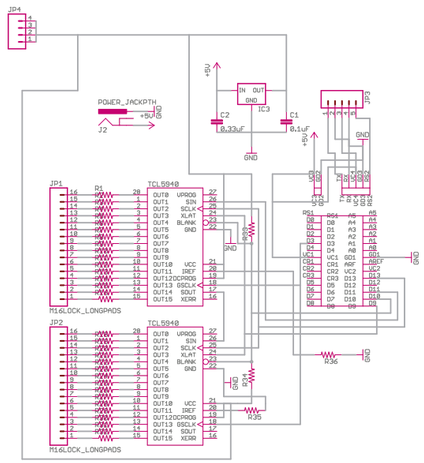
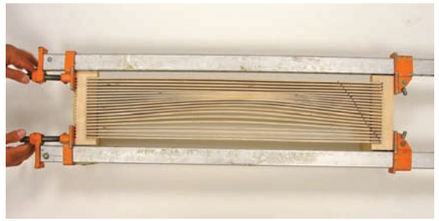
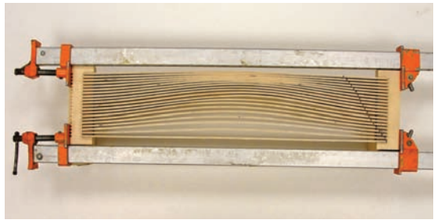
1| Detail of embedded LED lighting
2,3| Detail of printed PVC insert panels
4| Registration of PVC panels and plywood fin
5| Variable lighting condition
6| Lighting circuitry diagram



Alice Wall traces the evolution of a materially informed design process that seeks to interrogate and maximize the performative capacity of thin readily available material. Initially inspired by Sir John Tenniel's engravings for the first printing of Alice's Adventures in Wonderland, the project originated as a "two-sided" wall component within the scope of a broader residential design commission and sought to foster glances through the wall through select, varied panel deformation. Inspired, in part by the folds and pleats in Tenniel's engravings, the project sought to elevate the characteristics of otherwise humble material - plywood. The resulting prototypes document a process of design that was regularly informed by a feedback loop between design, fabrication and prototyping. As such, they record a reciprocal method that leveraged digital fabrication as a means of design research and refinement. Furthermore, they document attempts to "embed" characteristics of digital processing within the physical object.

From origins that focused on geometrically complex veneer laminations, the process evolved through a series of subtractive fabrications and finally led to force shaped plywood and resin composite panels. At the onset of the research, the smoothness found with veneer sheet was leveraged to accentuate a subtle deformation of the panels along the axis of cross views. The degree of compound curvature of the resulting surface necessitated either a degree of material stretch (highly unreliable and effectively impossible with veneer) or a pattern of slices to faciliate material bending. It is in essence a problem related to surface deformation and change in surface area, a process well documented through the work of Charles and Ray Eames related to plywood splints and subsequent pressure formed veneer furniture. This path was deemed unsatisfactory due to the necessity of seams across the face of the panels. As the project proceeded, direction shifted to focus more intensely upon subtractive fabrication to achieve variably deformed surfaces. While this initially reproduced the smoothness inherent in the initial veneer based studies, tool traces were utilized as a means to texture the surface and produce moire patterns though perceptual vibrations between the strict, parallel pattern of plywood laminations and a varied distribution of surface flutes that followed the surface deformation. While initially a visual device, the tool trace flutes had the potential to increase structural rigidity of the panel by increasing the cross-section of the panel and effectively acting as stiffening ribs. This was intriguing for the potential to retain a degree of panel strength despite the fact a portion of material was removed to produce cross-views.





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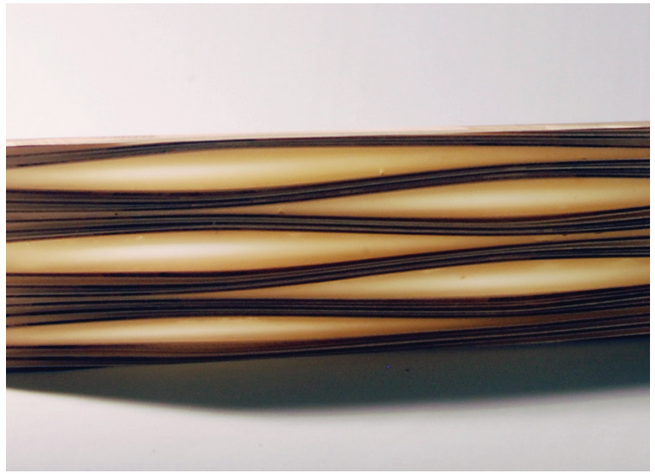
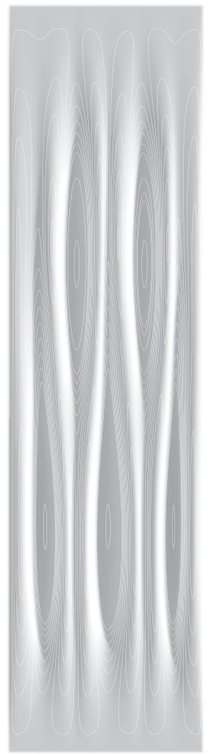
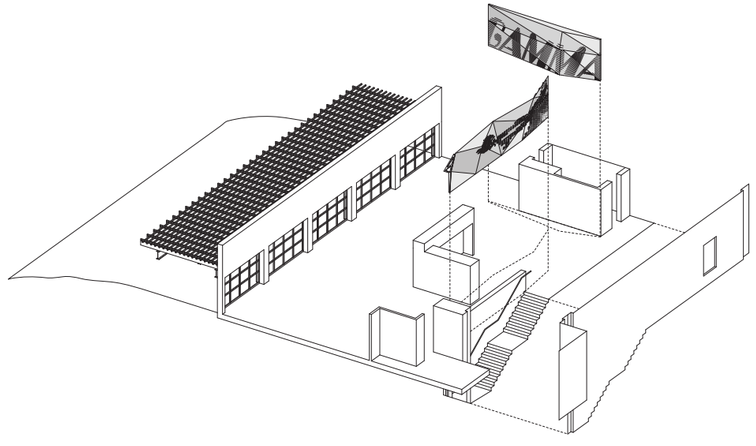
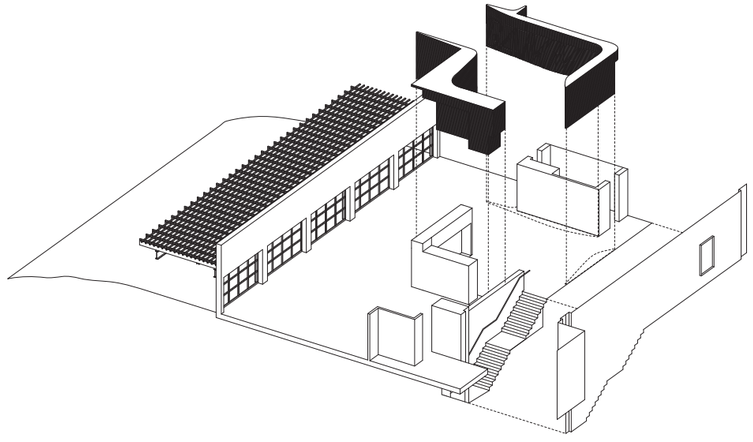
1| Clamping deformation of plywood strips
2| Detail of plywood and resin composite
3| Plywood and resin panel

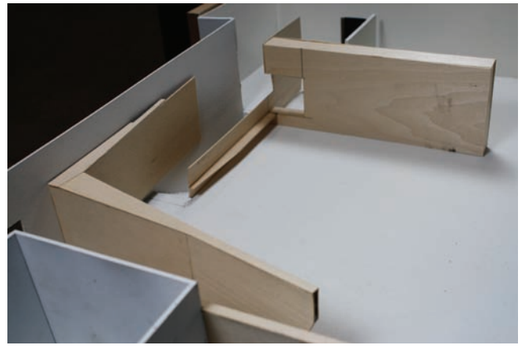


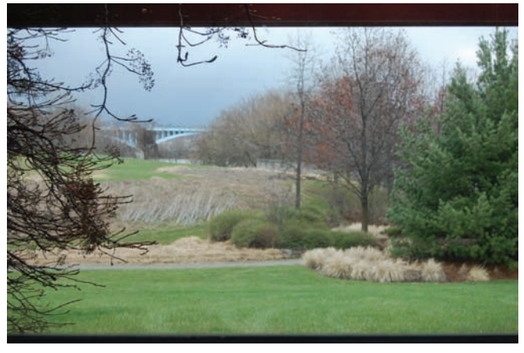


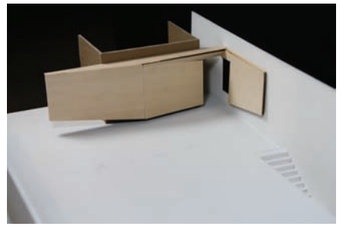
Plywood is by its very nature a composite, consisting of multiple layers of wood veneer fused together through the use of high performance glues, that are in essence a form of resin. The Tenniel engravings allude to a multilayered condition in which the curtain distinguishes spaces but also contains within its pleats and folds spaces for Alice to pass. It speaks to the potential of a material 'depth' that is substantiated though a change in fundamental material characterstics beyond a geometric surface treatmentment. Here, the composite basis of plywood can be utilized as a scaleable framework for wood and resin material compositions. Rather than deforming the panel to permit views around and between, the resin within the composite offers the potential for a diffused view through the panel and achieves a lightness through the transmissive charactersitics of the material. Whereas the resin is deployed as an adhesive and visual filter, the wood plys are utlized to lend strength to the panel while also registering the formative forces placed upon the panel during the casting process. The resulting material gradation is controlled yet, alludes to the free-flowing surface qualities of Tenniel's curtain.











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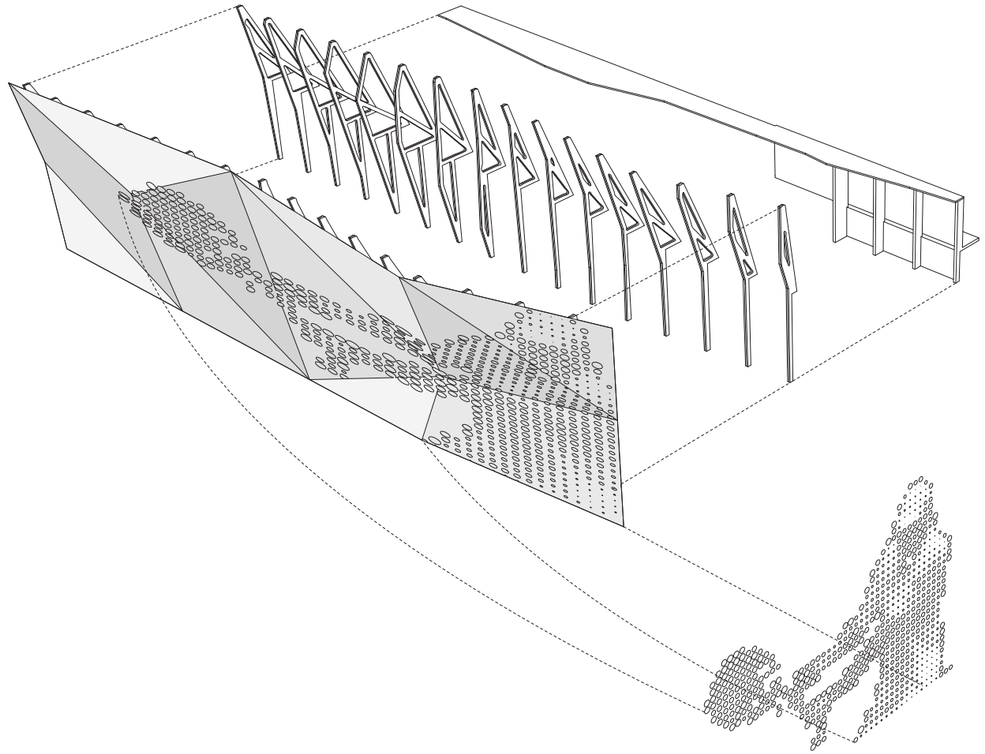
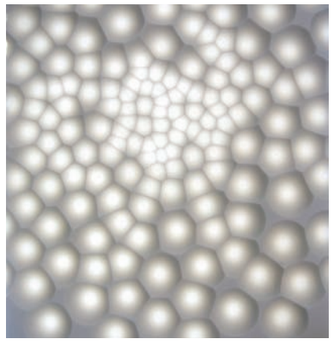
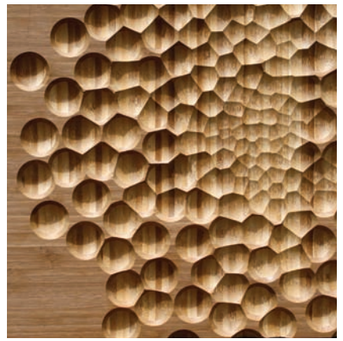
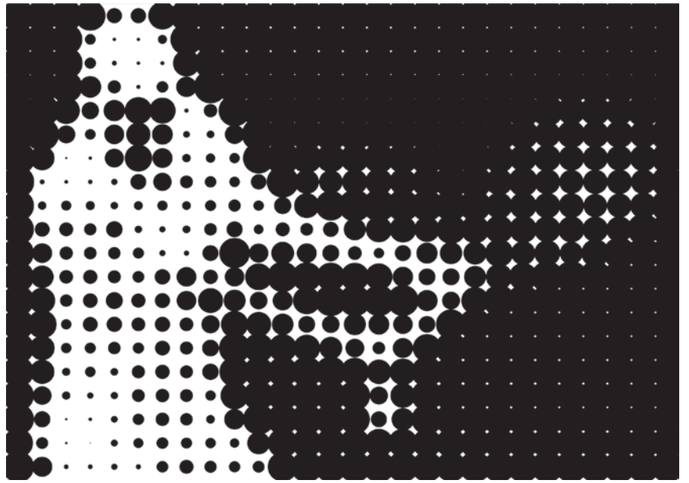
1| Image based proposal
2| Landscape based proposal
3| Study model
4| View toward river from interior
5| Study model
6| Drill perforation test

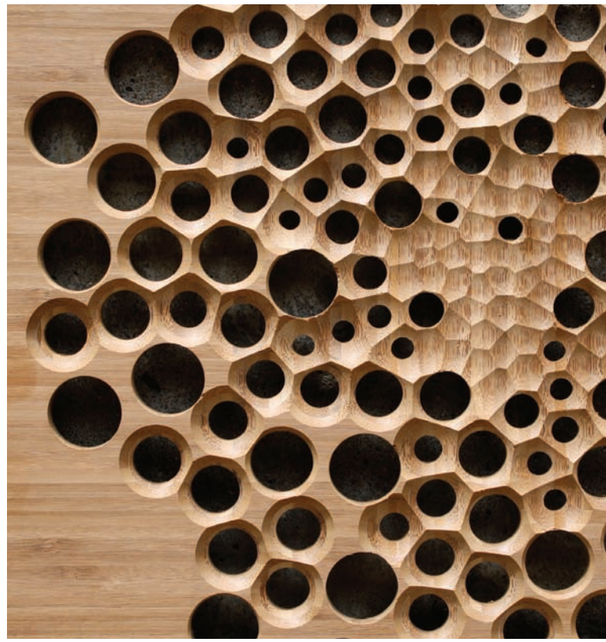
This design proposal for the Pittsburgh headquarters of a global tennis company addressed the clients desire to economically reconfigure the entry vestibule. Establishing a central hub within the office for both employees and visitors became a significant goal. While the current office space sits directly adjacent to a riverside park, few ovetures are made to the abundance of natural light and picturesque views. Two distinct versions were explored that focused principally on (1) branding through use of image (2) correlation of entry space with exterior.







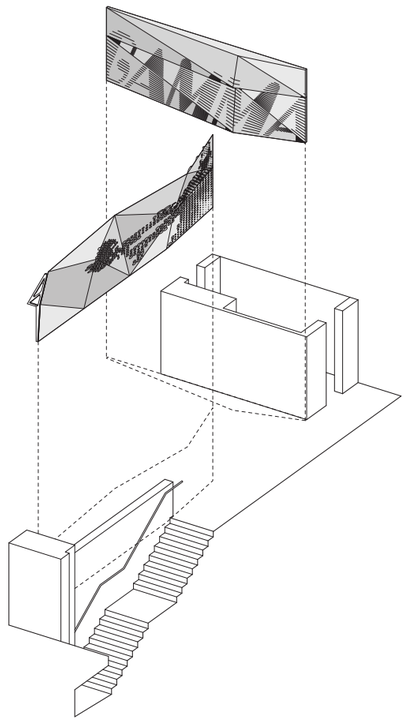


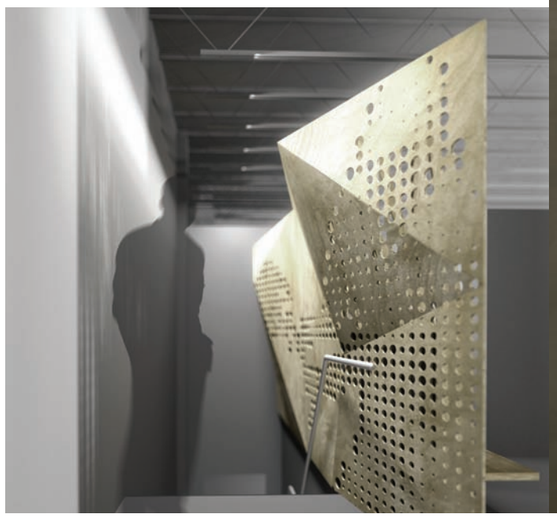


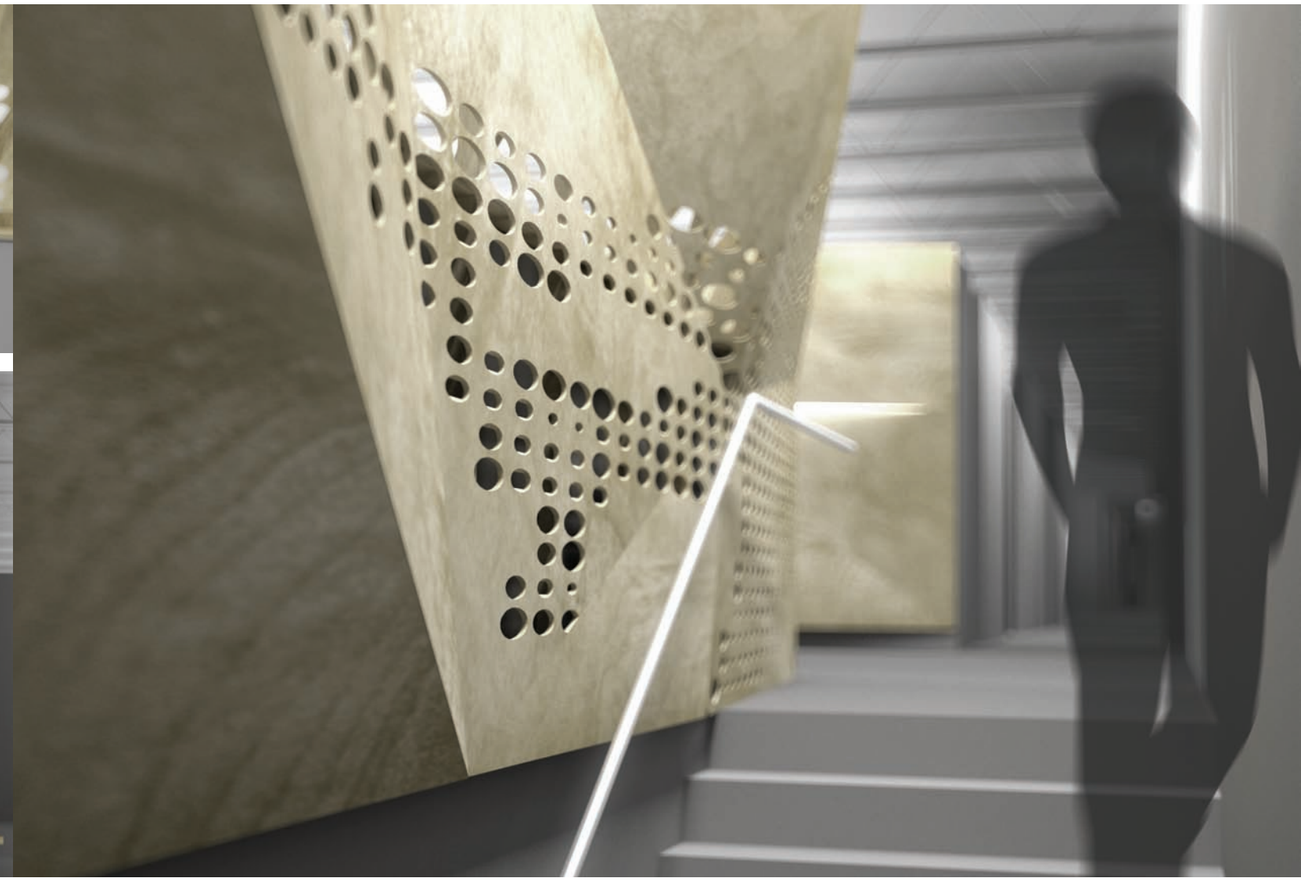
1 3 4 5
2 6

1,2| Image based proposal
3,4,5| Drilling tests
6| Image halftone

As the utilization of image as a branding device was explored, interest grew in the correlation between image abstraction and material surfacing. Halftoning was utilized as a graphic device that resulted in a translation from ‘pixels’ to ‘holes’. Of particular interest was the promotion of image abstraction through anamorphic projection.







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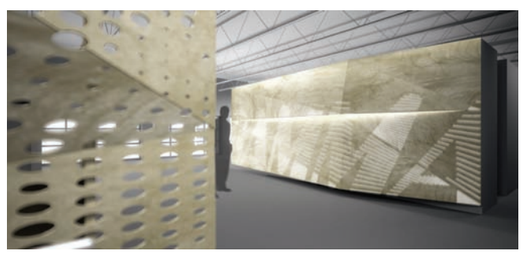
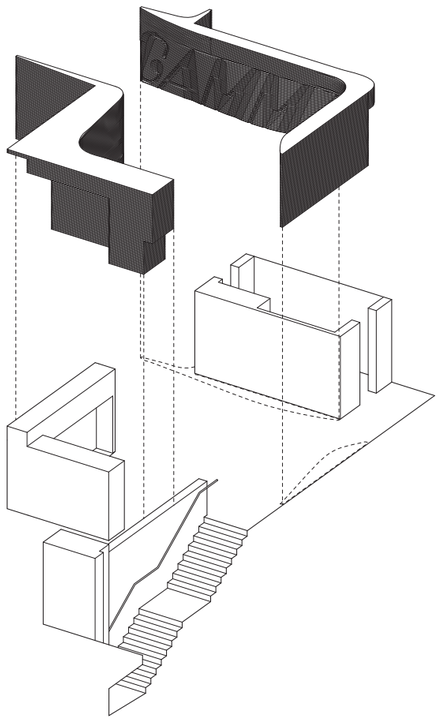
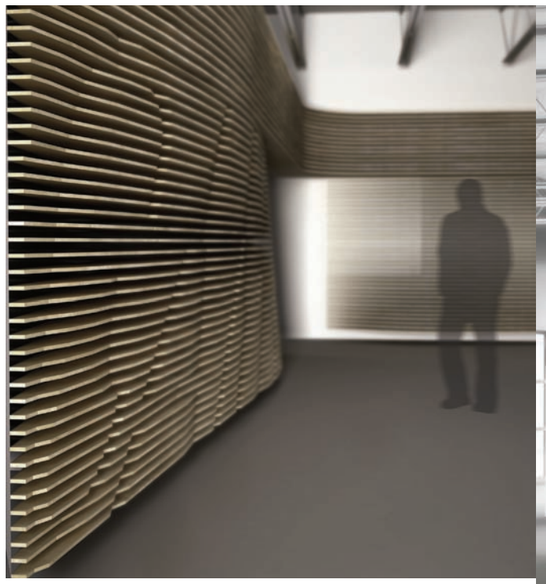
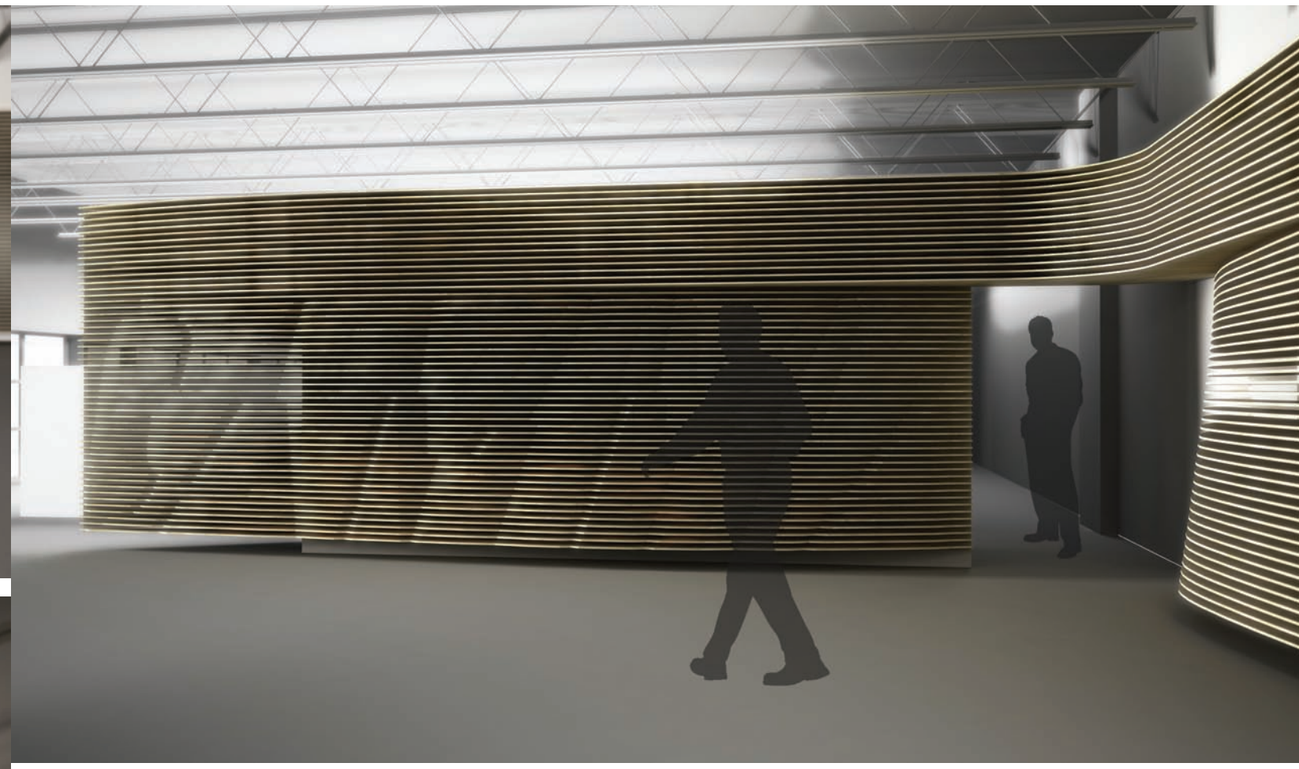
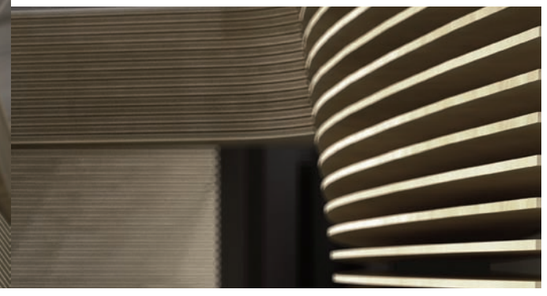
1| Faceted plywood navigation walls
2| Bench at lobby
3| Faceted wall with image pattern
4| Detail at top of entrance stair
5| Logo wall at entrance lobby











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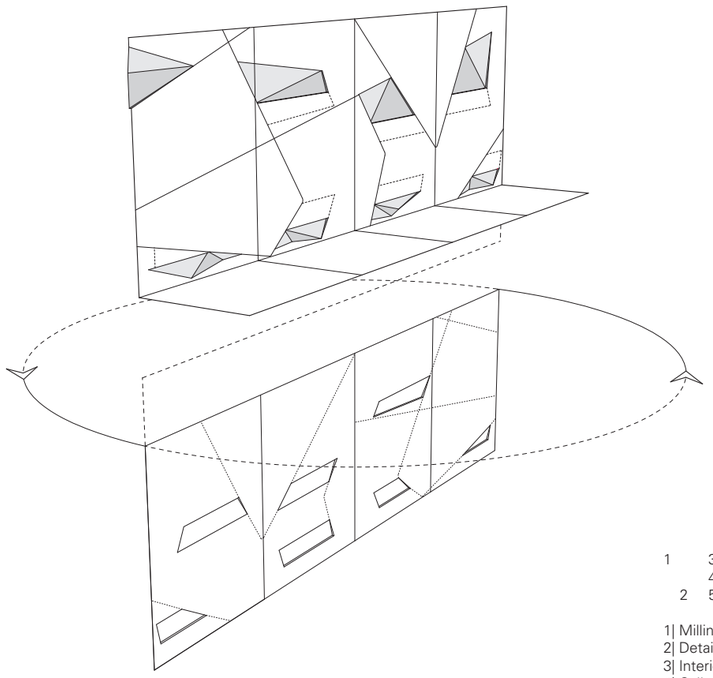
1| Stacked plywood navigation walls
2| Routed plywood bands with logo profile
3| Plywood band detail
4| Plywood wall at logo
5| Plywood band detail



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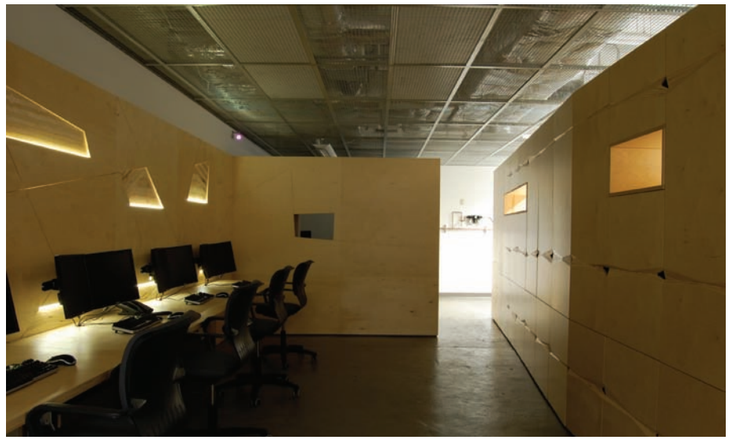
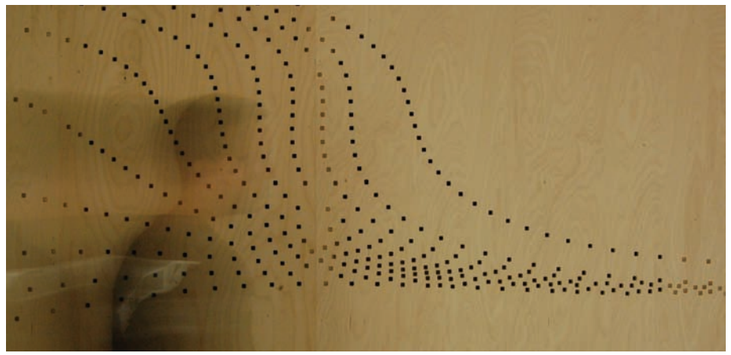
1| Milling pattern at front and back of desk wall
2| Detail at office window
3| Interior view at desk and storage wall
4| Gallery wall at corridor
5| Plywood assemblies
6| Detail of backlit wall at desk

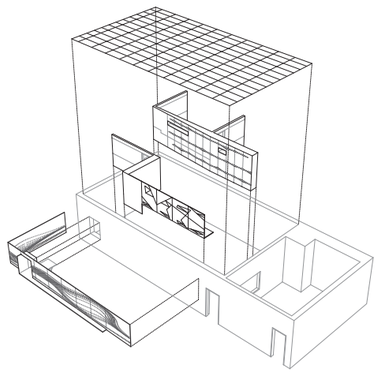




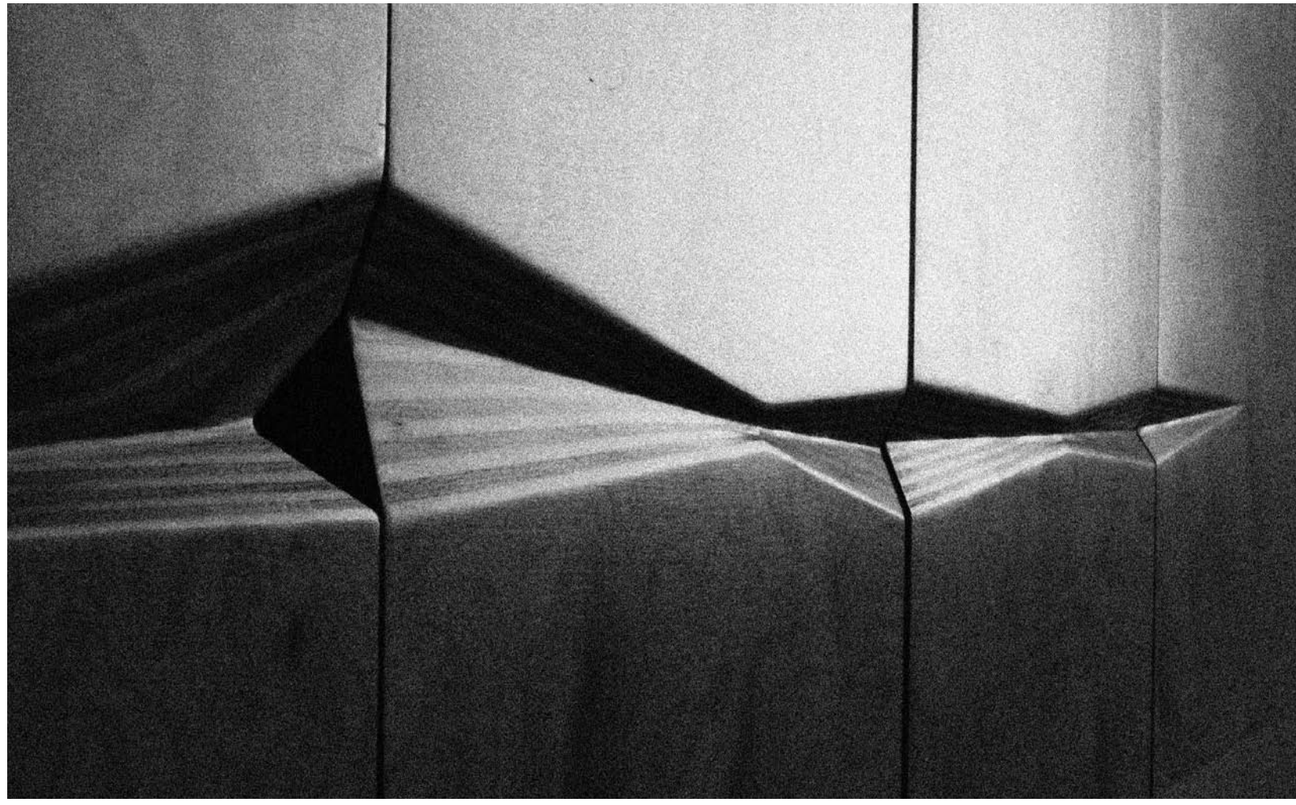
This project for the Carnegie Mellon University [CMU] School of Architecture houses advanced prototyping and digital fabrication equipment and acts as a hands-on learning laboratory. Under my direction, a group of undergraduate students at CMU assisted with the design and fabrication of various small-scale elements within the lab space.

The work focuses on two distinct areas, a display surface along a public corridor, and a hybrid classroom/lab that contains computer workstations, a material library and computerized fabrication equipment.

Design research relying upon the use of the tools within the lab informed the final project outcome. Marine grade birch plywood is used as the primary material throughout the lab for its economy, durability and relative ease of working. The project design seeks to achieve an expressive thickness within this inherently thin material with the aid of a computer numerically controlled [CNC] router.



These material investigations take on different forms throughout the project. A pattern of perforations on the one-quarter inch thick plywood corridor wall reveals a tackable homosote substrate while providing a graphic identity for the lab. At the computer stations, the plywood is carved on both faces and backlit to provide subtle lighting behind the workstation monitors as a measure to counter eyestrain while offering a quality of light unexpected in this basement interior. At the case-work wall that houses the material library, the doors have been carved to reveal the layers that make up the plywood, and provide an integrated door pull.



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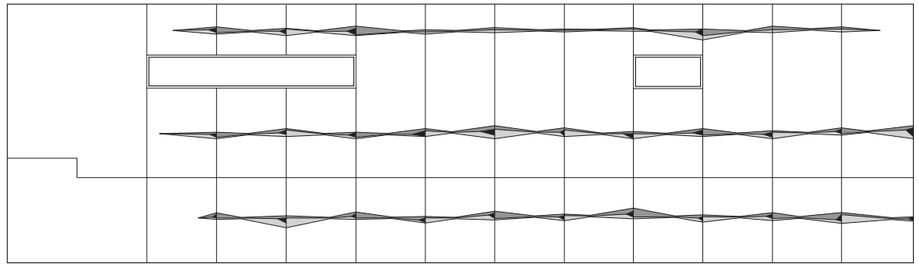
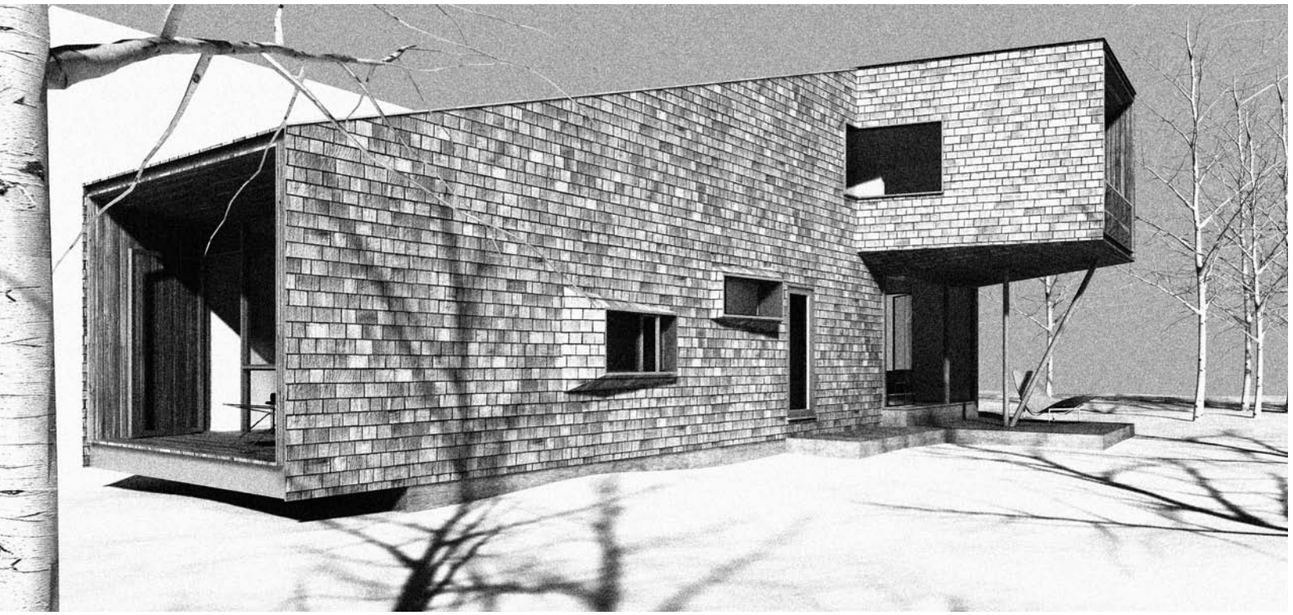
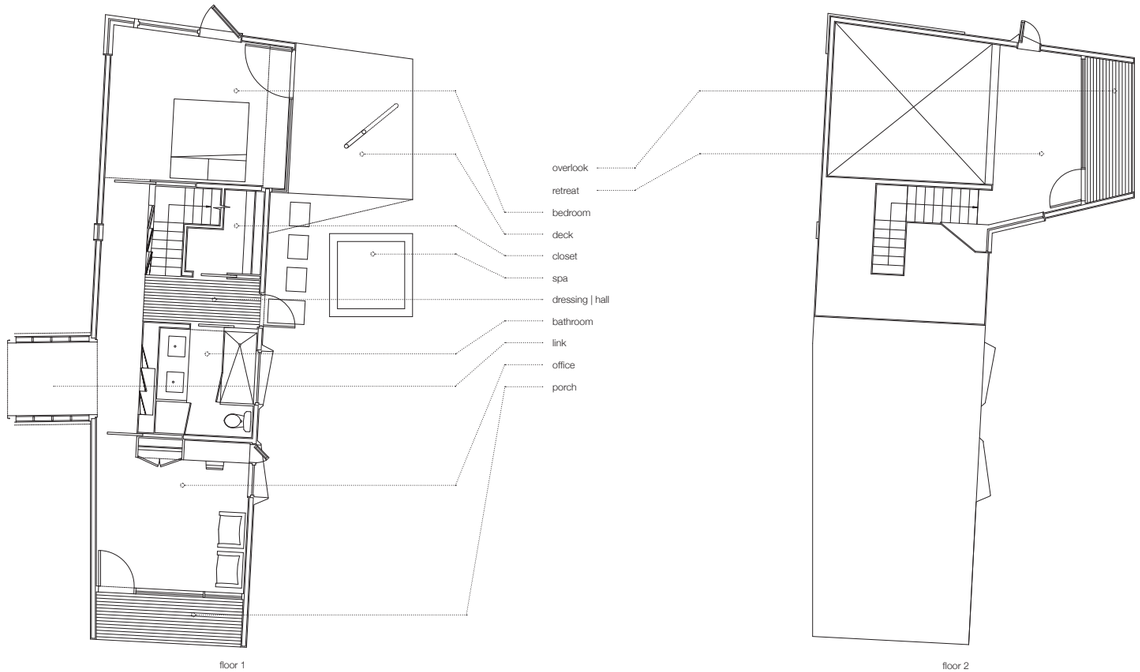
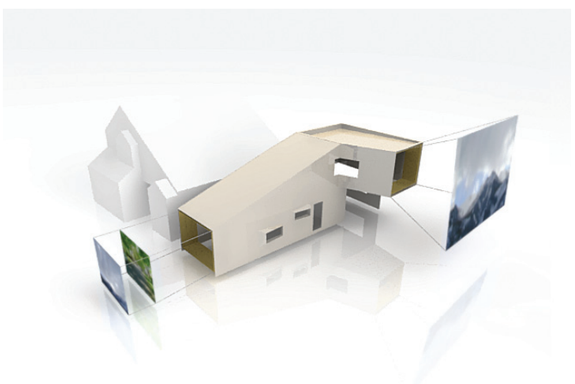
1| Utilitarian ornamentation at integral door pull
2| Door pull banding
3| Storage wall elevation



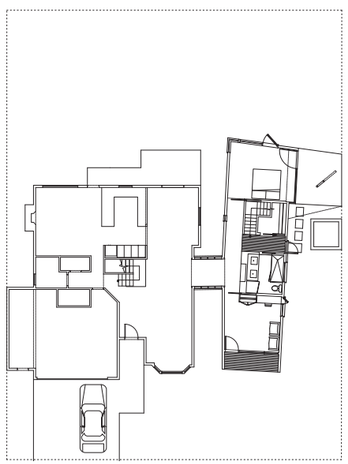






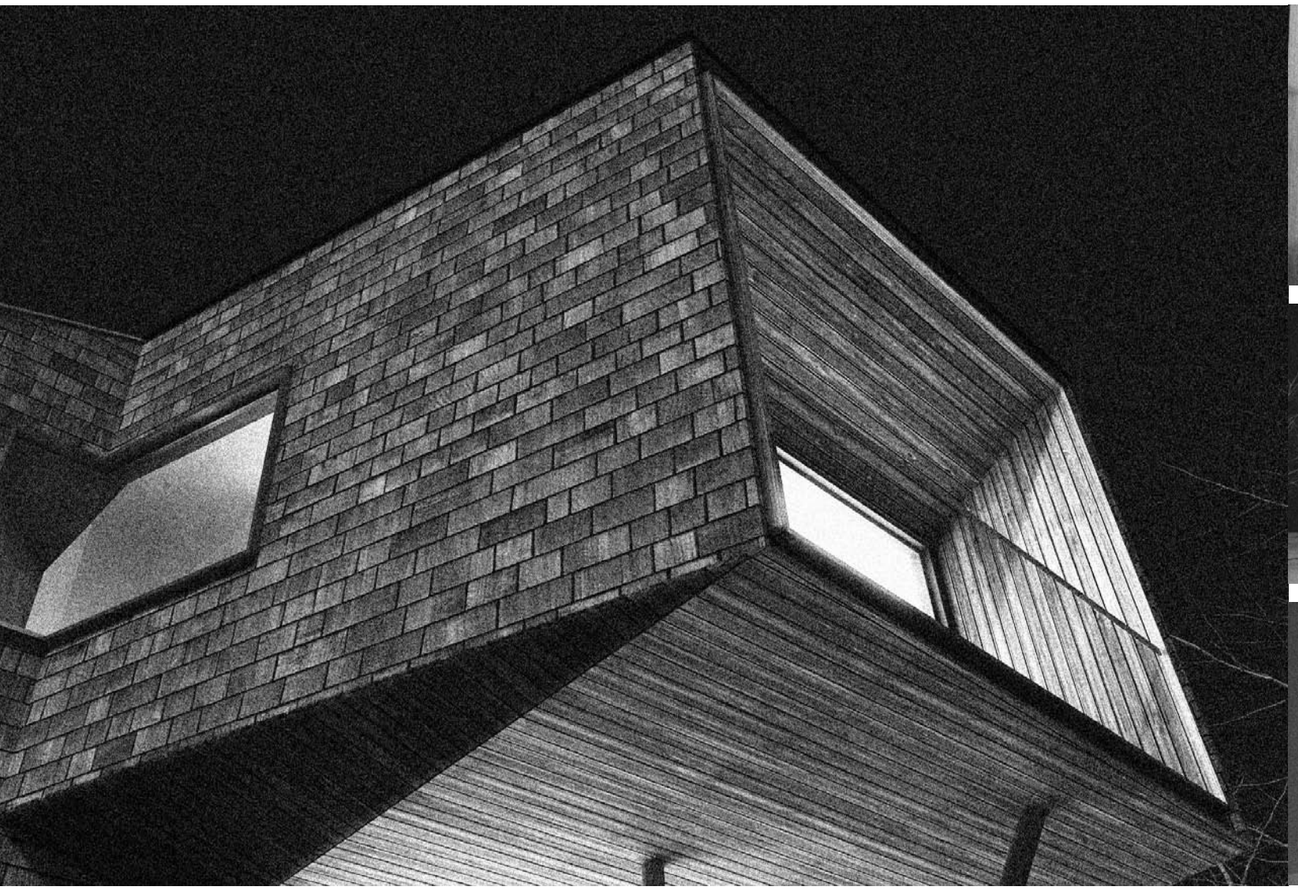
1 3
2 4

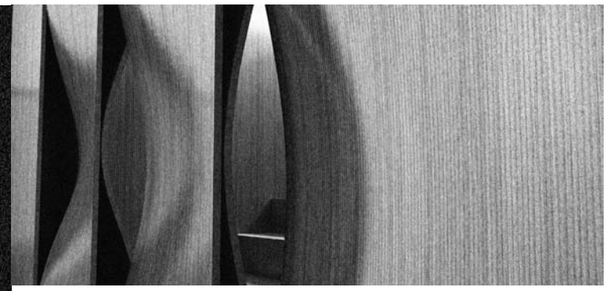
1| View from street
2| View tube diagram
3| Addition plans
4| Existing ground floor plan with addition

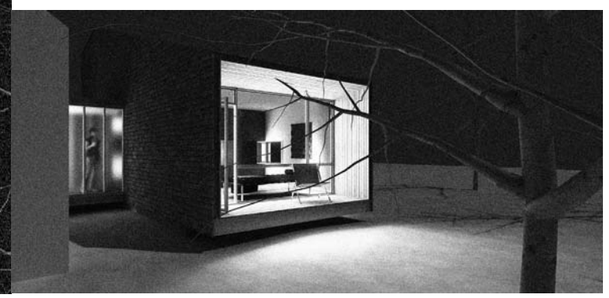


Located in a Park City, Utah subdivision, this proposed addition to a typical three-bedroom home forges visual connections to both the street and the dramatic Wasatch Mountain Range. The addition provides space for an office, guest room and upstairs retreat while working within the limits of neighborhood design restrictions.

Connected to the existing house by a short passageway, the addition stands separate and distinct, articulated on the outside as a shingled sleeve that rises from the street to the rear of the house. The upper retreat area stretches outward to capture a southern view of the mountains while providing cover for a private patio below. The front of the addition extends beyond the office enclosure to provide a covered entrance area for business visitors.

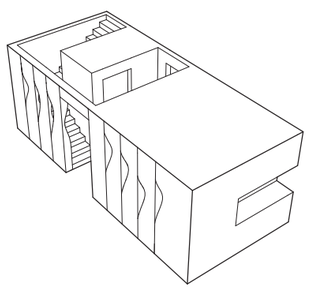






1 3 6
4
5
2

1| View towards retreat balcony
2| Existing house
3| Detail of bent wall panels
4| View toward bedroom terrace
5| Entry view toward office
5| View from backyard

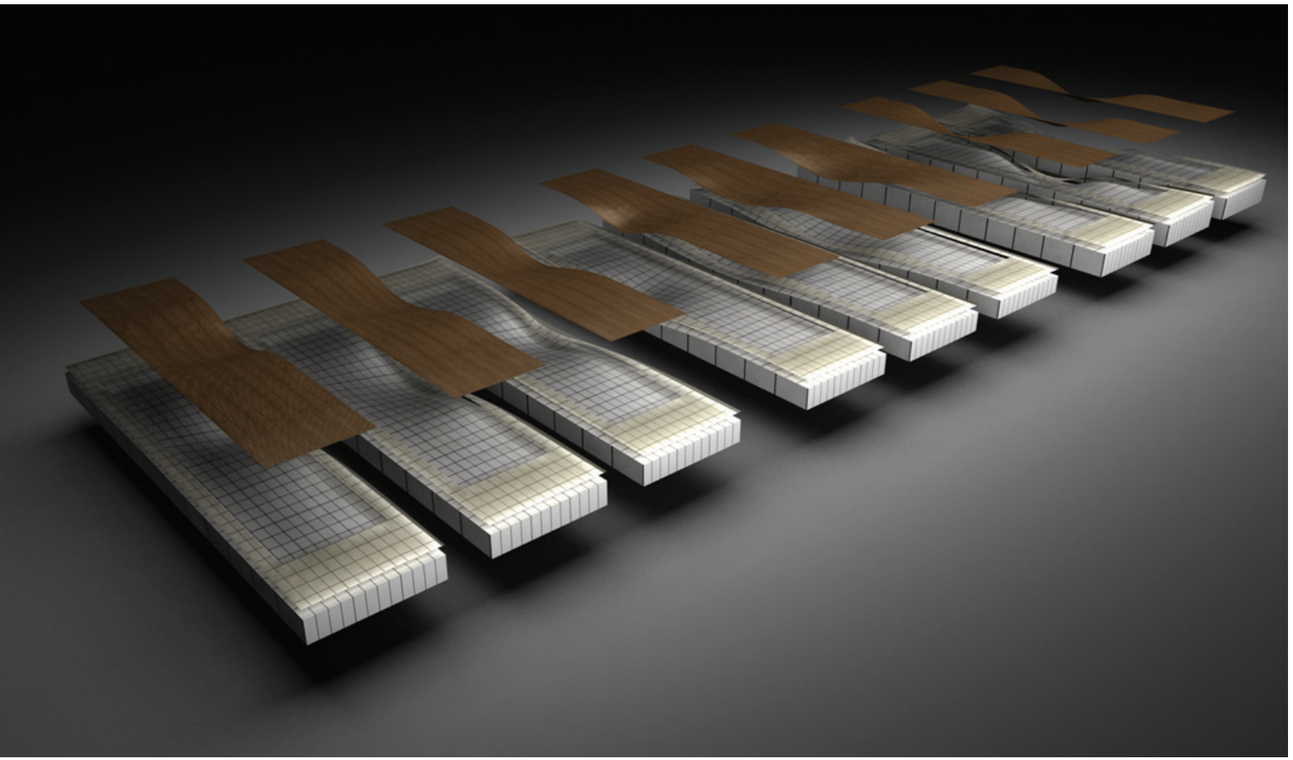


1 2 4
3 5

1| Milled plywood reduced scale prototype
2| Prototype detail
3| 'Wood Box' with integral wall panels
4| View toward stair
5| Alice in Wonderland woodcut print, 1865

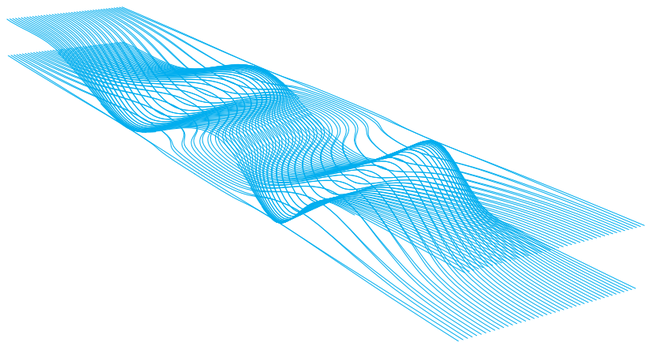
As one enters the addition from the main living space of the existing house, they encounter a sculptural wall that is part of a larger wooden volume. This volume contains the stair, bathroom and closet areas and helps to define the boundaries of the new guest room and office. The wall along the corridor was studied as both a series of vacuum formed wood veneer panels and milled laminated plywood. Both with the ambition to create openings which allow light from the open space above to pass through the stairwell and into the corridor.

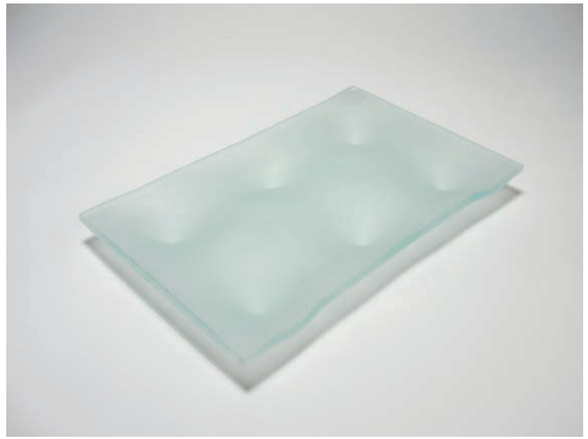
Shaped by the owners desire for visual connections both near and far, the addition adopts an exterior material language reminiscent of local utilitarian buildings and barns, but does so in a manor that seeks to express the foundational logic of the project, a double view that is bound yet distinct.

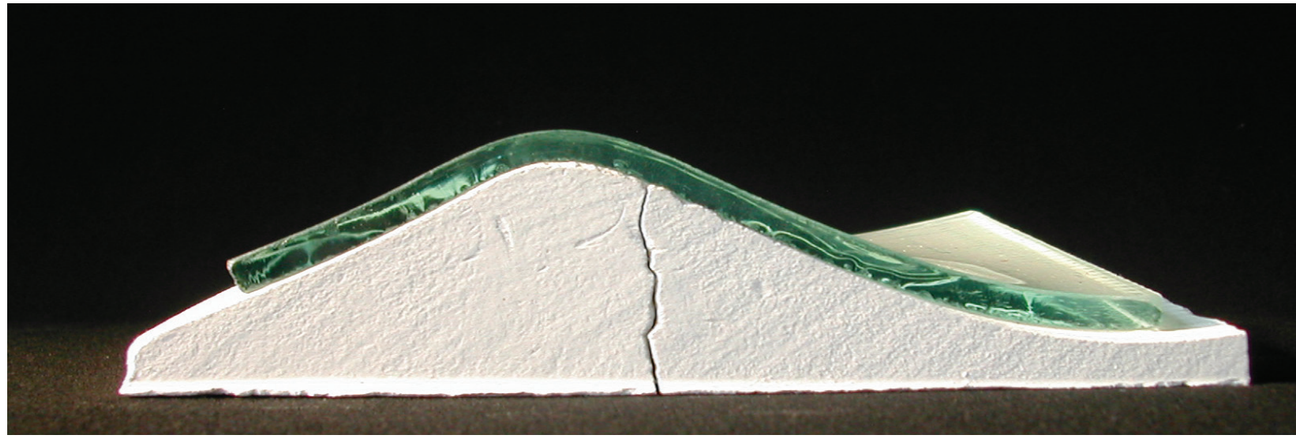


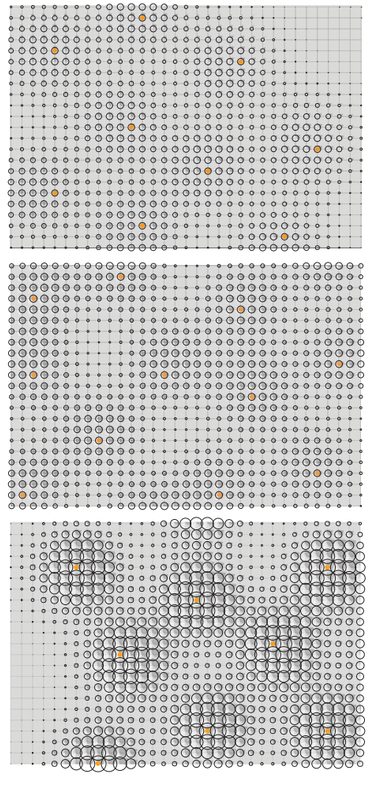
1 3
2

1| Rendering of CNC molds and vacuum formed veneer panels
2| Mirrored panels
3| Stress analysis of veneered panels





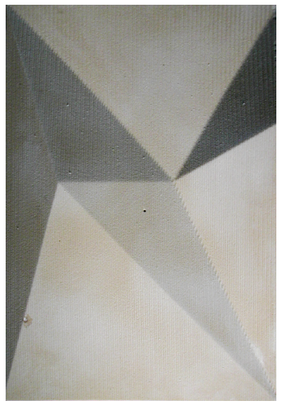


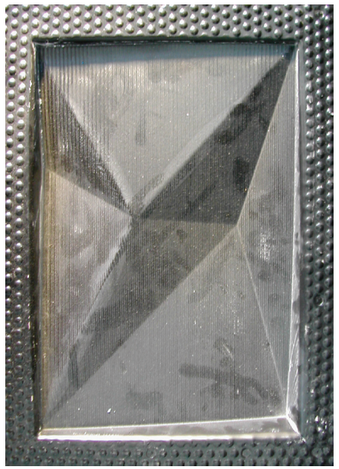


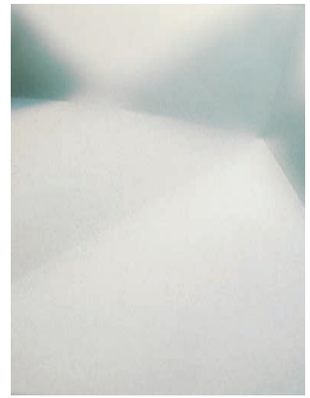
1 - 4 5
6

1-4| Slump formed glass - glass bead processed
5| Slump formed glass and mold
6| Surface deformation pattern studies

Conducted as a material and process research project with a glass product manufacturer, this project explored the use of glass slumping processes to achieve complex deformations of sheet glass. Specifically, the project explored high-fidelity slumped glass through the utilization of cnc processes for the production of the glass slumping molds. This offers alternatives to pre-existing analog methogs in which glass was slumped through holes in heat-resistant jigs. The direct-mold process allows for a broad range of surface deformation and precise alignment of geometry across multiple glass panels through the dimensional consistancy of the molds. Furthermore, it offers a method to reconcile the precision of computationally derived geometry with the glass slumping method by providing a thighter correlation between mold and final glass sheet.

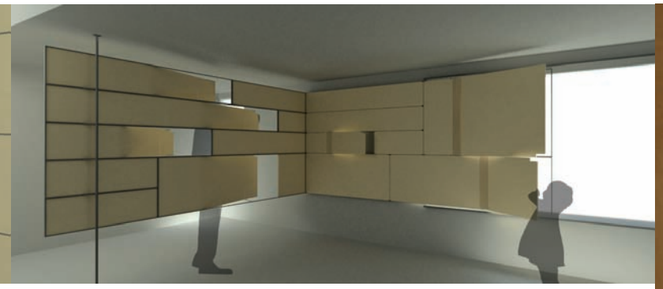


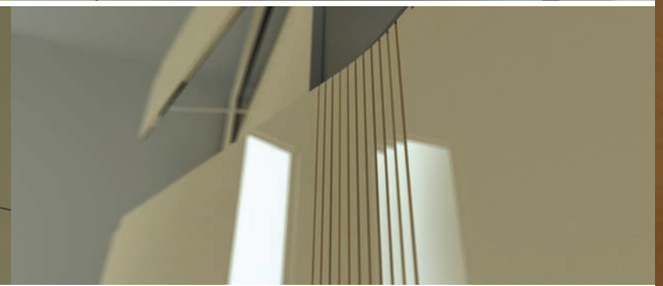


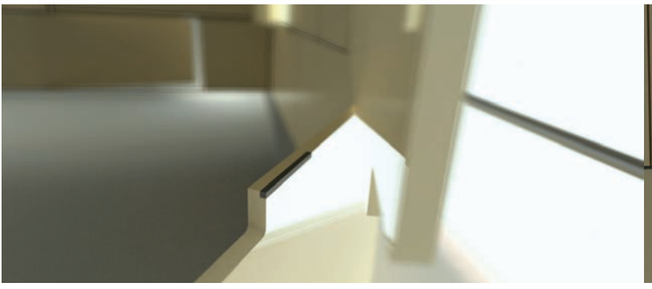


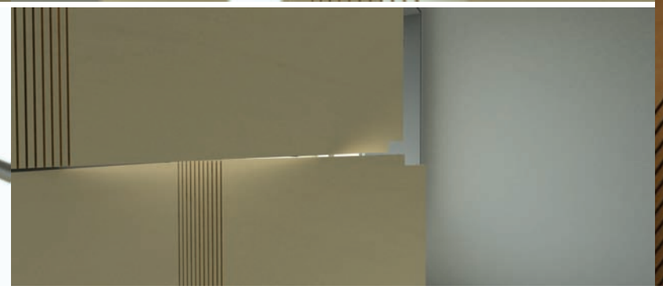
1 - 4

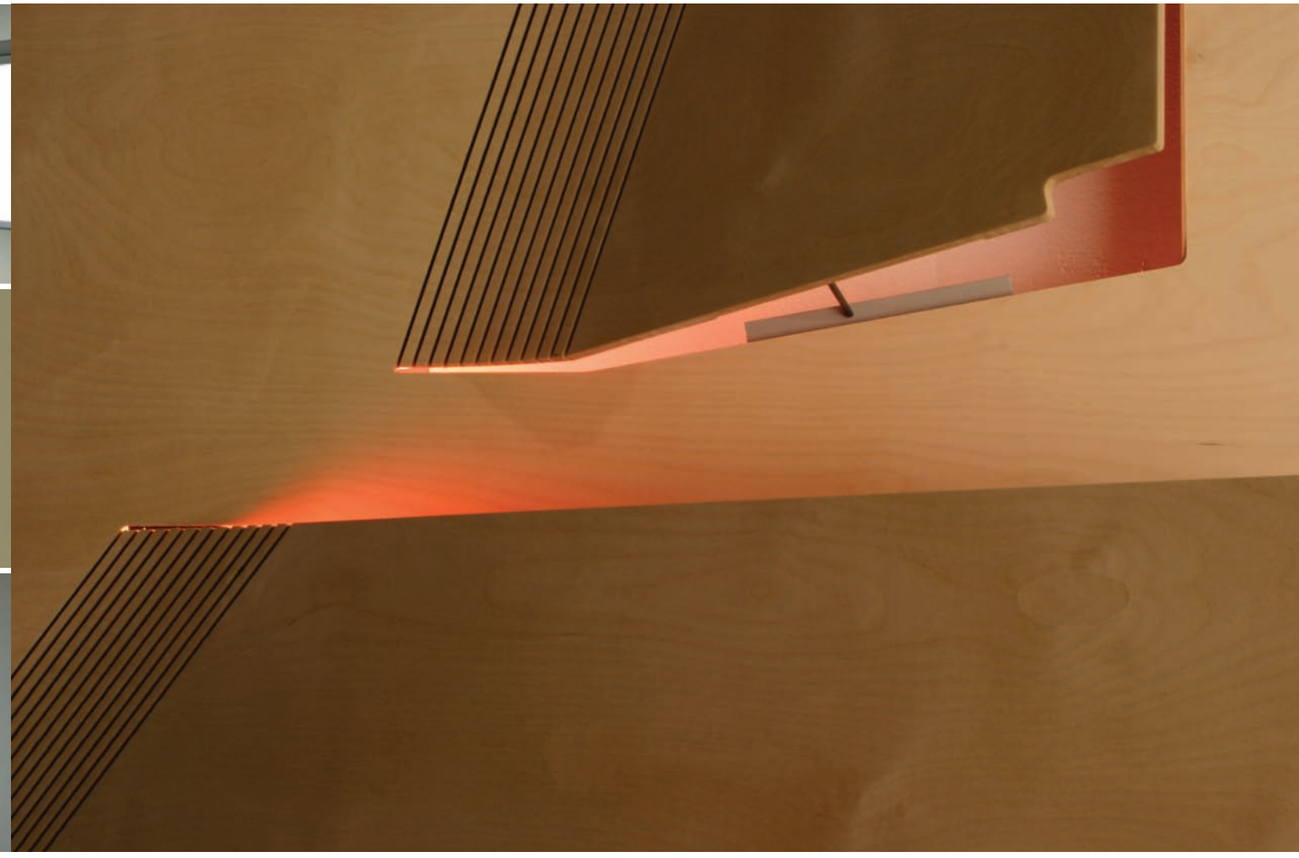
1| CNC routed high density urethane positive
2| Thermal formed shell from positive mold
3| Cast high silica refractory plaster
4| Slump formed glass - glass bead processed









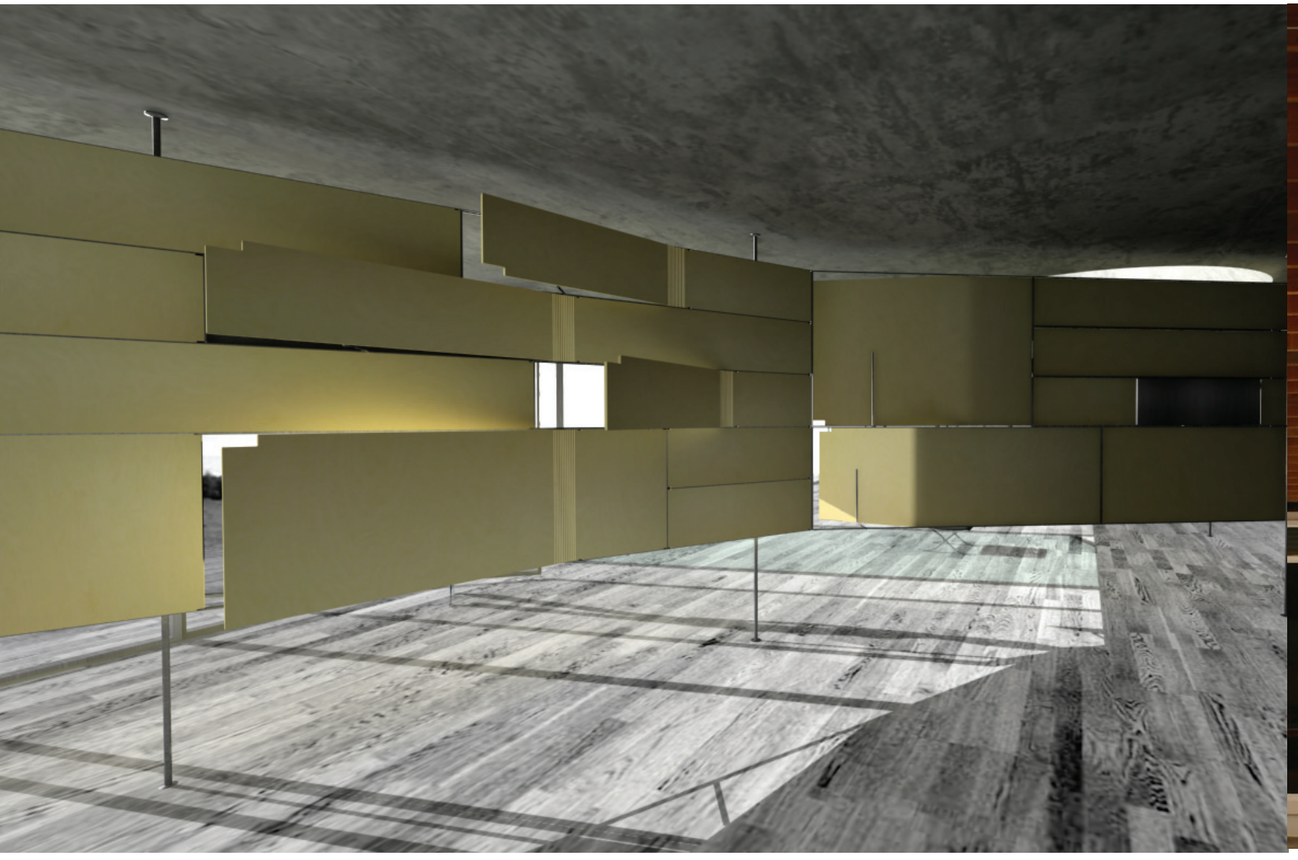


1 4 7
2 5
3 6

1 - 6| Views of bending plywood panels
7| Plywood panel wall system - opened

Performance relative to this investigation can be considered as both effectiveness and action, whereby the action of the panels is reliant upon the body. In the case of the plywood panels, action becomes bending. [figure 4] The operation of the panels is facilitated through the milling of visual clues into to the panels, informing the user as to their operation. The amount of action upon the panels is determined by the user. Here, performance becomes participatory as panels are adjusted to achieve a desired effect.

Both branches of research, related to Plywood and MDF occurred in tandem. Although similar techniques were employed, intrinsic differences between the materials led to quite different results. In the case of plywood, 7 ply Baltic Birch was chosen for strength and finish quality. Initial routing was primarily 2-dimensional, producing kerfs and cuts which allowed bending in response to push and pull, effectively transforming a rigid sheet into a pliable surface. A subtle change in the depth or spacing of kerfs dramatically affected ease of bending and general stability. Milling too deep resulted in precarious sheets that were easily broken. Milling to shallow effectively left sheet rigidity unchanged. Additionally, it became clear that locating the bending element as a figure within or extension of a larger sheet, provided area for mounting. As these investigations progressed, milling moved to both faces of the plywood sheet. Here, the registration and intentional mis-registration between cuts on both faces provided tabs for hardware, which held panels open or closed, while in the instance of multiple superimposed cuts of opposing angles, offered a lattice like condition. At the scale of a room, a series of operable panels encourage a modulation of view and light through adjustments of the surface by inhabitants. The panels can be installed on top of existing walls or glazing,

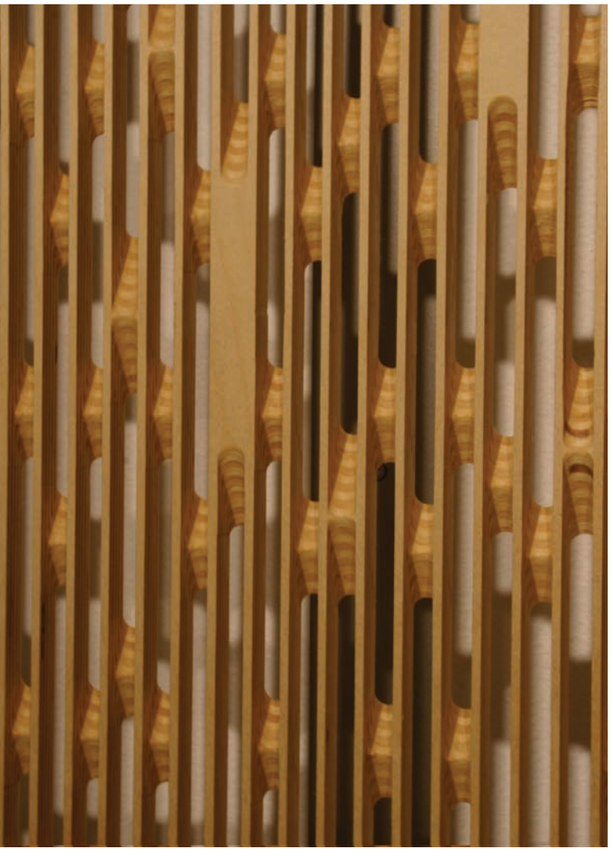


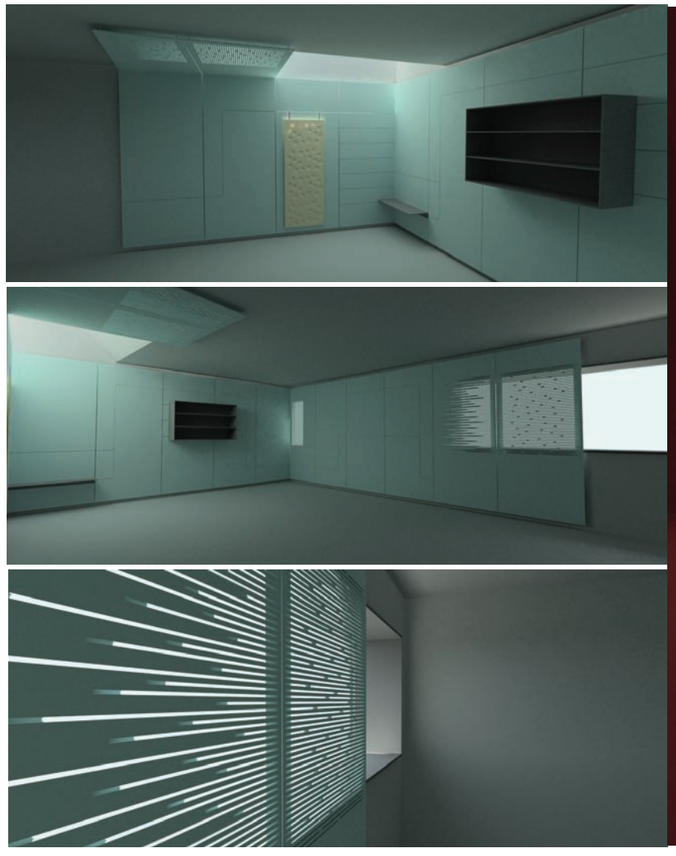
1 2
3

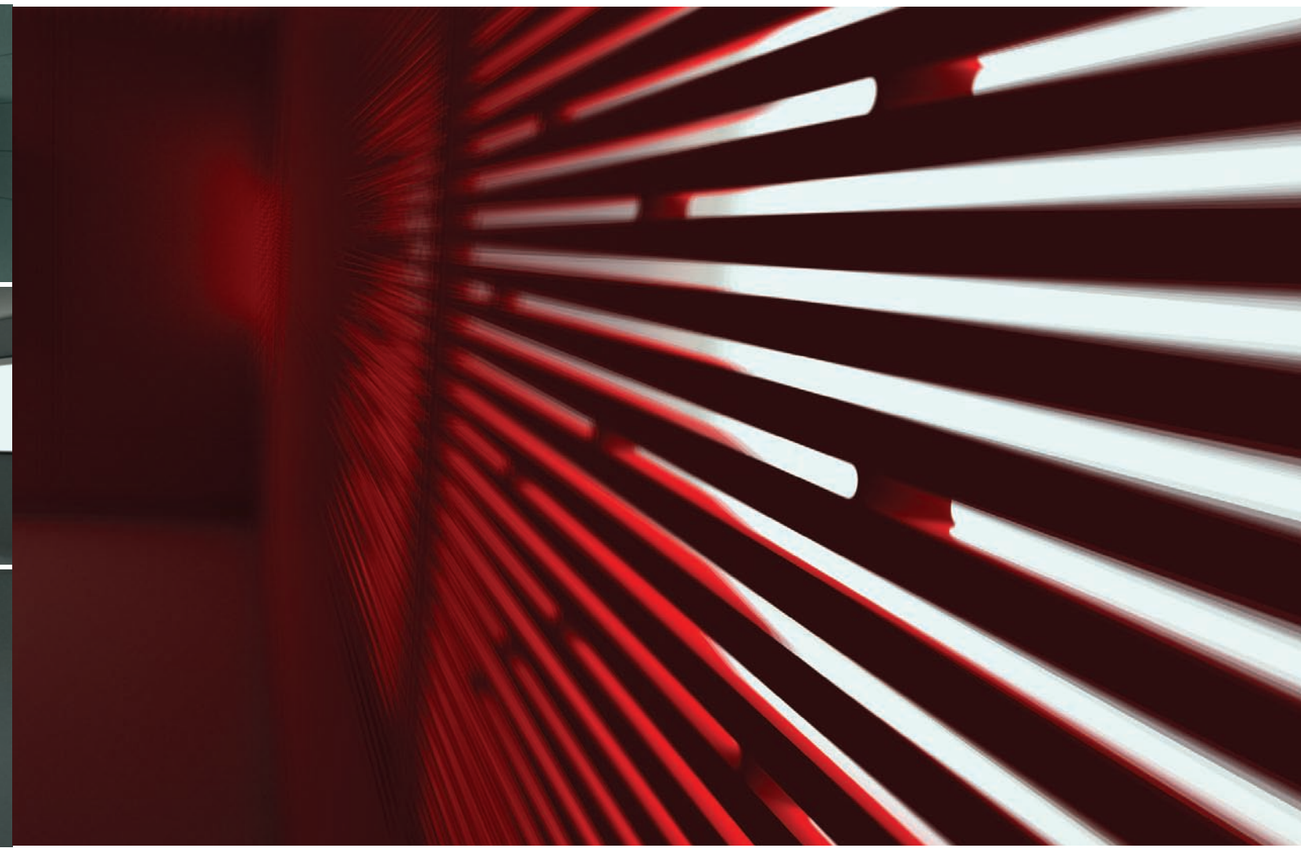
1,3| Partition system
2| Detail of bending tabs

effectively re-skinning it, or as free-standing partitions. In both scenarios, plywood panels are attached to a steel frame, providing structural rigidity while allowing for panels to be held off of ceiling and floor. Depending upon the number of bendable panels installed, the ratio of bendable surface to fixed surface and the degree of opened or closed panels, the ability for the surface to bracket view and light change significantly. Due to its fiber size and lack of grain, many of the outcomes of the plywood inquiry, such as pliability and translucency are unachievable with MDF. The homogeneity and strength of Medium Density Fiber board offered milling consistency throughout its section while allowing for relatively simple surface finishing. Here, the sheet contains multiple types of cuts, resulting in a vocabulary of tracks, screens and anchors. Tracks allow for objects to be hung and moved across the sheet; screens allow the transmission of light, air or view; while anchors allow for fixed fastening. The inscription of these cuts across sheets is driven by current and anticipated requirements of a space, such as lighting, storage, air circulation and view to mention but a few. The resulting panels blur the distinction between wall surface and furniture and by doing so; reconfigure the relationship between room, content and inhabitant.

Both instances suggest a multiplicity of conditions within a finite system of panels. The processes employed and the resulting forms establish a formal language capable of fulfilling various needs. Cuts for a handle may also double as a light diffuser. Although they may attach onto existing walls or ceilings, both the plywood and MDF panel systems are effectively portable and provide the potential for installation in multiple locations. As user moves, so can the interior surfaces of the rooms which enclose them. The resulting reconfiguration of the panels recalls previous installations while adapting to current needs.

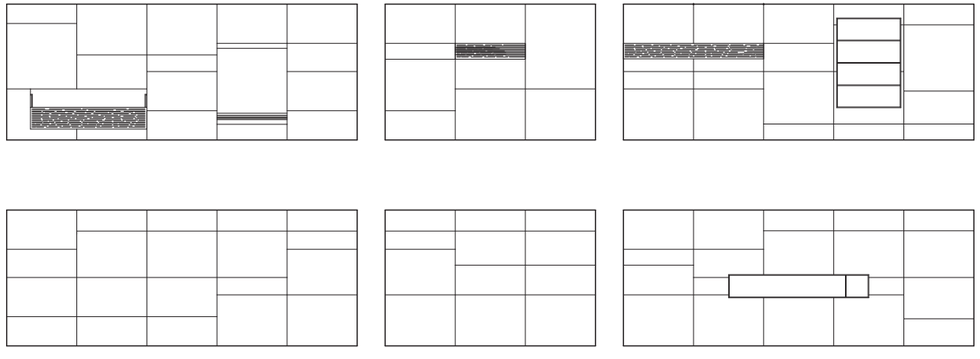


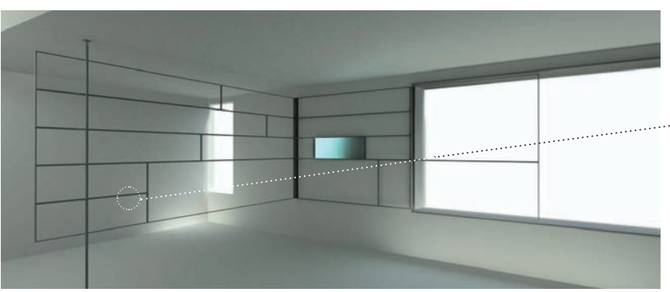


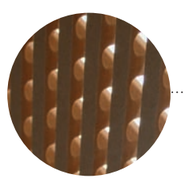


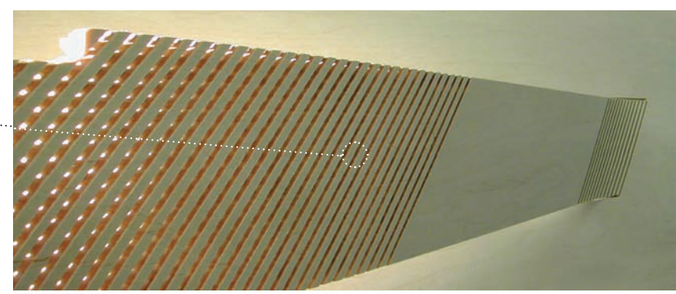
1 2 3 4 5 6

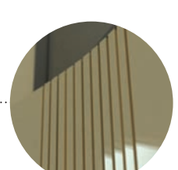
1| Plywood Screen
2|3|4| Panel System with “furniture” components
5| Detail of Medium Density Fiber Board screen
6| Medium Density Fiber Board Panels

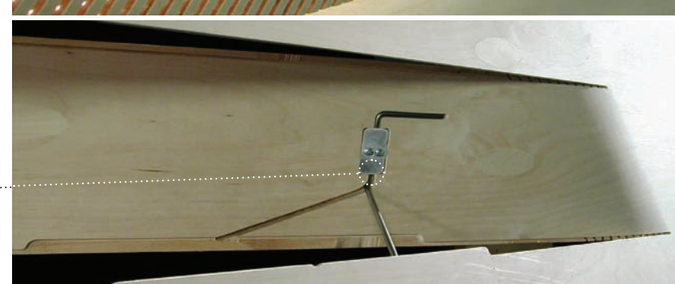


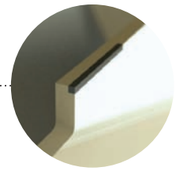


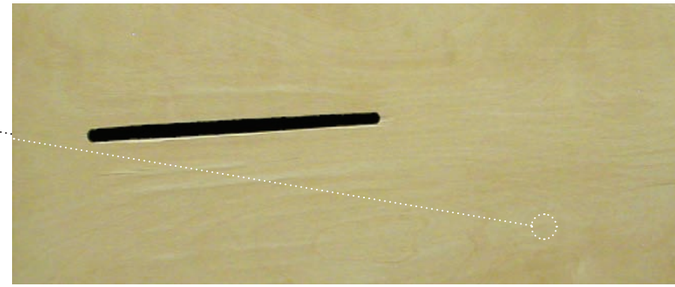






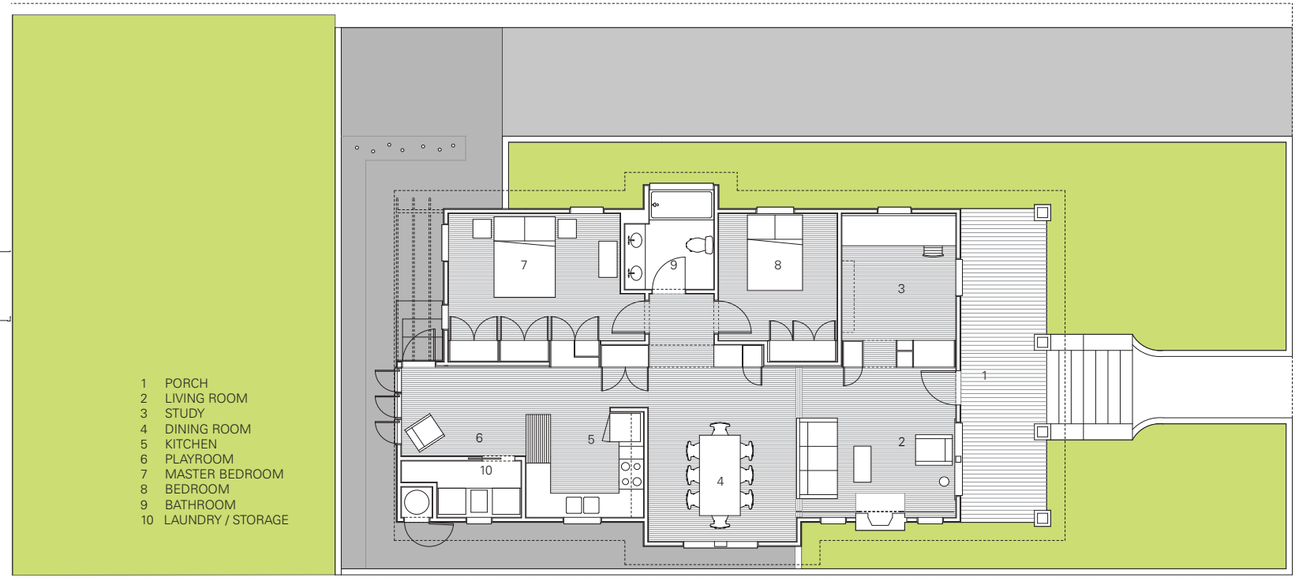


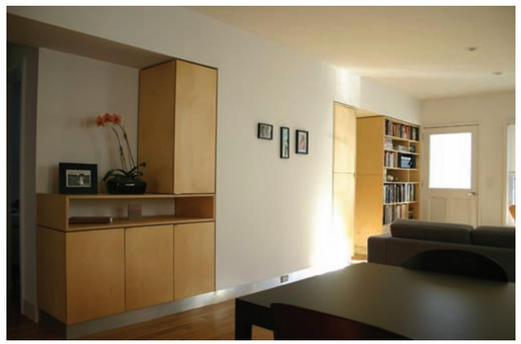




1 4 7 10
2 5 8 11
3 6 9 12

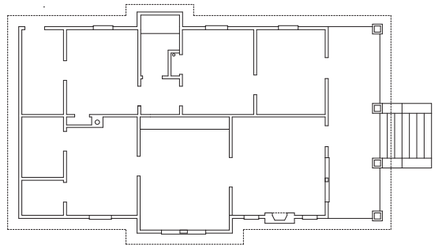
1|4| Steel Support Frame
2|5| Bending Kerfs
3|6| Closure Magnets
7|4| Double-sided light screen
8|11| Position lock
9|12| Integrated switches (supplemental lighting)



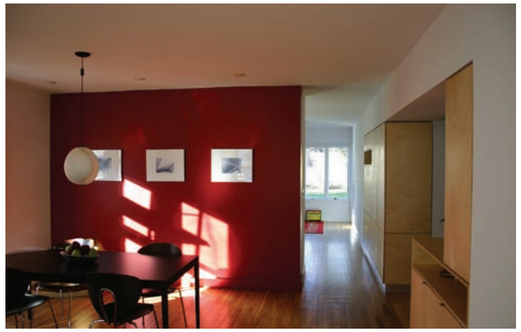


1 3
2 4

1| Sections looking east and west
3| View toward entrance
4| Renovation plan
5| Existing plan

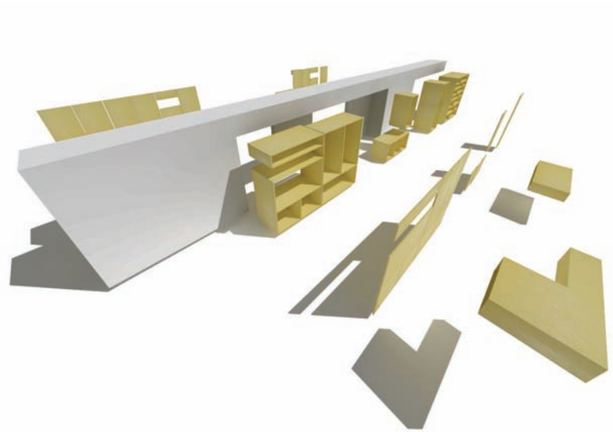


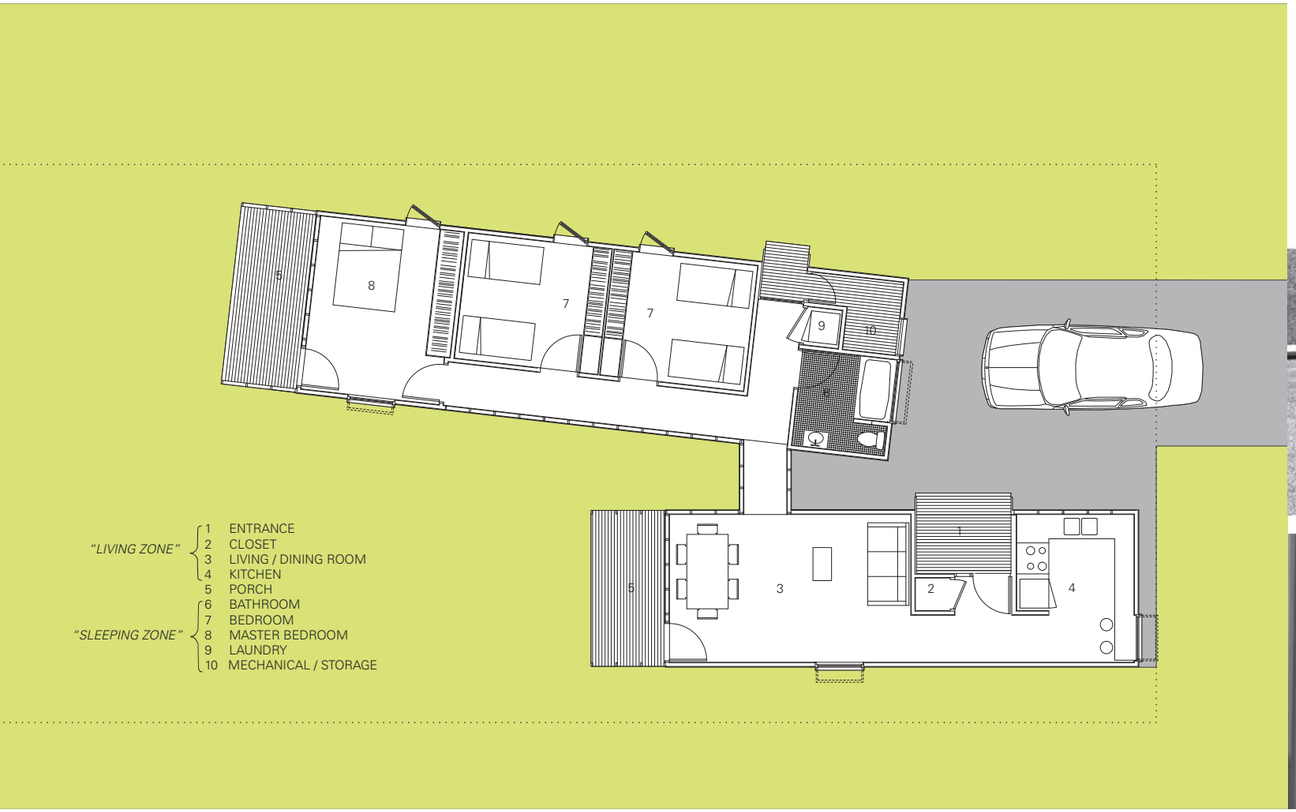
Situated within a historic Raleigh North Carolina neighborhood of 1930's bungalows, the renovation sought to strategically tap into the legacy of the bungalow built-in while reconfiguring and de-fragmenting the original spatial layout. The modest size of the house and desire to maximize occupied square footage led to a storage strategy in which conventional closets gave way to a series of built-ins that run the length of the house. The resulting storage wall is treated as fixed furniture with a cohesive visual language, yet flexible to the storage requirements of the adjacent spaces. This series of double-sided nested casework acts as the threshold between public and private spaces, the plywood storage units provide a range of storage options and alleviate the necessity for storage furniture resulting in a unobstructed plan.



1 2 4
3 5

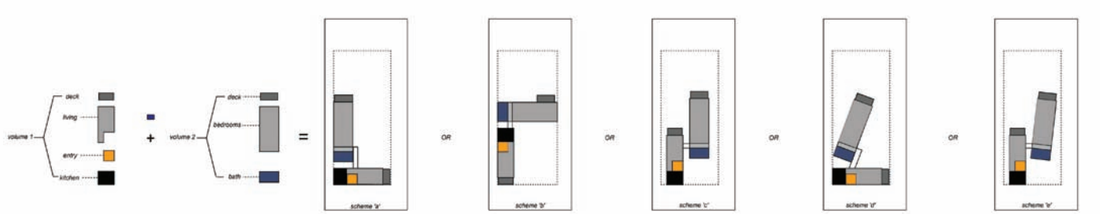
1,2| View along storage wall
3| Portal view into master bedroom
4| Machined pocket door
5| Storage wal - assembly





"LIVING ZONE"
1 ENTRANCE
2 CLOSET
3 LIVING / DINING ROOM
4 KITCHEN
5 PORCH

"SLEEPING ZONE"
6 BATHROOM
7 BEDROOM
8 MASTER BEDROOM
9 LAUNDRY
10 MECHANICAL / STORAGE



1 3
4 5
2

1| Typical Plan
2| Alternate Plan arrangements
3| View from yard looking toward porches
4| View toward entrance
5| Interior view from living area towards porch and yard

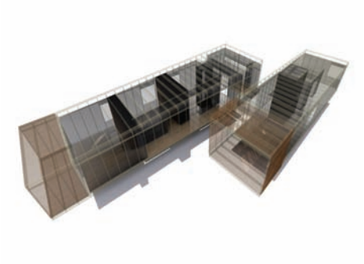
Volunteer labor is the force which makes Habitat houses possible. Owners building houses is an essential facet of the Habitat for Humanity program. For this to work, houses must be simple, easy to construct and quick to erect. While current Habitat houses provide simple, decent and afford- able dwelling, variation is typically limited to a surface palate. Houses are reduced to the lowest common denominator and repeated.
Broad applicability is essential for a Habitat house, however all such houses need not be identical. This proposal seeks to shift the constant from the house as a finite entity to dis- crete elements. By fragmenting the program, various spatial arrangements are possible. In this context there must be guides. This is achieved through the use of two distinct vol- umes which act as containers for components to nest within and attach onto. The arrangement 'within' and 'between' the volumes provides multiple compositions that can respond to site and landscape conditions.

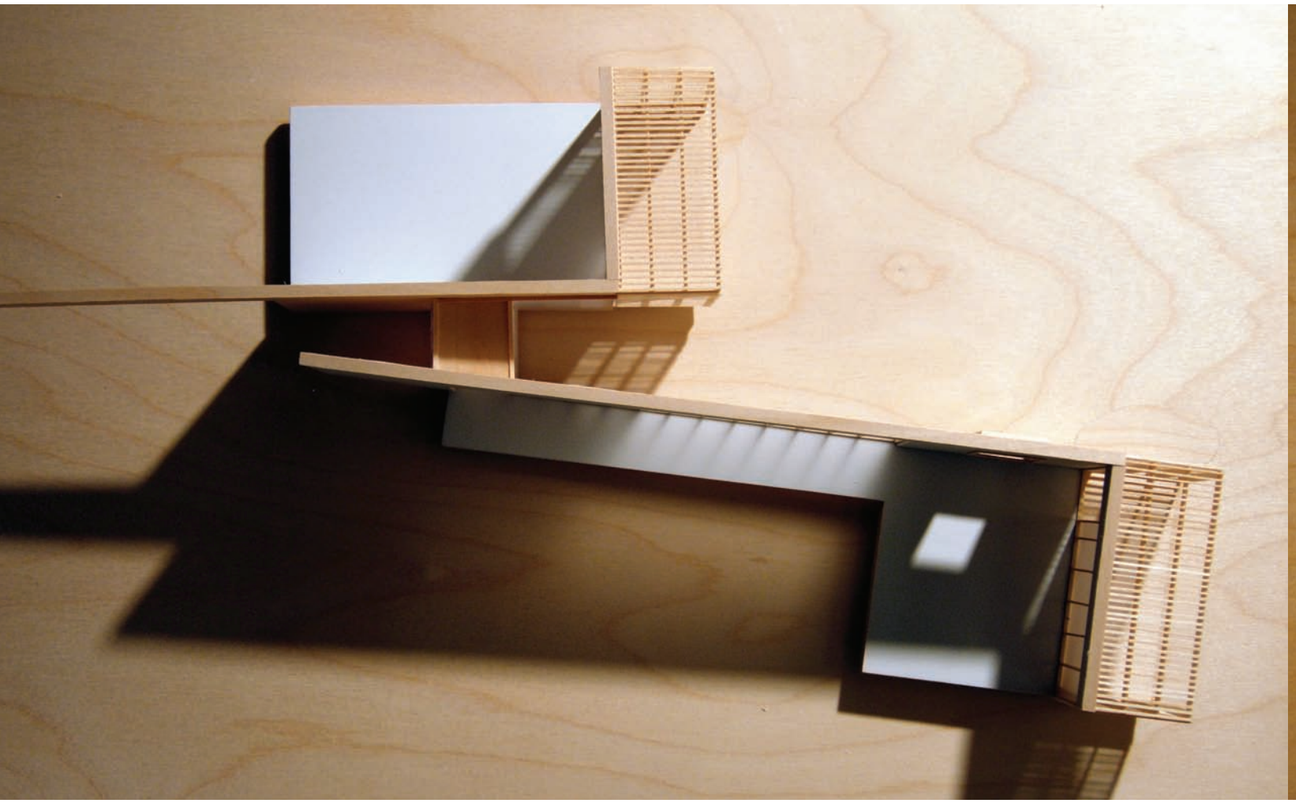
The proposed house is based on a typical wood-frame con- struction module and utilizes standardized, readily available cladding material for interior and exterior wall surfaces.

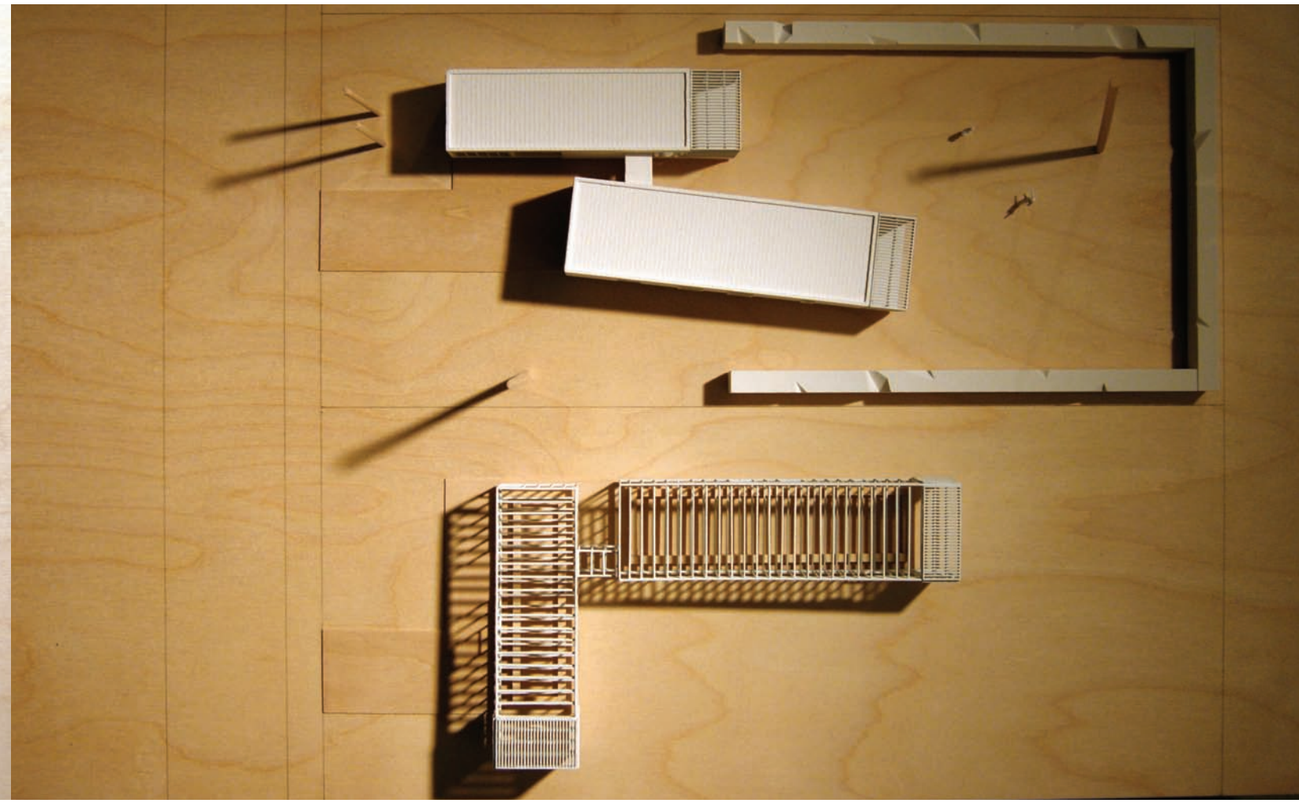
The formal manifestation of the Habitat house is no longer a broadly applied object but rather a means to various ends.

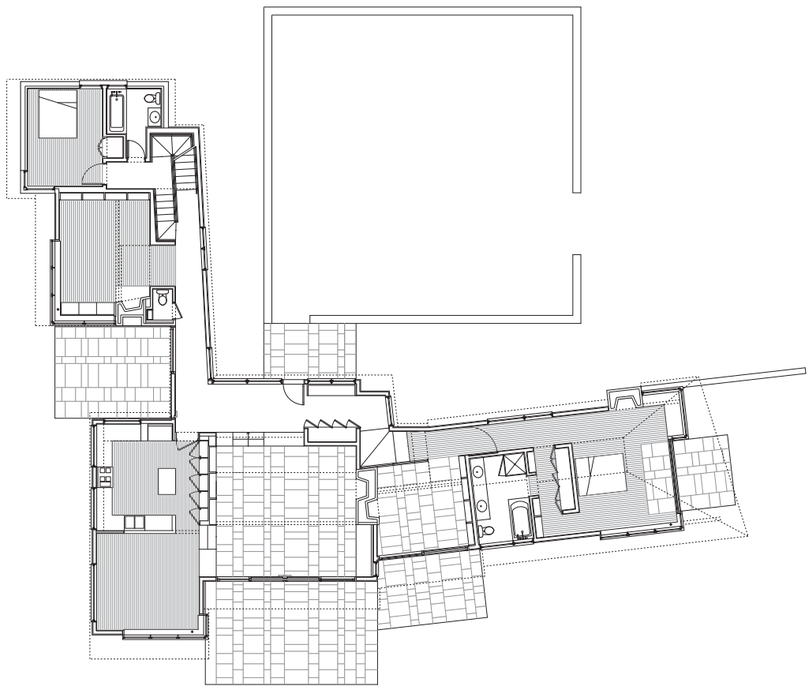
1 3
2

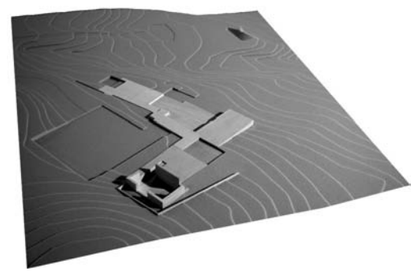
1| View from corridor toward porch
2| Assembly components
3| Section - elevation through living space and porch











1 4
2 3

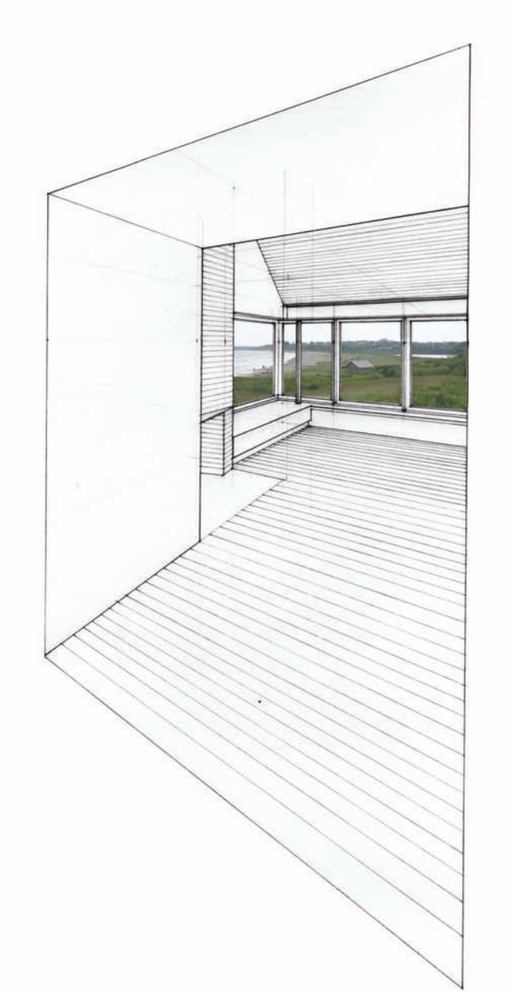
1| View toward corner window from patio
2| Plan
3| Foundation model
4| View of cedar interior along corridor

Designed as a retreat for a New York art collector, the plan allows every room a view of the ocean. Windows facing the water are oversized, often going around corners to provide panoramic views of the coast. Every room has light and air from at least two, and often three sides. On bright days, the interior has balanced light and no glare, and even on the gloomiest days, lights will be rarely required anywhere in the interior. In the living room, dining room, kitchen and study, large panels of glass slide open, eliminating all barriers to the sight, sound, and smell of the sea.

Cedar-planked walls are dimensioned to make space for cabinetry and the concealment of doors and sliding partitions. Interior doors swing into this space when open, becoming nearly invisible. Bedroom orientation provides complete visual privacy, so doors are rarely closed, and doorways remain open, cedar-planked passages. Entry and kitchen, and living room and office are separable by moving partitions, which slide or swing into wall spaces, concealing the partitions or cabinetry behind.

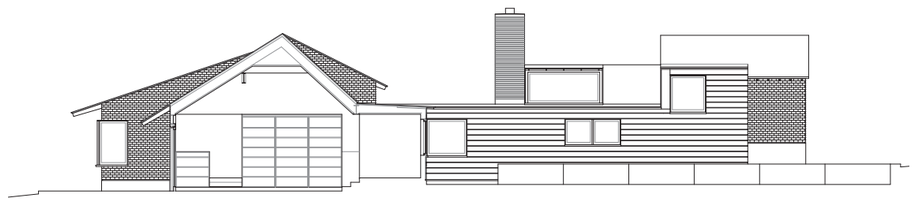
With a primary structure mostly of steel, the house is robust, constructed to weather well and be durable in the face of hurricanes and winter storms. Ath the same time, it is finely finished and detailed with both the exterior and interiors entirely of wood. Settled into its environment with a subborn ruggedness, yet fully operable and made to engage the site by slipping out of the way, it is a carefully crafted piece of cabinetry, an instrument.

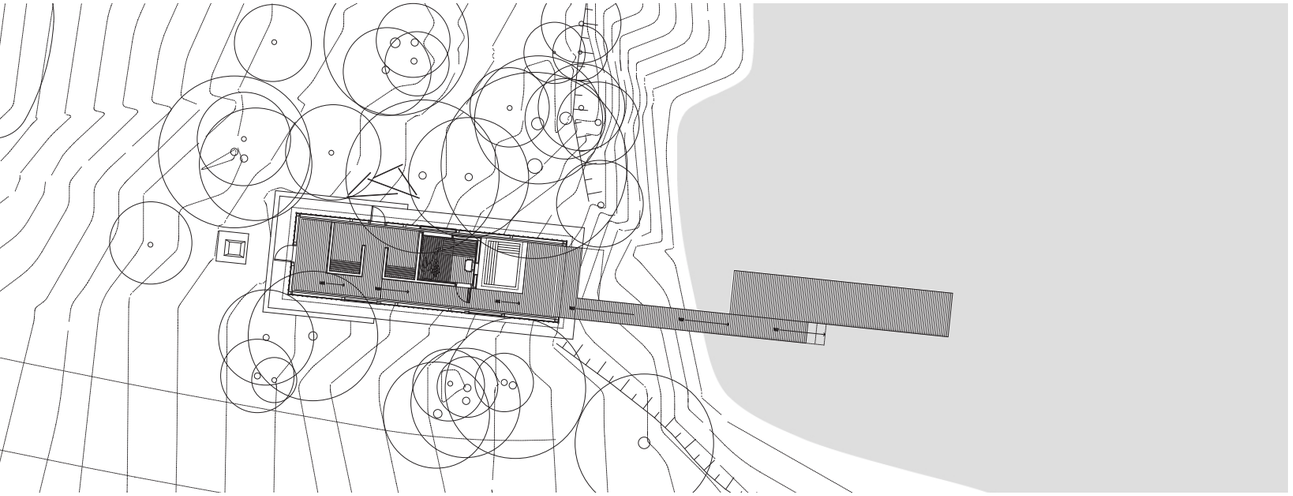
William Morgan, Peter Rose: Houses

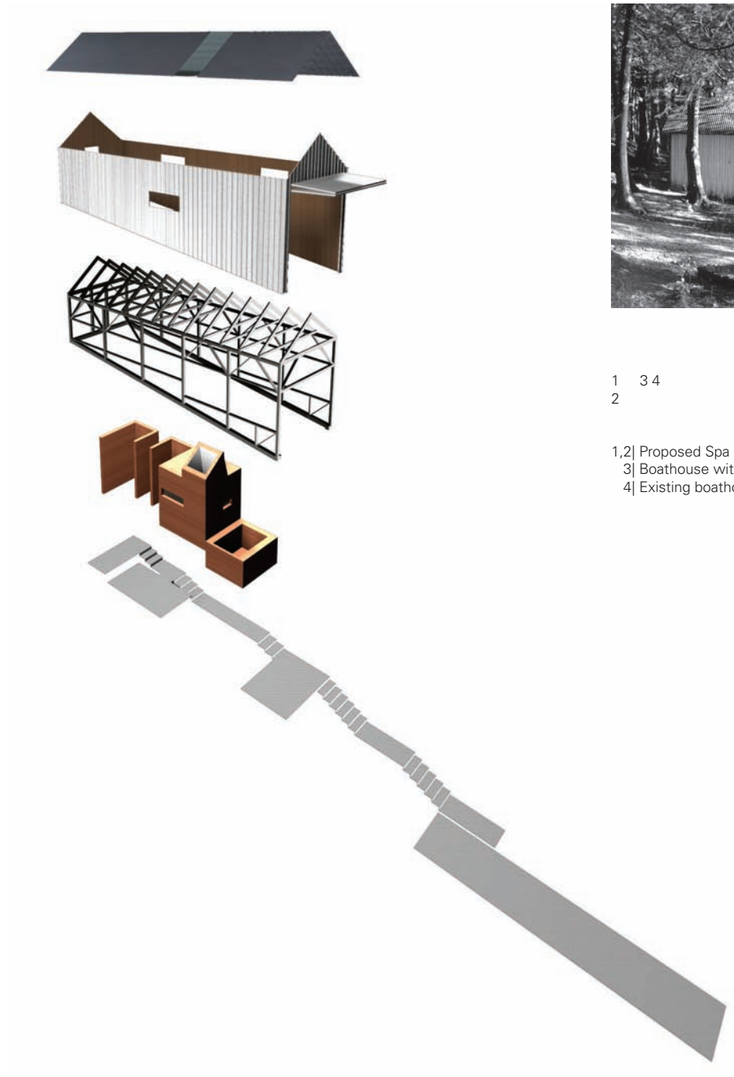


1 2 3 5
4

1,2| View toward ocean through corner windows
3| Exterior patios at sliding door
4| Rolling corner window detail
5| Cedar planking at corridor
6| Section through entry court and living space







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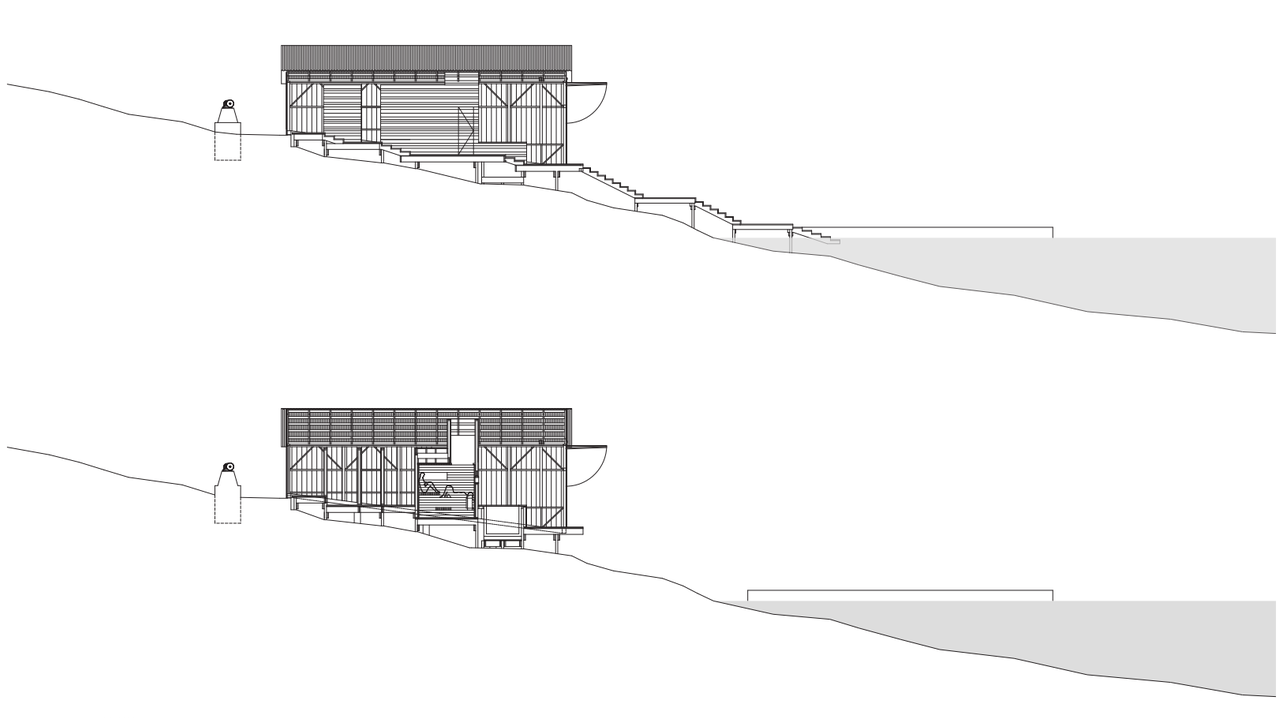
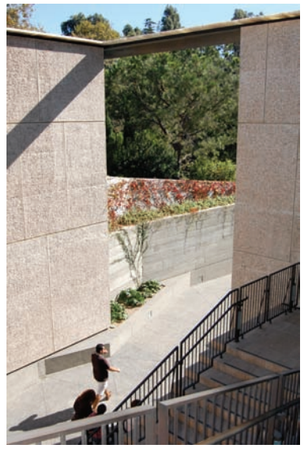
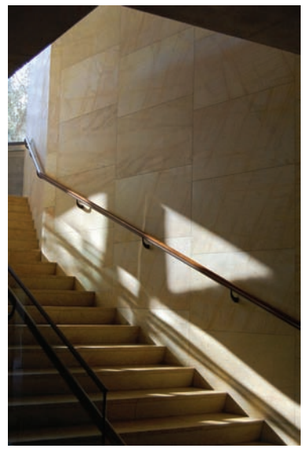
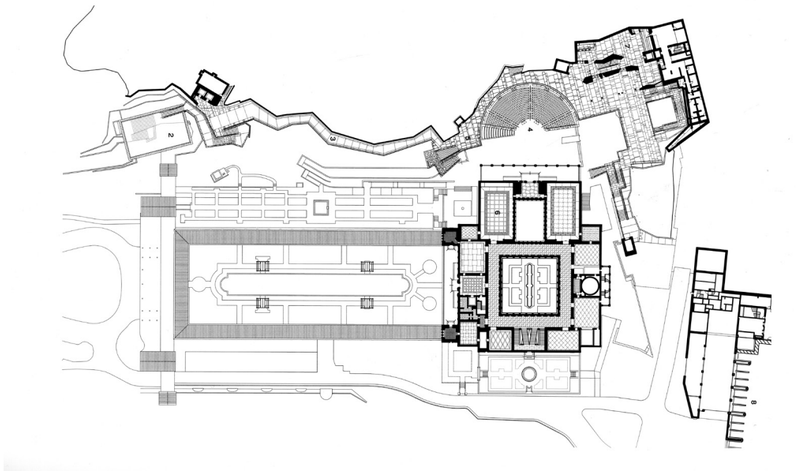
1,2| Proposed Spa plan and sections
3| Boathouse with inserted spa ‘furniture’ and dock
4| Existing boathouse









1 2 3 4 5 6 7
8 9

1-7| Museum entry sequence
8| Plan, including entry court and path
9| Elevation of bookstore and cafe