

SCOTT JOSEPH TROMBETTA

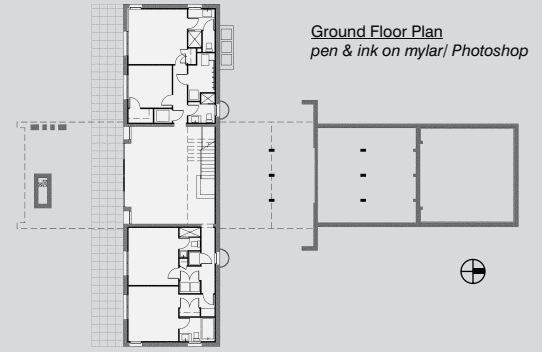


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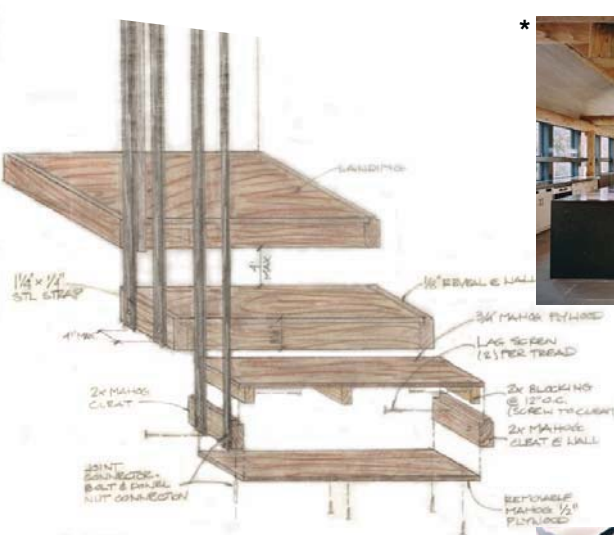
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Entering on the overlapping second level, the open living area focuses the view towards the custom poured concrete and stone fireplace, and beyond to the valleys and mountains. The lower level offers privacy for the bedrooms and lounge. The 90° rotation provides mountain views and generous daylight in each room.



Ground Floor Plan
pen & ink on mylar/ Photoshop

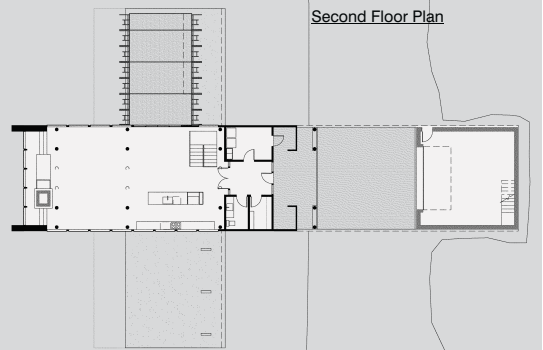
Inspired by the surrounding landscape, lodge pole pines support the top level, wrapped in slate tiles. The variety of the forest is echoed in the multiple species of wood for the custom cabinetry and tongue & groove ceiling. The cast concrete lower level walls and floors of stained concrete and bluestone panels, provide thermal mass and recall the rock ledge.



Stair Construction Detail @ Landing
pencil & color pencil on trace



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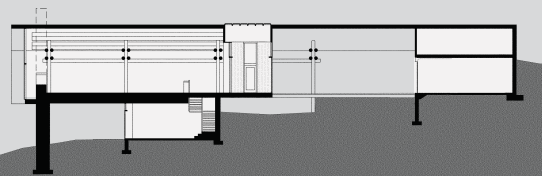


Second Floor Plan

Thermal mass, second floor walls with high R-value insulation and abundant daylighting combine with a radiant heat floor system to reduce fluctuating heating demands in a home with sporadic use.



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Section looking West



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Deferring to the mountainside site, the house is perched atop a clearing with minimal impact. It both "integrates into" the natural rock terrace and "extends out" from it.



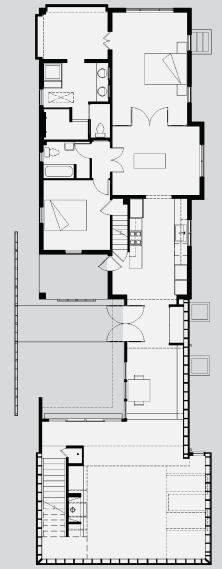
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"Integrating into" and "extending from" a remote mountainside site
A retreat for family gatherings in the Catskill Mountains; Big Indian, New York

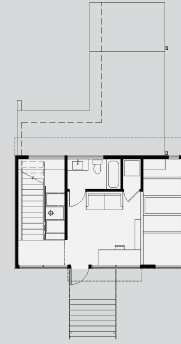


A material palette consistent with the local agricultural buildings is contrasted by the forms, which were a direct result of program, light and economy. Expressed structural elements of blasted, black oxide finished steel, wood and glass are elements of visual interest in the clean, open space.

A new entry was defined by a courtyard formed by the mass of the old and the new. An expanded master bedroom suite claimed an unused entry and porch. While a galley style kitchen and library/hallway flank the entry and link the existing with the new living and entertaining space.



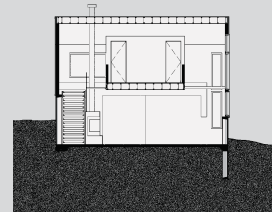
1st Floor Plan
pen & ink on mylar/ Photoshop



2nd Floor Plan



Stair Construction Detail
marker & color pencil on trace



Section looking West

Excavation time and cost were reduced by use of a precast concrete panel wall/foundation system. An open artist's studio overlooks the new living space, allowing extensive reflected daylight to enter the home through the window assemblies on the east and north walls and through the glass surrounded courtyard.



Section looking North

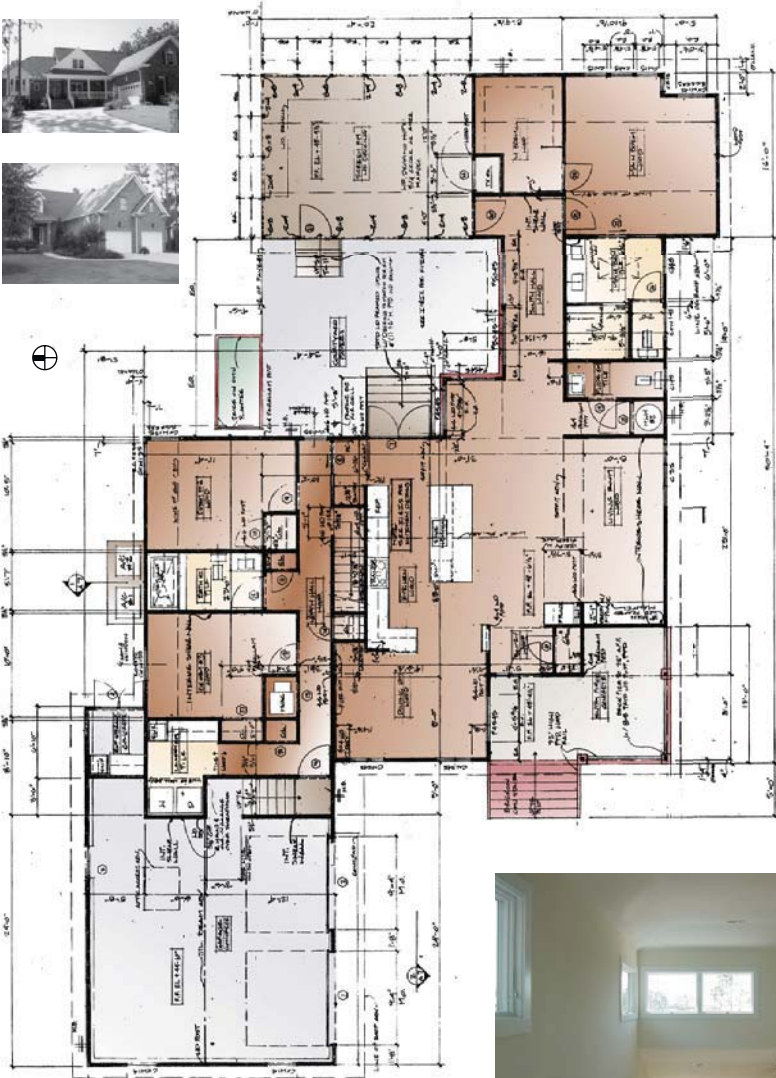
Set on a sloped site adjacent to a primary road into town, the existing structure was in need of reconfiguration and extensive repair. An addition was required to accommodate the client's living and social requirements and is built into the hillside.



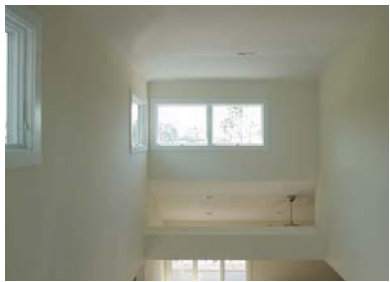
Compressing and revealing history at a rural suburban site
A couple's reconfigured pre-war bungalow; Frenchtown, New Jersey



Sited in a new, planned neighborhood near a historic coastal village at the mouth of the Cape Fear River. A former paper production forest, it is populated by new growth southern pine and oaks. The surrounding environment includes the Intercoastal Waterway and wetlands. Restrictive design standards include a minimum roof pitch of 6/12, resulting in an abundance of homes more consistent with northern suburbs than the south.



Ground Floor Plan
pencil on mylar/ Photoshop



A central spine of public spaces is an organizational element where the spaces offer varying levels of internal and external privacy from the street, neighbors and golf course. An open kitchen/living/dining space, central courtyard and screen room, allow open and semi-open access to the exterior.



The program for a newly retired couple anticipated many family members and friends visiting them in their new home. They preferred as much of the space to be on the ground floor as possible. The main bedroom is accessible from a hallway along the south side of the courtyard and has a view through the site's undisturbed area to the golf course. The guest bedrooms are set off to the north to allow the residents to live the same whether they have guests or not. A open-walled office, which overlooks the living spaces, and family room occupy the 2nd floor.

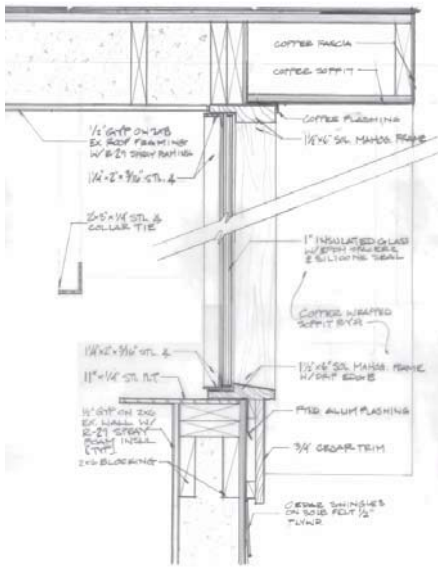


Overhangs, clearstory windows and a north-facing, glass-walled courtyard flood the spaces with reflected daylight while limiting solar heat gain and electric lighting use. The two-story space distributes light from all directions except the intense western sun.



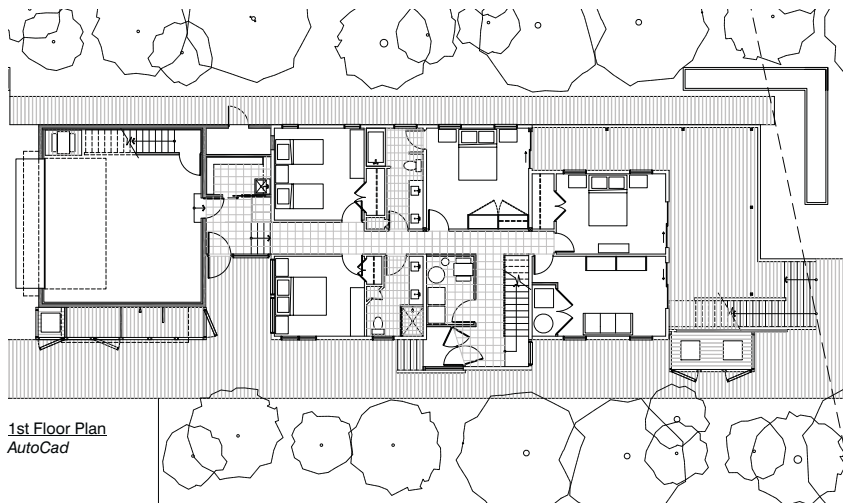
The front porch provides protection for the western elevation entry and a place to view the setting sun. Built at the height of the construction boom, budgetary concerns limited the use of the clients preferred materials. So those were deployed in the spaces that would be most experienced by the users - the porch and the courtyard, where the brick and cedar contrast the typical CMU foundation and cement board siding. All materials were selected for their weather resistance and minimal maintenance requirements within the harsh coastal climate.



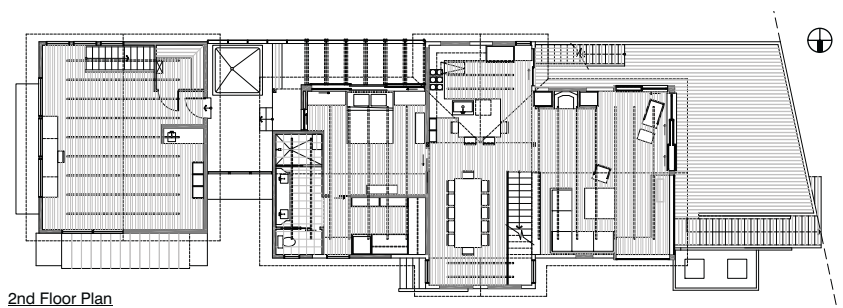


Typical Gable End Wall Detail
pencil on mylar

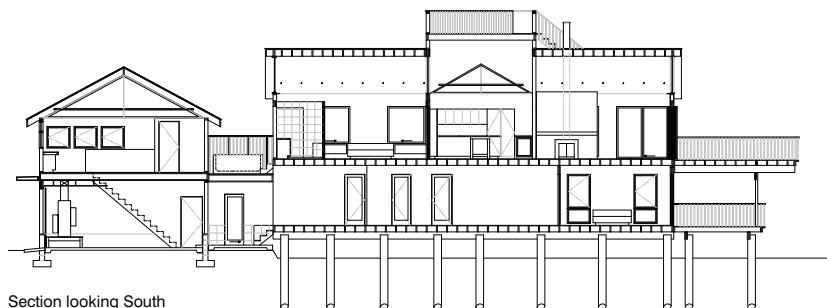
Nestled among trees, oceanfront sand dunes and two houses, daylight was nearly nonexistent in the existing spaces and views of the dunes and ocean were severely restricted. The new public living spaces are set on 2nd floor of the existing structure to take advantage of these views to the east. And access to the roof deck was restored, providing a perch to see the ocean and lighthouse at the inlet to the bay.



1st Floor Plan
AutoCad



2nd Floor Plan



Section looking South

The original structure had evolved into a discontinuous collection of spaces with no defined entry. Previous additions were removed and the original cottage was stripped to its frame to restore weather resistance and apply spray foam insulation in new and existing walls and ceilings. Low-E windows were installed and the renovation allowed minimal expense to also replace all existing windows. The addition was constructed within the footprint of the areas that had been demolished and the existing driveway.



A glass box is set tangent to the path traversing the site and denotes the new entry. Five guest bedrooms occupy the 1st floor, set apart from the main living spaces. The 2nd floor main bedroom suite is afforded privacy and also openness by an 8' high wall and typical glass gable infill panels above. A deck links the bedroom and private space of the addition.



Materials were selected for their resistance to the significant wear that an oceanfront house is subjected to by the climate and users. Copper eaves and cedar shingles, railings and screen walls were left unfinished to age naturally; the fixed glass units are framed with clear finished mahogany. Floors, stair treads and railings of Australian Cypress contrast with collar ties, fixed glass angle stops and structural elements of blasted, black oxide finished steel and the 1st floor salttillo tile.

The program requirement for increased daylight was developed as a principal thematic element. The tops of the existing gable end walls were removed for minimal expense, as the structure required extensive rehabilitation. Insulated glass unit infill panels distribute reflected daylight throughout the space. The open entry stair and new glass panel doors illuminate the previously dim 1st floor hallway.



Resuscitating a beachfront cottage set among the trees and sand dunes
A retreat for a retired couple and their extended family; Barnegat Light, New Jersey

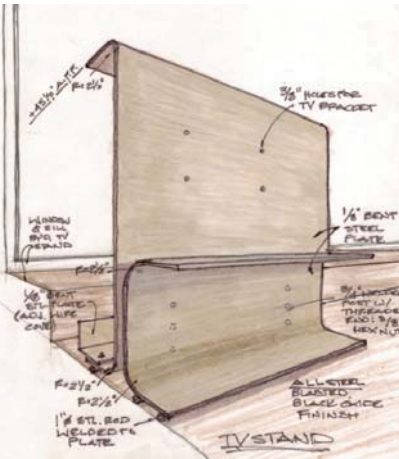
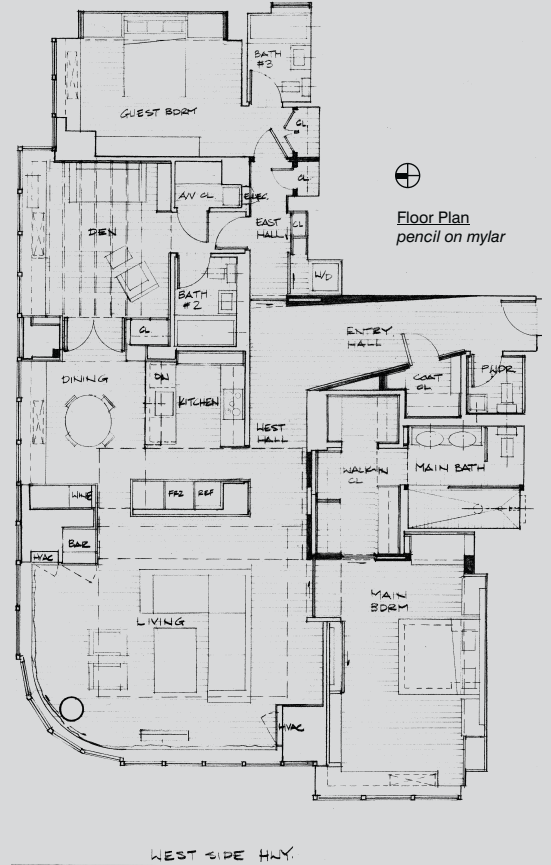


Lighting was a primary consideration: fluorescent covers were used extensively to provide general lighting with dimming capabilities. An LED cove, with the ability to change color, adds an aspect of entertainment to the living area as a combination of dimmable recessed lights and adjustable halogen spotlights illuminate the corridors.

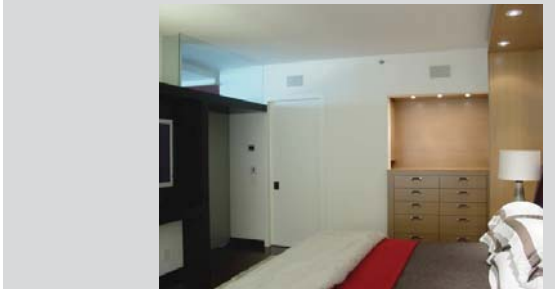


A coordinated approach to the furnishings, with a consistent palette of color, was provided throughout. Variation exists in a contrast of textures, reflectivity and absorptive qualities. A goal of creating uncluttered environment contrasts the surrounding street life, yet keeps with the simplicity of the river.

The intent was to reconfigure a generic, newly built 3-bedroom condominium to suit the real lifestyle of the inhabitants living in West Greenwich Village, overlooking the Hudson River and West Side Highway. The general location of plumbing and mechanical systems were maintained, while the rooms and their access were reconfigured to provide paths along the perimeter of the spaces. All existing cabinetry and appliances were removed and donated for reuse.



Bent steel TV stand Design Development
marker & color pencil on vellum



Most of the kitchen cabinets blend with wall surfaces, but a section becomes a three dimensional red lacquered element that is the point of reference within the living and dining spaces.

A den with new direct access to the kitchen and living areas was created from a bedroom, while the main bedroom and bath was completely reconfigured to provide an open living arrangement and additional storage. The custom low-profile, steel plate TV stand allows the living space to focus on the magnificent view and personal interaction, without obstruction or becoming a competing focal point.



Re-imagining a generic interior to complement a dynamic context
A couple's new condominium overlooking the Hudson River; New York City



Minimum material display: The fish inspired cutout allows the shelves to rotate and lock into place and support all loads. Steel cables with turnbuckles provide lateral stability. The five equal pieces of a 5'x 5' sheet of Baltic birch plywood contrasts finishes of natural tung oil and a denatured alcohol based stain.



Zero waste: A coffee table fabricated from a 5'x 5' sheet of Baltic birch plywood. Wood-glued, stopped dado and rabbet joinery eliminate the need for hardware beyond two drawer hinges and a magnetic catch. Natural tung oil finish enhances the figured grain pattern and allows for simple cleaning and refinishing.

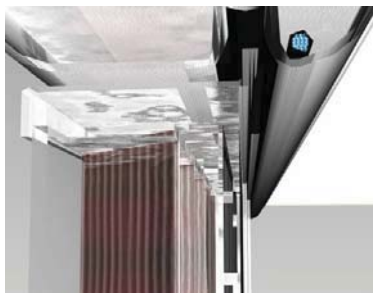
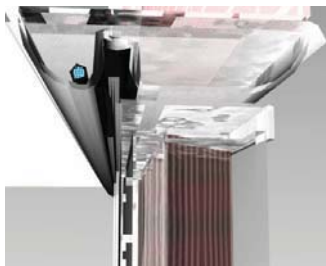


A jig of two 3/4" plywood sheets (with a hand drilled 1"x1" grid) and 1/8" steel dowels were used to shape a form that would be comfortable for both chair types. Volunteers tested and commented on the form, which was refined by relocating the rods. The final shape was drawn onto the jig and the measured radii provided the data to form the steel sheet using a 3-roll hand operated slip roller.



Elasticity in movement and position: 1/8" thick steel plate provides flexible, but continuous body support as a lounge or rocking chair.

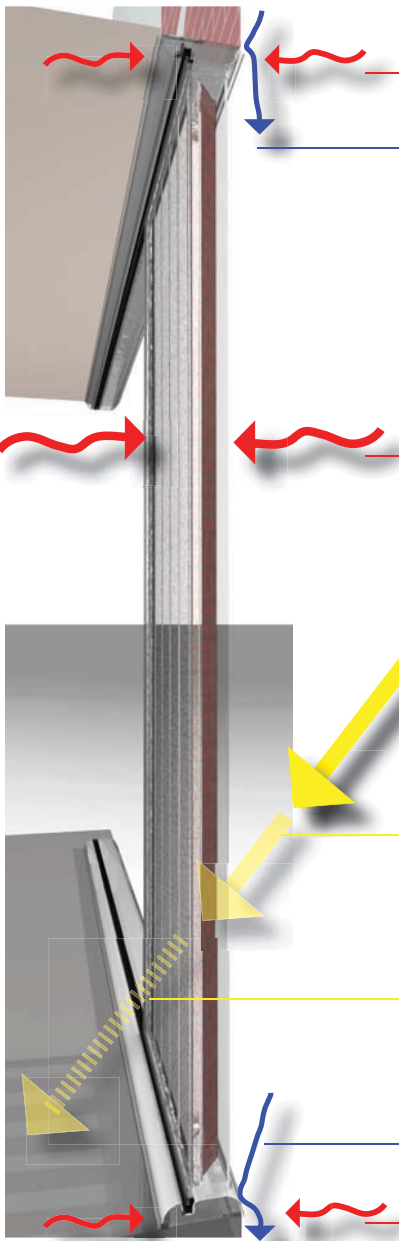




Head & Sill Section Detail
Rhino & Flamingo

Implementation
Rhino & Flamingo/ Photoshop

The system is designed to allow installation in any application where a framed storefront enclosure system would typically be specified. Heating and cooling loads are reduced by the thermal core, "solar fins" and superior frame insulation. The thin-film solar film allows renewable energy technology installation where it may otherwise be prevented. Refracted light events appear from light striking the FRP frame and vary throughout the day, but do not dominate the space.



Conduction: Fiber reinforced polymer (FRP) head, with epoxy resin fill with glass micro-spheres, increases R-value of frame - generally an area of poor performance of standard enclosure frames.

Water: Rounded head & plate diverts rainwater.

Radiant heat flow: Low U-value assembly with 3" air space and 1" transparent Aerogel (or transparent Honeycomb panel) "thermal core". Thermal core reduces convection heat transfer by limiting molecular air movement within its cellular structure. Core is contained within FRP frame with epoxy resin fill with glass micro-spheres.

Transmittance - Absorbed light: thin-film solar cells on polycarbonate fins. West & east elevation to have vertical fins, angle of installation can be customized for optimal solar absorption per the elevation's orientation to the south. South elevation to have horizontal fins, angle of installation can be customized for optimal solar absorption per degree latitude.

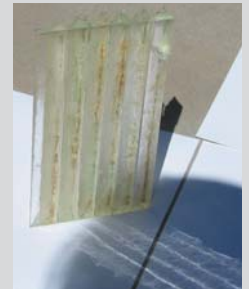
Transmittance - Filtered light: angle of "solar fins" eliminates direct solar gain during hottest part of the day while allowing indirect and reflected light to pass thru, resulting in a low solar heat gain coefficient. Visible transmittance is maintained by high optical clarity of polycarbonate lites & transparent thermal core.

Water: Rounded sill & plate shape diverts rainwater.

Conduction: Epoxy resin fill, with glass micro-spheres, within FRP sill increases R-value over typical performance.

Storefront System Section

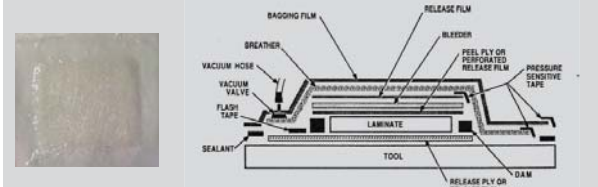
Clear epoxy resin has several inherent optical and mechanical characteristics that offer interesting potential for refracting light and providing strength. This study examines its use for application as a structural building element. Different fabrication and shaping techniques were explored to determine the material configuration and geometry needed to shape the material as components of a storefront enclosure system



Initial experiments investigated material properties such as material flow, light interaction, and shaping potential. Simple and complex mold shapes were tested; as were a variety of fabrication techniques including: wood and fabric mold castings and the integration of fiberglass fabric through a wet lay-up technique.



The artifacts demonstrated the material's ability to create interesting patterns of refracted light. Shape manipulation was possible, but it proved difficult to control the level of precision. The wet-lay technique showed the most potential for precise shape control and was significantly improved by curing the piece in a mylar bag, under a vacuum. This process had the additional benefit of increasing the strength of the piece through tighter compression of the fabric layers and a consistent environment for the material to cure.



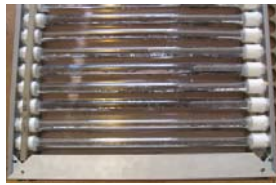
Summary of semester long research, artifact & five page paper.

**Shadows were the brushwork of the ancient architect.
Let the modern now work with light, light diffused, light reflected, light refracted
- light for its own sake, shadows gratuitous.** ~Frank Lloyd Wright

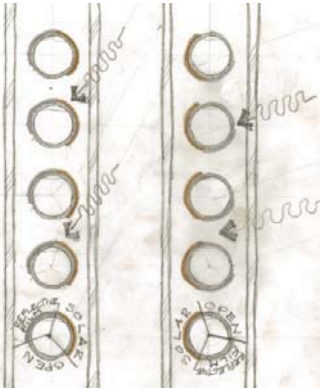


Installed Prototype

Prototype Detail
 -Recycled HDPE interior frame/spacer
 -1" dia. extruded acrylic tubes with water and PVC caps and nylon hex head plugs with silicone sealant.
 -Reflective metalized polyester film and thin-film solar cells applied to tubes with spray adhesive.
 -Aluminum frame with acrylic lites



- Solving global climate change issues will require a combination renewable energy systems, increasing efficiencies and the advent of new technologies.
- The intent of the modeled prototype is to produce distributed diffuse light and to create "light events" to provide a level of intrigue to a particular sustainable technology - an Insulated Glass Unit.
- Successful integration of the phenomenal may be an inexpensive means of attracting additional consumer interest.
- A small scale system of combined solutions, the prototype also harnesses the electrical and thermal potential of light through thin-film solar cells and thermal storage (water tubes).



summer daytime
 winter daytime
 Tube orientation diagram
 pencil sketch



Detail of light event - on the wall south of installed Prototype

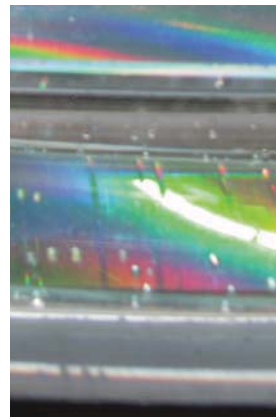
Measured Performance
 The prototype was installed on the interior of an existing, west facing window in a Tucson, AZ residence. Temperatures were taken with a handheld infrared thermometer during four days of full sunshine during May 2010. Another window within the same wall served as a control. The prototype's head, frame, sill, core and glass consistently measured 8°- 20°F less than the control. Lower differences came later into the evening. (18" x 44" glazed area with 6.75 sq. ft. of solar thin-film cells and .75 cu. ft. of thermal mass.)



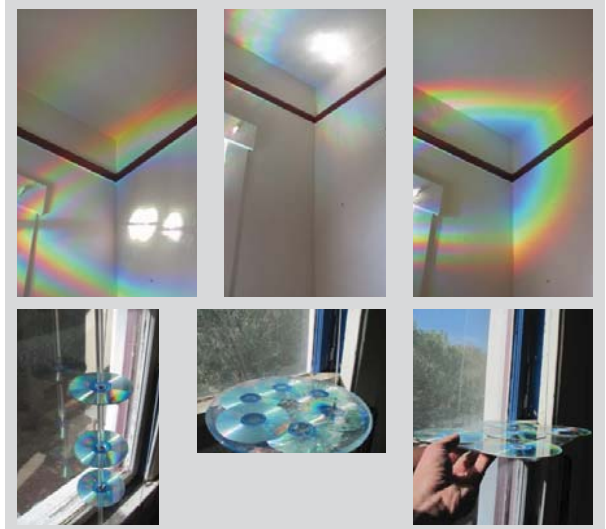
Quality of Light
 The visible and phenomenal properties of the light provided by the prototype are a considerable improvement from those of the existing window. Extensive diffuse light, interesting and varying shadow patterns and the appearance color have replaced a harsh, uncontrolled light. The most significant events of color occur at complementary angles to the shadow pattern on the wall and within the darker shadow areas on the floor. Less intense than in the previous experiments, these colors appear as more of a joyful revelation upon closer inspection, as they are rarely visible if the viewer is more than ten feet away. They have become a hint at the phenomenal, varying with space and time as the sun move across the sky.



Late afternoon: light event on wall at complementary angle to shadows

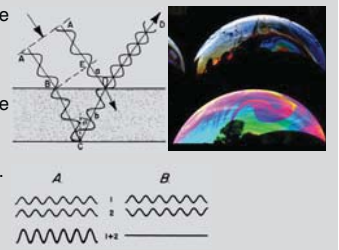


Detail of light event in shadow - on floor in front of installed Prototype

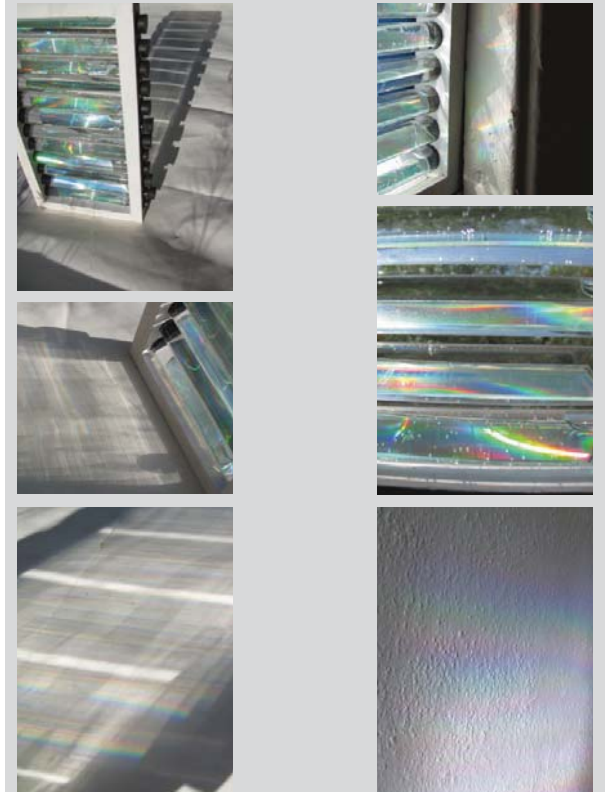


Random, yet intuitive, initial modeling of the manipulation and control of the rainbow-like phenomenon observed on the back of a compact disk. Multiple CDs were configured and set in direct sunlight in a west facing window. Vibrant colors and dispersed white light appeared on the nearby walls and floor and varied per grouping and the angle of incidence of the sunlight. The experiments produced interesting results, but presented no obvious application or use.

Light striking a thin-film surface is reflected by multiple layers and two waves may occupy the same region of space and time. Constructive interference (A) occurs if they are in phase with each other, resulting in a wave with twice the amplitude. The thickness of the material will affect the intensity and variations of color.



Further modeling attempted to control the phenomenal results by manipulating the angle and amount of daylight striking the reflective film. Observed in a west facing window, as well as an independent object outdoors, quality diffuse light is scattered deep within the room. Varied hints of striated color appeared in shadow patterns and areas of diffuse light. A level of visibility, yet also privacy was maintained with the exterior while it was set in the window.



Summary of semester long research, prototype & 14 page paper.

Early afternoon: light event appears on the floor in foreground shadow

**Manipulating color from lightwave interference in a thin-film material
 Applied to create phenomenal intrigue in an insulated glass window unit**