



Cloak Wall / Cloak House

A NEW APPROACH TO THE MODULAR PERFORMATIVE WALL

ROLE
Project Designer

SIZE
Installation

CONSTRUCTION COST
\$8,000 fabrication grant

COMPLETION DATE
2007

AWARDS/EXHIBITS
“Here by Design”
Goldstein Gallery,
Minneapolis, Oct 2007 -
Jan 2008

PUBLICATIONS
“Cite Magazine”
Jan 2008

FIRM
slvDESIGN

The exploration of the modular wall system continues with the development of *Cloak Wall / Cloak House*. The project was created as part of “Here by Design III”, an exhibit that provides a cross-disciplinary view of innovation in design thinking. The show centered on alternative fabrication techniques and methods. slvDESIGN used the opportunity to continue its collaboration with a team of designers, fabricators, and engineers to pursue ideas and questions left open by Drape Wall.

Cloak Wall takes a fresh look at the problem of a rethinking the wall section for a single family dwelling. This iteration reinvestigates the “brick” and takes a fresh look at the inner liner developed in Cloak Wall. One significant move is the separation of the interior felt surface and the weather barrier of the wall. The liner still creates an interior skin that can be customized. It also provides a location for storage, power, light and data. These functions are easier to accommodate when the weather barrier is no longer part of the interior skin. In this version, what was once a layer attached to the inner liner has morphed into a quilted

ETFE surface that handles weather, insulation and light. Specific zones of the ETFE skin can be manually opened and closed to allow for ventilation. The surfaces of the ETFE skin will be printed with patterns of varying density to provide filtered light or full shade where desirable.

Both the interior and exterior constructs protect the ETFE portion of the building from impact and puncture. The exterior surface acts as a rain screen, allowing moisture through to the ETFE inner skin where it moves down to the ground.

The final test for the project was to design a simple house around the concept. The strategy has the building hovering above the ground to allow for maximum absorption by the soil. The floor is a thickened plane that carries any HVAC component for the building. It acts as a flat duct. Storage and core elements add rigidity to the assembly and provide a place for the ceiling plane to connect to the wall system.

ADDITIONAL CREDITS slvDESIGN **Principals:** Blair Satterfield, Marc Swackhamer **Project Designers:** Blair Satterfield, Marc Swackhamer **Project Team:** Marcus Martinez, Susanna Hohmann, Rob Tickle, David Hultman **Client:** Goldstein Gallery of Design, Minneapolis **Photographer:** slvDESIGN **Fabrication:** Industrial Art & Design, Minneapolis, Minnesota, Susanna Hohmann, Portland, Oregon



Vanishing Act

A RESPONSIVE FACADE

Investigation concerning paint has been a collaboration with a computer scientist who's primary research is in the area of predictive automotive paint software. His team of RA's is developing a customized version of the software that will accomplish the goal of generating color gradients based on analysis of site-specific colors.

BUILDING

An image of a building mass is used as a base condition.

HORIZON

A simple "horizon" line is established with a two color palette. By coordinating the "flop" color, it might be possible to make a floating horizon line that utilizes green for "ground" and light blue for "sky".

PERFORMANCE

By coordinating paint with form, Parts of the building vanish - others are emphasized or diminished. The read of a building has been modified and the traditional performance of the facade altered.



OPPOSITE PAGE Cloak Wall in the Goldstein Gallery in Minneapolis. The project was a featured piece for the "Here By Design" show in the fall of 2007. **ABOVE** Study sketches provide a conceptual framework for paint studies.



The predictive paint software mentioned on the previous page is shown at the bottom of this page. First, colors are derived from photographs of the site, through either an open-source software, like Palette Generator (shown lower left), to create a family of colors. This can also be done through direct sampling of the photographs through a custom interface.

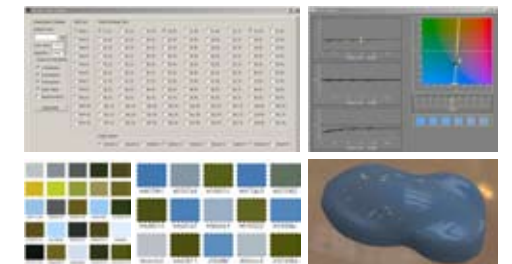
Next, the metallic properties of the color are adjusted through sliders and arrows in the “BRDF Designer” interface (upper right). This involves manipulating both the main color and the “flop” color of the paint, so that as the color is viewed from different angles, its perceived color shifts.

Once bookend colors are established, a custom interface interpolates the colors between those extremes. This interface is shown at right.

Not shown here is the final stage in the process of defining paint color which is to translate CMYK values to actual metallic paint calculations. An additional custom interface generates numbers that are provided to the

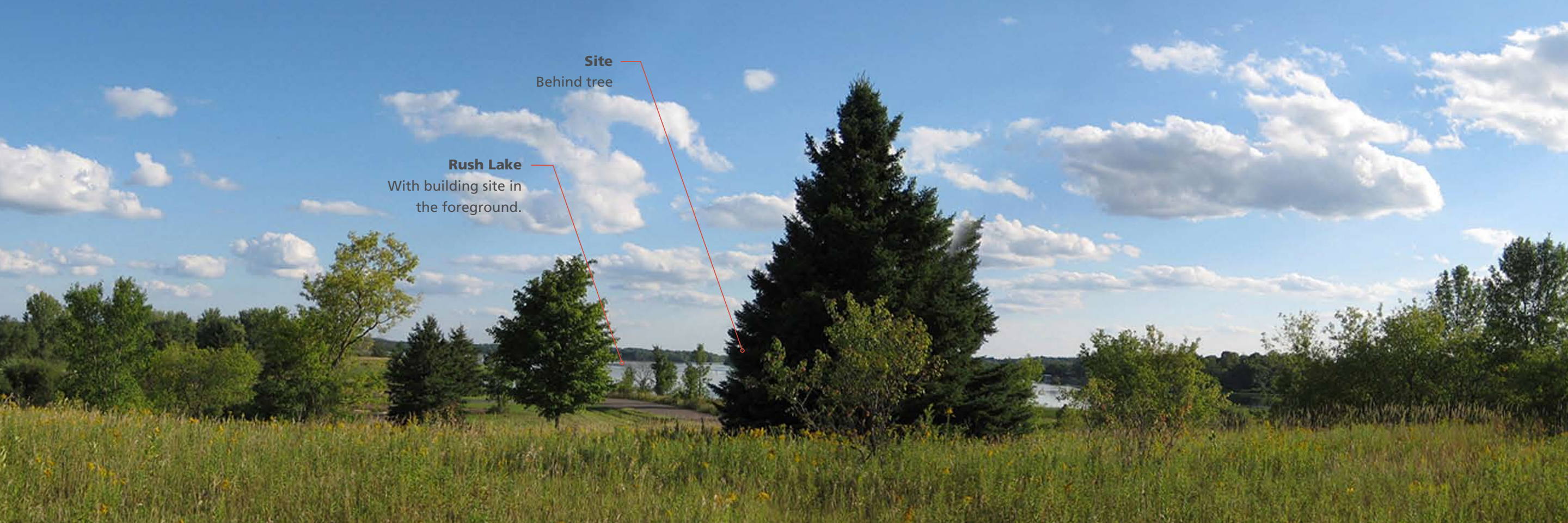
paint manufacturer.

Metallic paints are viewed in the “BRDF Viewer” window shown in the images below. A drawing is imported from an outside modeling software like AutoCAD, SketchUp, Rhino, or Maya. Once color is applied, it can be placed in a specially photographed environment under real lighting conditions and rotated, in real-time, in that space to reveal color change, reflectivity, and distortion from variations in light temperature. While difficult to communicate on printed paper, the software generates an exceptionally accurate depiction on a very high-resolution screen of a given material with subtleties in lightness, reflectivity, color, and surface quality. A palette is generated from colors found on a site.



Performance and aesthetic possibilities are opened up by technological advances.

OPPOSITE PAGE Cloak Wall in the Goldstein Gallery in Minneapolis. The project was a featured piece for the “Here By Design” show in the fall of 2007. **ABOVE** Digital interface of Palette Generator.



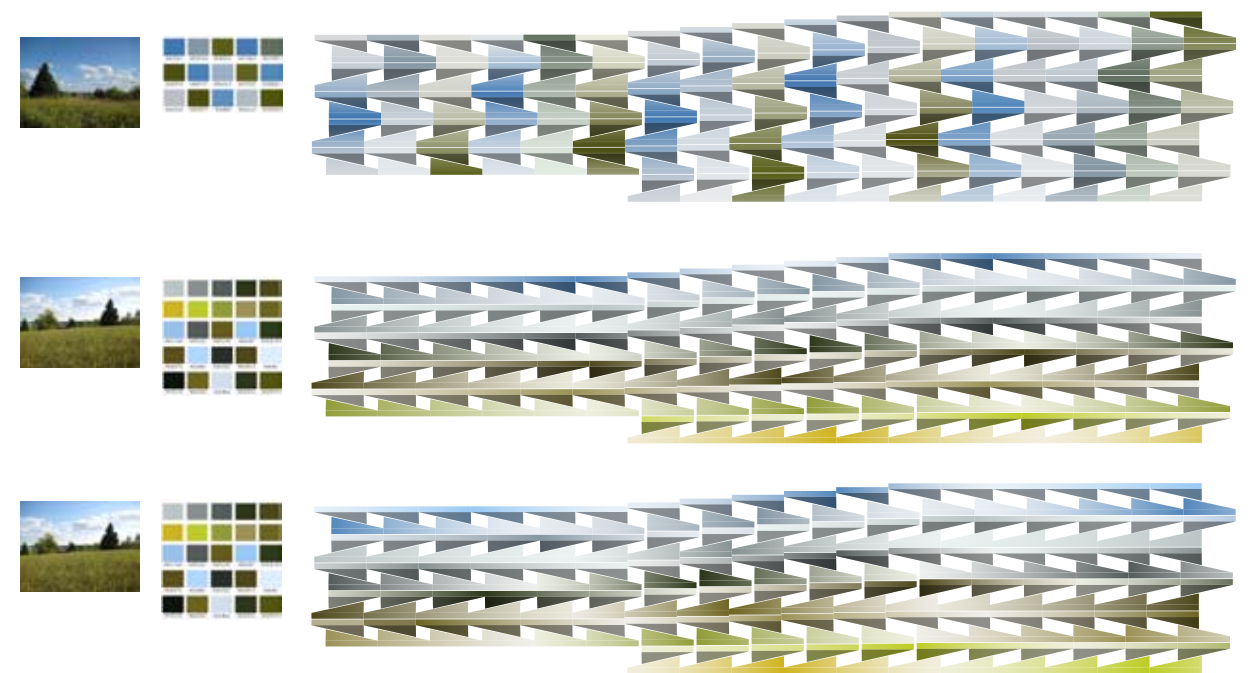
Because Cloak Wall's modules are shop-fabricated, their surface finish can be tightly controlled to a degree not possible with conventional building construction. Current efforts examine how paint finish, color, and reflectivity can be accurately predicted prior to application through proprietary software and projection technology. With Cloak Wall, this technology achieves two desirable results.

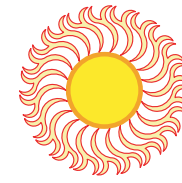
Paint Exploration 1: visual emphasis / de-emphasis of wall characteristics

Through strategic paint application, the surface of Cloak Wall might be rendered such that joints between panels are de-emphasized and larger geometric qualities, like a bend in a wall or window openings, are highlighted. This can potentially be done through creating optical phenomenon with paint application.

Paint Exploration 2: performative / functional implications of reflectivity and color

By subtly altering the levels of reflectivity across a surface, light can be absorbed by one region of a surface and reflected off another. Paint can also be made to appear one color from one viewing angle, and another color from a different viewing angle. This could serve the purpose of passively heating the house with solar radiation in the winter. These bricks could be rotated to reveal a reflective surface for keeping radiation out in the summer.



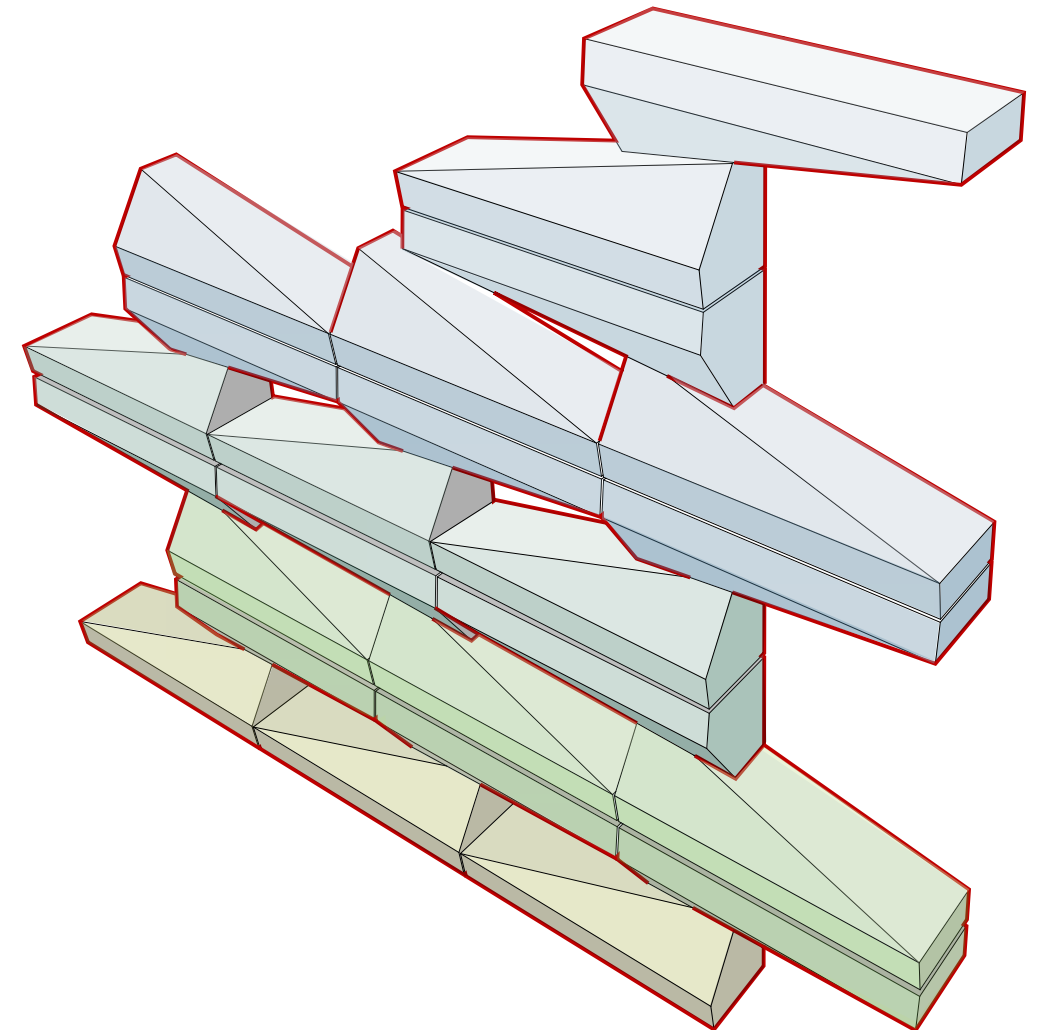
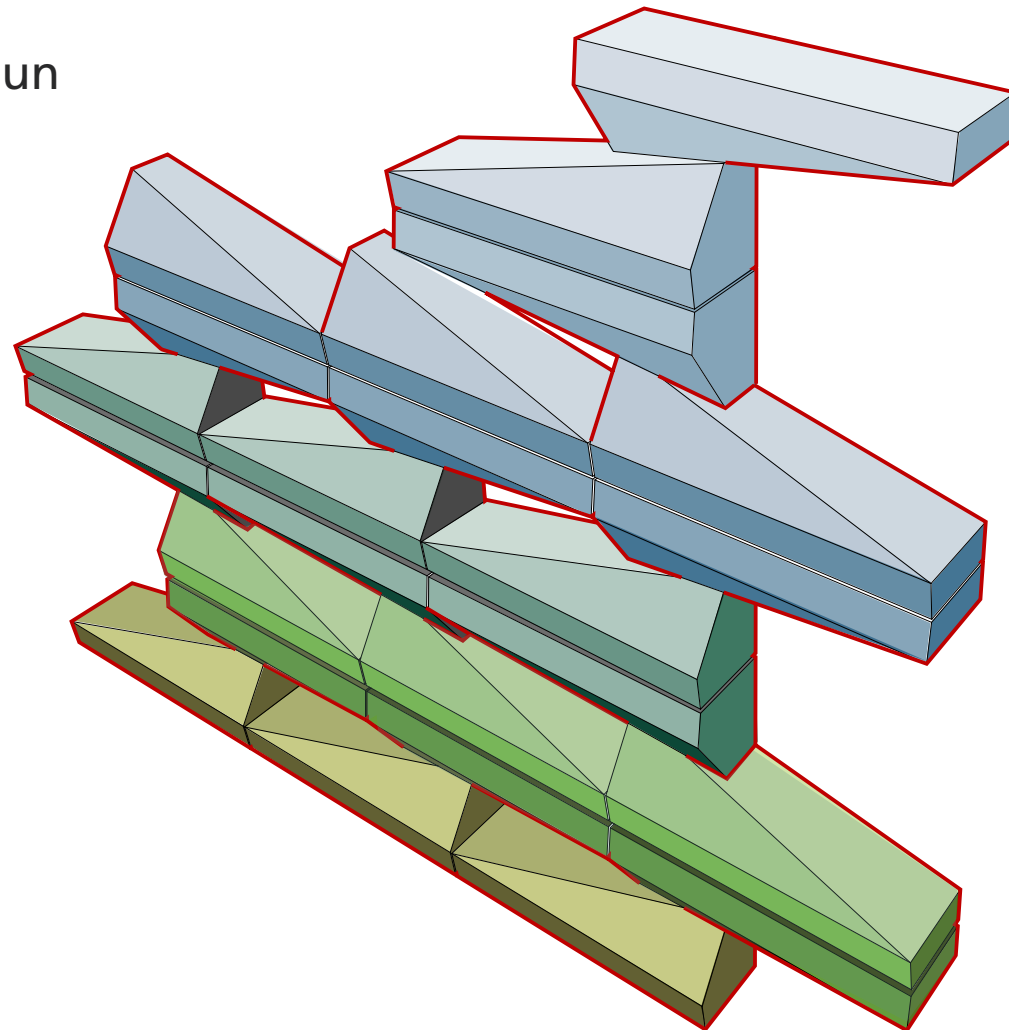
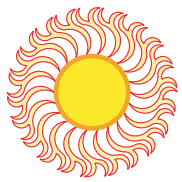


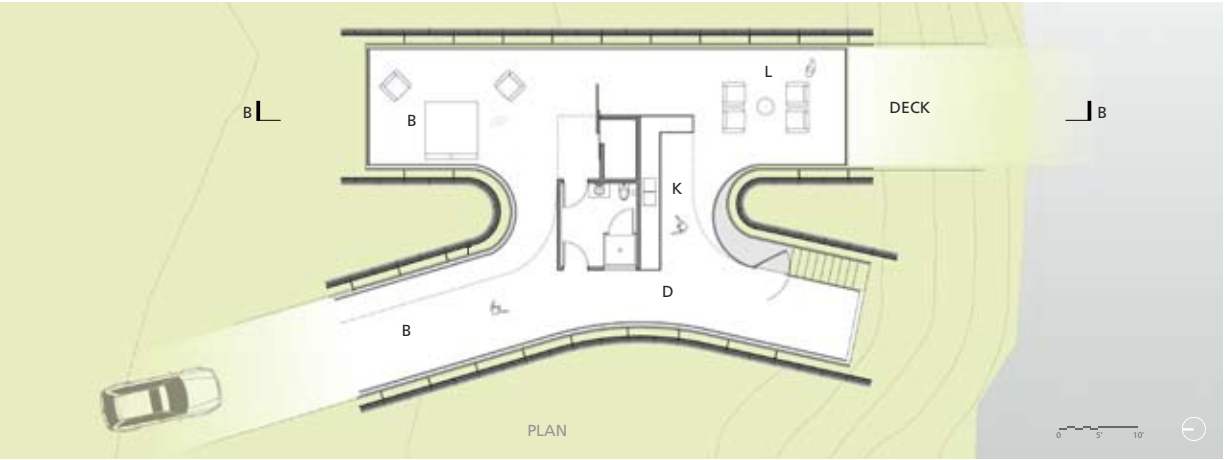
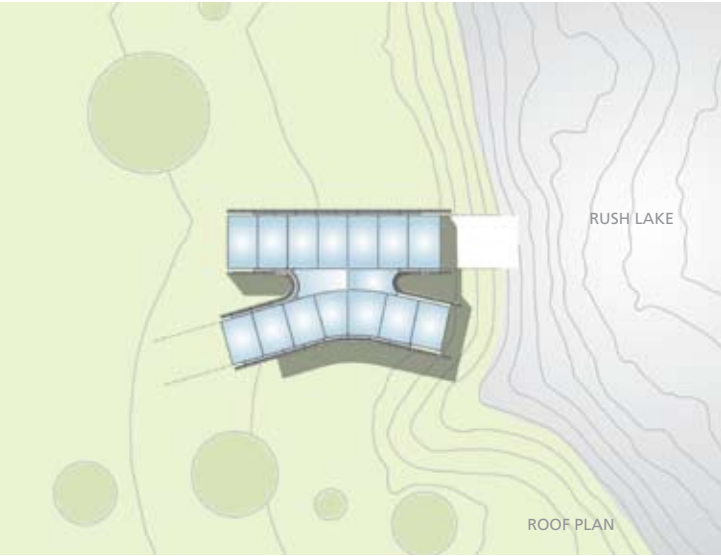
Summer Sun

Cloak House

SUN RELATIONSHIP DIAGRAMS

Winter Sun





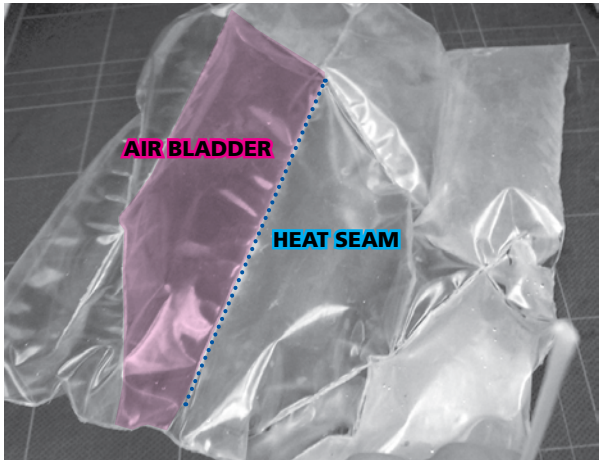
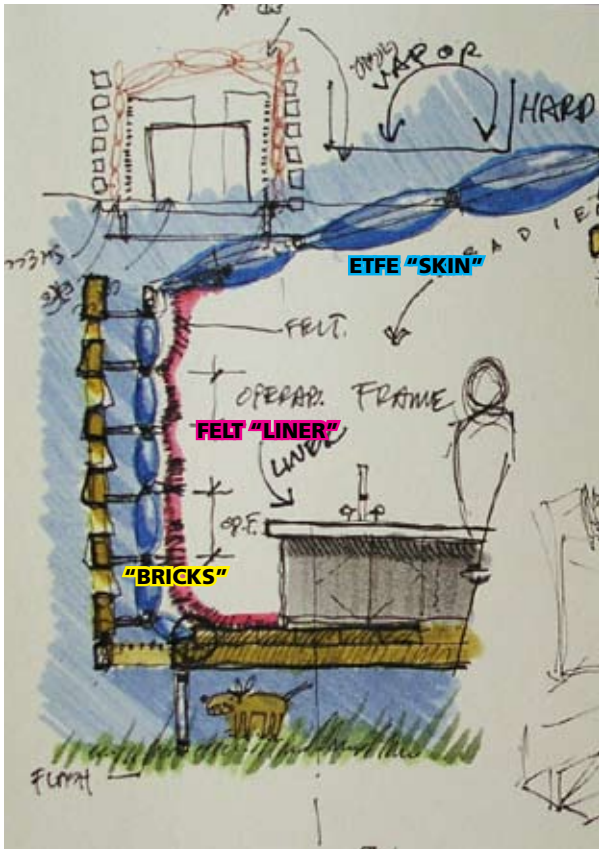
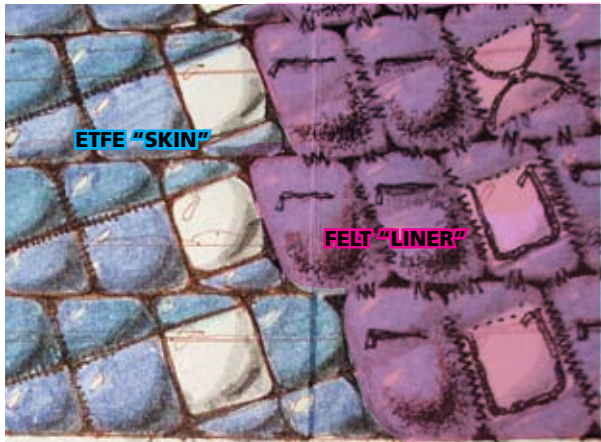
ABOVE The building will sit in an open field (top left and right), buffered on two sides by a tree line that cuts wind. It orients to water toward the south and pairie to the north. The “K”- shaped floor plan offers a zoned open space while pushing the potential of the brick to contain space.

Cloak House

RENDERED VIEW

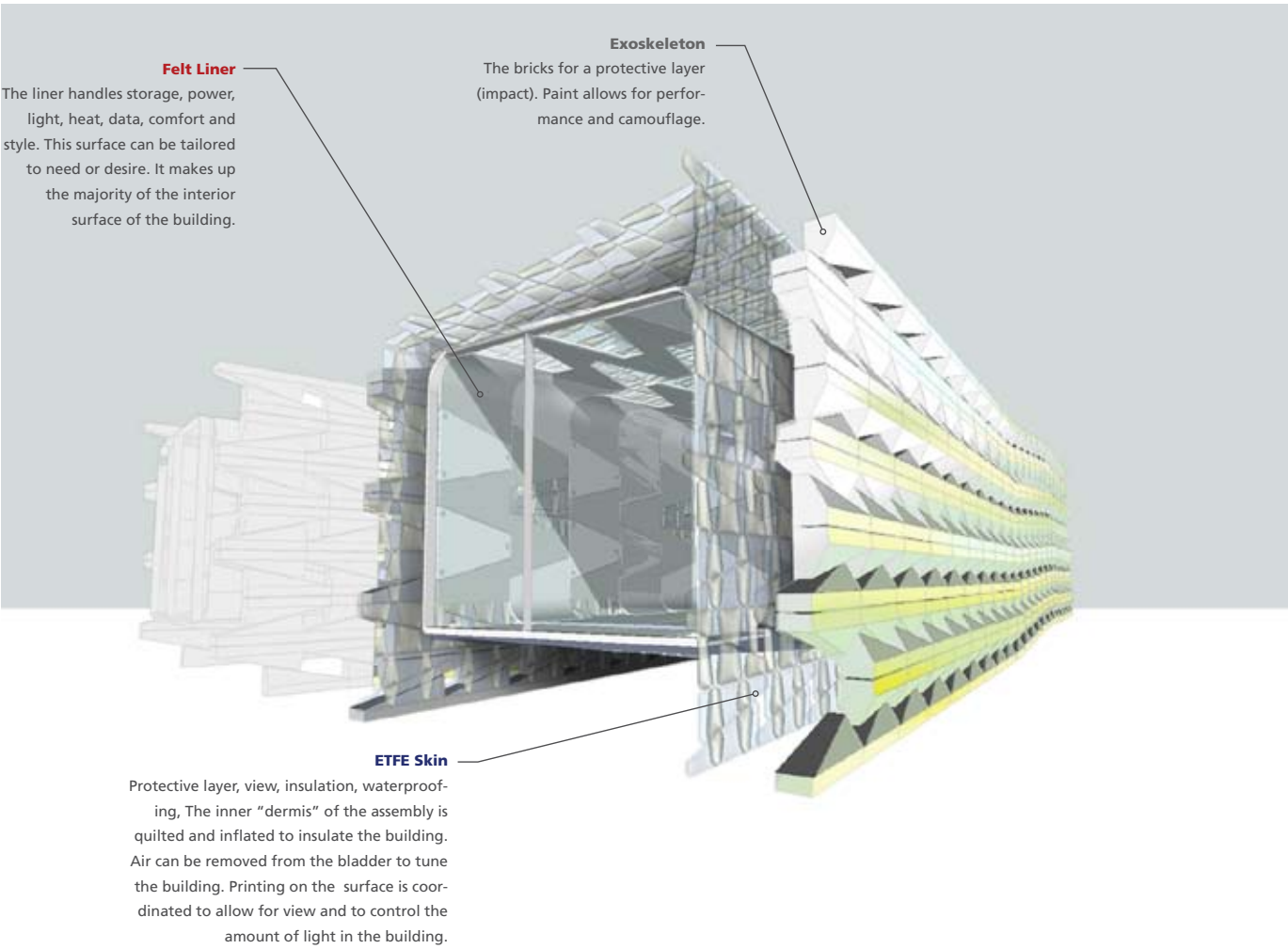


CLOAK HOUSE A computer rendering of Cloak House shows the relationship between systems as well as how the building takes advantage of the property. The strategy has the building hovering above the ground to allow for maximum absorption by the soil. The floor is a thickened plane that carries any HVAC component for the building. It is basically a flat duct. Storage and core elements add rigidity to the assembly (torsion boxes that do double duty).



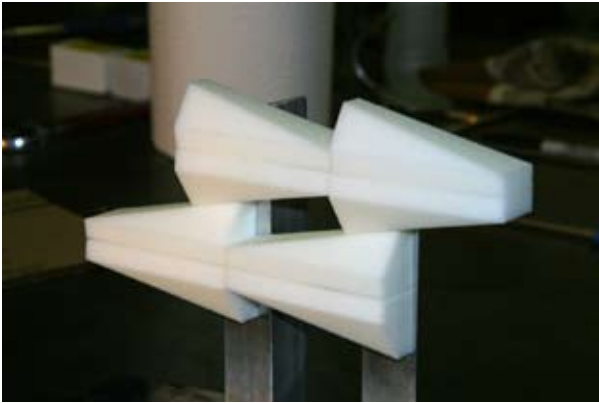
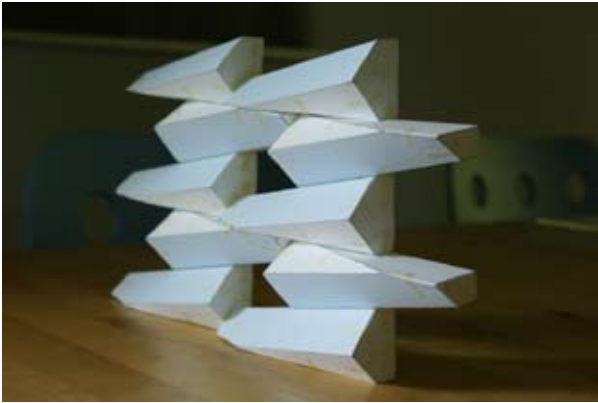
Cloak House

ORGANIZATIONAL STRATEGY



ABOVE Conceived of as smart wallpaper, the quilt allows the occupant enhanced control of his/her interior environment. The ETFE "skin" is separated from the quilt and handles moisture, view and insulation. This frees the felt quilt to better handle touch, power, storage and flooring. The images above represent a sampling of quilt and skin exploration. The sketch at top right looks at how the assembly works together to contain space.

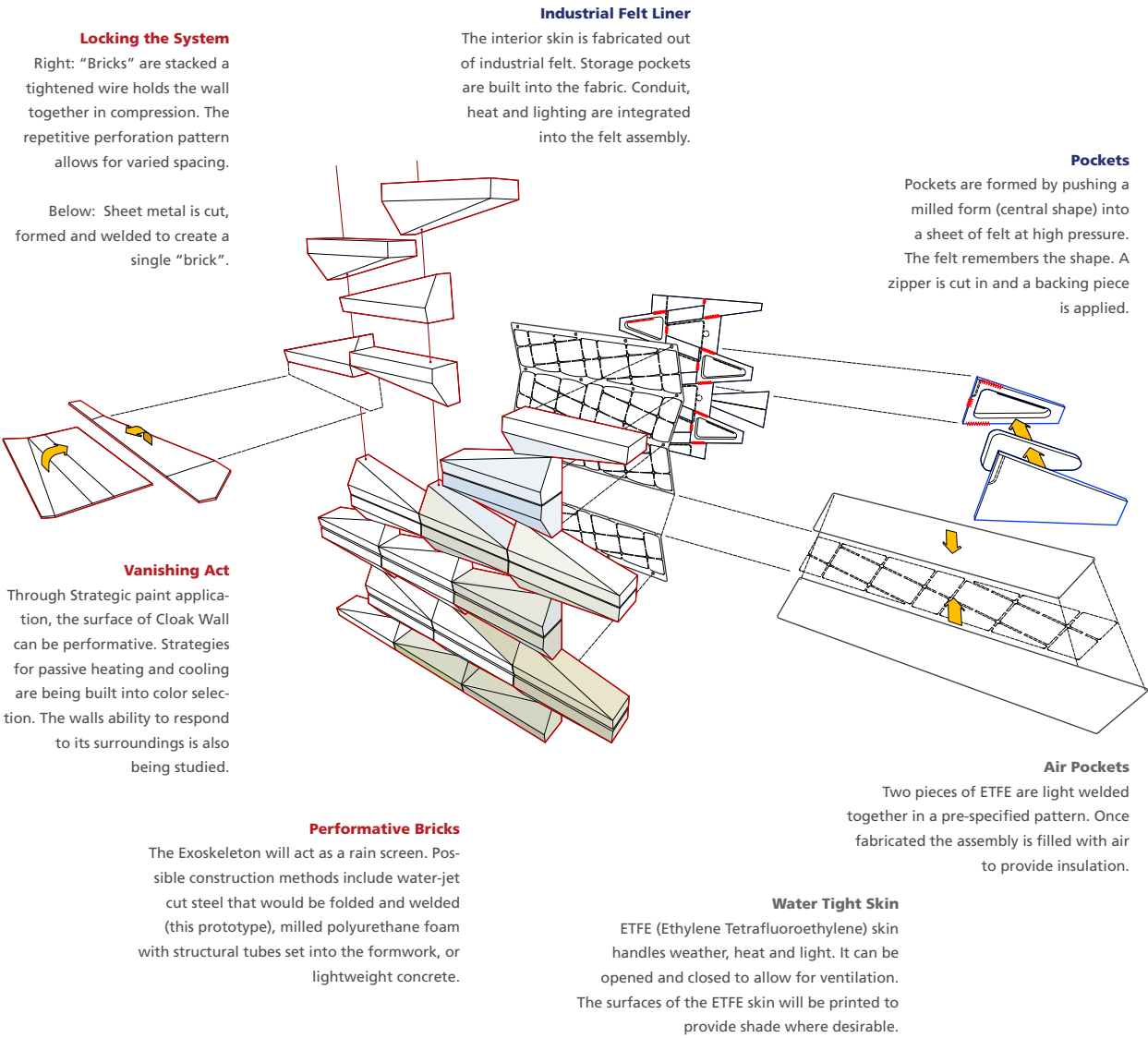
Layers of intelligence
The design uses a hard exoskeleton arrayed over an ETFE & Felt liner. The building can be fabricated using industrial methods and equipment.



FROM TOP Paper model of the wall. Rapid prototyping model of bricks for the wall. **MIDDLE** Metal pieces under construction and stacked for test fit. **BOTTOM** Dave paints individual brick. Bricks lined up to dry prior to installation.

Wall Construction

EXPLODED PERSPECTIVE



A NEW WALL STRATEGY As with Drape Wall, high-strength, low-weight composite materials will allow the wall to be delivered to the site with minimum effort, constructed quickly and without heavy equipment, and de-mountable and re-usable for temporary structures. Material assemblies and combinations are further developed to solve the problems traditionally assigned to the wall.



CLOCKWISE FROM TOP LEFT Felt liner in fabrication - internal light is on. Detail of exterior brick. Fish-eye view of the felt skin, liner and brick beyond (in place in the Goldstein Gallery). Dave installs the bricks.

CLOCKWISE FROM TOP LEFT Zipper and pocket detail. Interior face of wall. ETFE quilted barrier (this version has a surrogate for the ETFE). Fish-eye view of the exterior of the wall.

