

ARCHITECT

AB

BUILDER

VOLUME 2 1993

SUN FOREST

P.O. BOX 13893 • RTP, NORTH CAROLINA 27709 • 919-361-9888



AB magazine proudly presents the staff of Sun Forest Architecture and Sun Forest Construction. We take this opportunity to introduce the people who make our work possible. Left to right are - back: Keith Brown, Bill Waddell, Don Black, and Jeff Andre'. front: Rebecca Brown, Mark Herbert, and Ellen O'Dea. The following is a brief description of each member's role in the firm, and qualifications.



J. WILLIAM WADDELL graduated cum laude from the North Carolina State University School of Design with a Bachelor of Environmental Design, and a Bachelor of Architecture. Bill became registered as an architect in the State of North Carolina after several years apprenticeship with local firms specializing in medium and large-scale commercial projects. As president of Sun Forest Architecture, he heads the architecture and interior design aspects of all Sun Forest projects.

KEITH T. BROWN graduated cum laude from the North Carolina State University School of Design with a Bachelor of Environmental Design, and a Bachelor of Architecture. Keith works with each client from design through the completion of the project. As president of Sun Forest, Inc. and licensed as a general contractor, he oversees all aspects of construction. Additionally, Keith is responsible for all photographs utilized in this publication.

JEFFERY J. ANDRE' graduated with honors from Louisiana State University in Baton Rouge, Louisiana with a Bachelor of Architecture, and is preparing for the Architectural Registration Exam, having completed his internship. He is also pursuing a Master of Architecture degree. As an intern architect for Sun Forest, Jeff works with Bill to complete the design and drawing phases of our projects. In addition, his background in computers serves the firm in many ways, including the design and production of this publication.

REBECCA LANDERS BROWN graduated from Florida State University with a Bachelor of Science in Interior Design. Rebecca works closely with Keith, Bill and each client beginning with space planning and continuing through to furnishing a project.

ELLEN M. O'DEA graduated cum laude from Suffolk University in Boston Massachusetts with an MBA. As company accountant, Ellen manages all of the day-to-day operations of the business.

MARK HERBERT graduated from North Carolina State University with a Bachelor of Science in Civil Engineering Construction and a Master of Science in Civil Engineering. As Project Manager for Sun Forest, Mark handles all estimating, bidding, contract negotiation, and purchasing. He is the office contact for all field operations, and works closely with project Superintendent, Don Black.

DONALD BLACK has an extensive background in residential and commercial construction. As Site Superintendent, Don is responsible for the implementation of detail, quality control, and all site supervision.



INSIDE

VOLUME II

Copyright © 1992 Sun Forest Inc.

1993

DESIGNING WITH GLASS 2

A thoughtful approach to the design and construction of window walls in a wood framed, glass house.

SMART HOUSE TECHNOLOGY 8

The future of home design is here with the latest in residential electrical design, computer controlled access to all of your electrical appliances, audio, video, security, and much more.

1715 FAISON ROAD 10

Bringing nature to a suburban setting.

A SENSE OF COMMUNITY 14

Sun Forest proudly introduces our most ambitious project to date.

288 HIGHVIEW DRIVE 16

One of the first Sun Forest "Concept Homes"

PROVIDING EXCEPTIONAL QUALITY AND SERVICE 24

The benefits of the Architect Builder concept.

SNEAK PREVIEW : 2207 VINTAGE HILL DRIVE - TREYBURN 28

A Classical approach to modern design, this home represents a unique expression of traditional design values while being firmly rooted in the present.

BUILDING A SAFE HOME ENVIRONMENT INSIDE BACK COVER

Toxic materials and their impact on the home environment.

Front Cover: A view from the balcony of
288 Highview Drive.

Back Cover: New stream and landscaping at 1409 Pinecrest
Road (Architect Builder Vol. 1 Number 1)

EDITOR'S NOTES

This is our second edition of Architect Builder Magazine, and as with any new publication, we are evolving and learning as we go. We received some excellent feedback from our first issue, along with suggestions for improvements. This time around, we have tried to address these comments, as well as further developing our general direction.

This issue offers as much visual information about our work as possible. We have found that photographs help tremendously in conveying the essence of a project, and with that in mind we have chosen to make the leap to full color printing throughout the magazine.

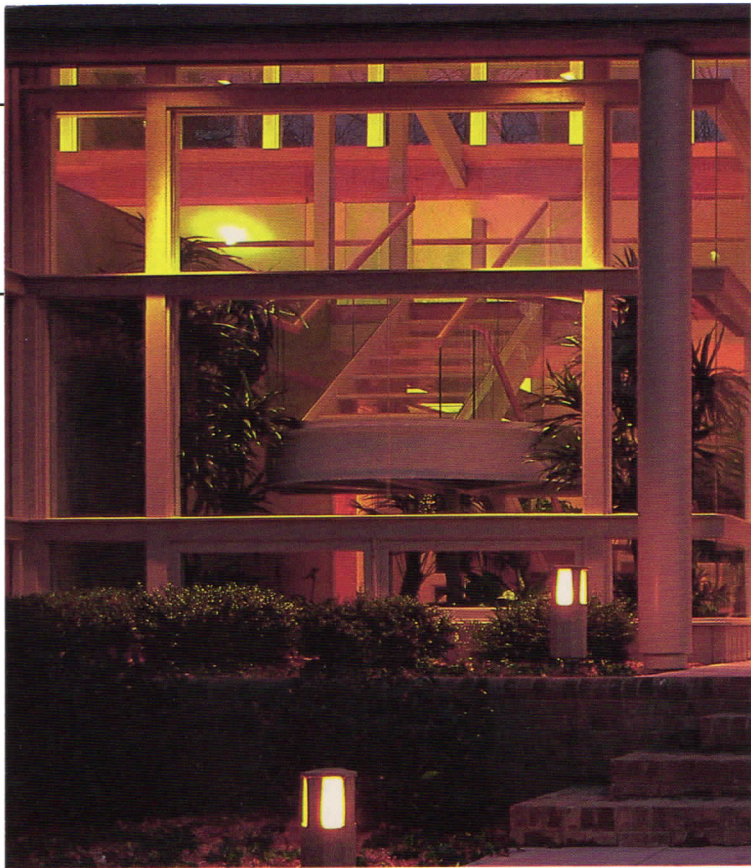
In our continued drive toward excellence in design and construction, this publication is becoming our primary method of communication with potential new clients, as

well as the community at large. It is one way in which we hope to educate the community to what is possible with good design. Our hope is not only that the public will appreciate our work, but will also come to expect this level of quality from every aspect of the built environment.

Architecture has the ability to affect the quality of our lives in many ways, and **Sun Forest** continues to be a driving force toward a quality future for the design and construction of the built environment.

————— Jeffery J. Andre'

ARCHITECT
AB
BUILDER



Exterior View of Sculptural Staircase

A thoughtful approach to the design and construction of window walls in a wood framed, glass house

By: Bill Waddell

BACKGROUND

The clients for the project presented here came to us because they were familiar with our work and felt that we could best help them realize the ideas they had for their new home. We began the process by working with them in several question and answer sessions to determine the specific functional and aesthetic requirements of their home. Having gained an understanding of the conceptual relationship desired between their ideal home and a potential site we began looking for appropriate properties. After a careful search of land in the areas best suited to their needs for accessibility and community involvement, a tract was chosen in Chapel Hill.

continued on page 5

NEWCASTLE PLACE DESIGNING WITH GLASS

Photography by Keith T. Brown



View of main entry landscaping



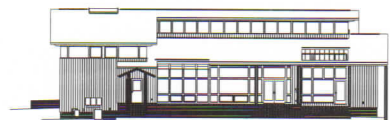




*Sculptural Stair at entry foyer with bridge above.
Landscaping around stair brings the outdoors in.*

*Main bath with jacuzzi tub and wet bar is
designed to maximize relaxation.*





DESIGNING WINDOW WALLS FOR ENERGY EFFICIENCY

Chief among the programmatic requirements for this home was the desire for the house to integrate with and appear to grow from the site. As such, the interior of the house needed to communicate with the exterior site development in a flowing, uninterrupted fashion. In other words, when you are inside you should feel like you are outside. This indicated the need for a large quantity of floor-to-ceiling and wall-to-wall glass. When designing with large areas of glass there is a critical balance between energy efficiency, budget, and construction efficiency. As we developed the design of the house, we gave careful consideration to the insulation and thermal envelope requirements, cost and construction implications of the type of glazing, type of window systems, required structural system, and fabrication techniques.

With respect to insulation and thermal envelope requirements, let me preface this topic by stating that Keith and I completed our architectural design training at the School of Design in the heyday of passive solar technology development. Consequently, we have been able to assimilate the best and discard the worst of the ideas formulated during that period and have modified the phrase "passive solar" to be more specific to our particular region. We call it "passive energy" design. This simply means that we take particular care to design and orient the home to take advantage of all the appropriate passive heating and cooling opportunities available to a project.

In the case of this home we took full advantage of the private view toward the south into an undisturbed forest area. The clients desired a very open, flowing connection for the street side of the home as well. This allows them the opportunity to be in contact with their neighbors during the day and, through the use of blinds, still allows privacy at night. Thus, the north side of the house is also developed with a great deal of transparency. Approximately 55% of the exterior walls of this home are glass. Clearly, the energy budget for such a home could be extraordinary. Our client wished to achieve the maximum energy efficiency possible while still maintaining the flowing connection to the site.

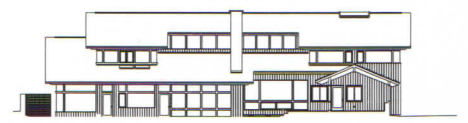
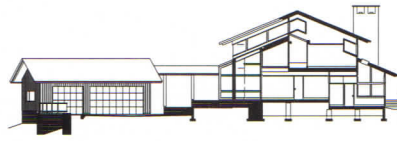
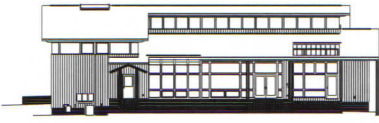
In designing the house we paid particular attention to the need for carefully controlled shading so as not to put a heating burden on the house during the hot, humid days of spring and summer. Windows and door openings are arranged in such a way as to allow natural ventilation through the house - though in our climate there are only 2 months out of the year where the humidity is low enough to enjoy this passive cooling technique. We also utilized



High glass enclosure at the main bath shower accentuates the feeling of showering outdoors.

View of sculptural stair from the bridge highlights the transparent qualities of the glass handrails.





A relaxing screen porch - the ultimate outdoor room.



View across kitchen toward informal dining area.



the newest in proven glazing technology - argon filled, insulated, low emissivity glass units. With an R-value of approximately 4.0 (rather than 1.5 for typical insulated glass units) these windows were able to cut heat gain and loss by 266% in comparison to a similar home with standard double glazing.

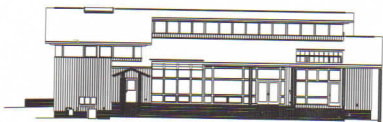
Perhaps to the homeowner, the most quantitative device we have employed is the design and application of simple, yet critical thermal envelope technology. Prior to siding a house we apply a continuous sheet of housewrap to the exterior of the sheathing. We prefer Tyvek due to its natural toughness and properties which allow water vapor to pass through freely. This is our first line of attack against infiltration of unwanted unconditioned air. Our second line of attack takes place just prior to insulating the house. At this point we caulk and seal all stud-to-stud connections, all top plate and sill plate-to-floor or foundation connections, etc. All cracks too big for caulk (shim spaces around windows, doors, etc.) are packed with closed cell foam rods (backer rod). After this sealing process is completed and unfaced insulation installed, we apply a continuous, unbroken reflective vapor barrier. All penetrations through this membrane (electrical outlets, etc.) are closed again with duct tape.

We have been criticized for overkill since this creates two infiltration barriers and concerns have been raised about the potential for too tight a home. We have discovered, however, that the still air film created by the housewrap significantly improves the overall U-value of the wall construction. Taking into consideration the unavoidable infiltration at windows and doors (of which, our homes have plenty!) then the result is still an air change rating on our homes well within the recommended standards.

Complementing the carefully controlled thermal envelope is a uniquely engineered HVAC system. All ductwork is oversized in comparison to typical residential construction to allow larger volumes of air to move at slower speeds throughout the house. This means a very quiet system with no discernible air movement. It also means a more homogeneous mixture of conditioned air throughout the house which results in minimal temperature differentials (± 3 degrees). This is a very simplified description of the system, but the result for the homeowner is an energy

continued on page 20

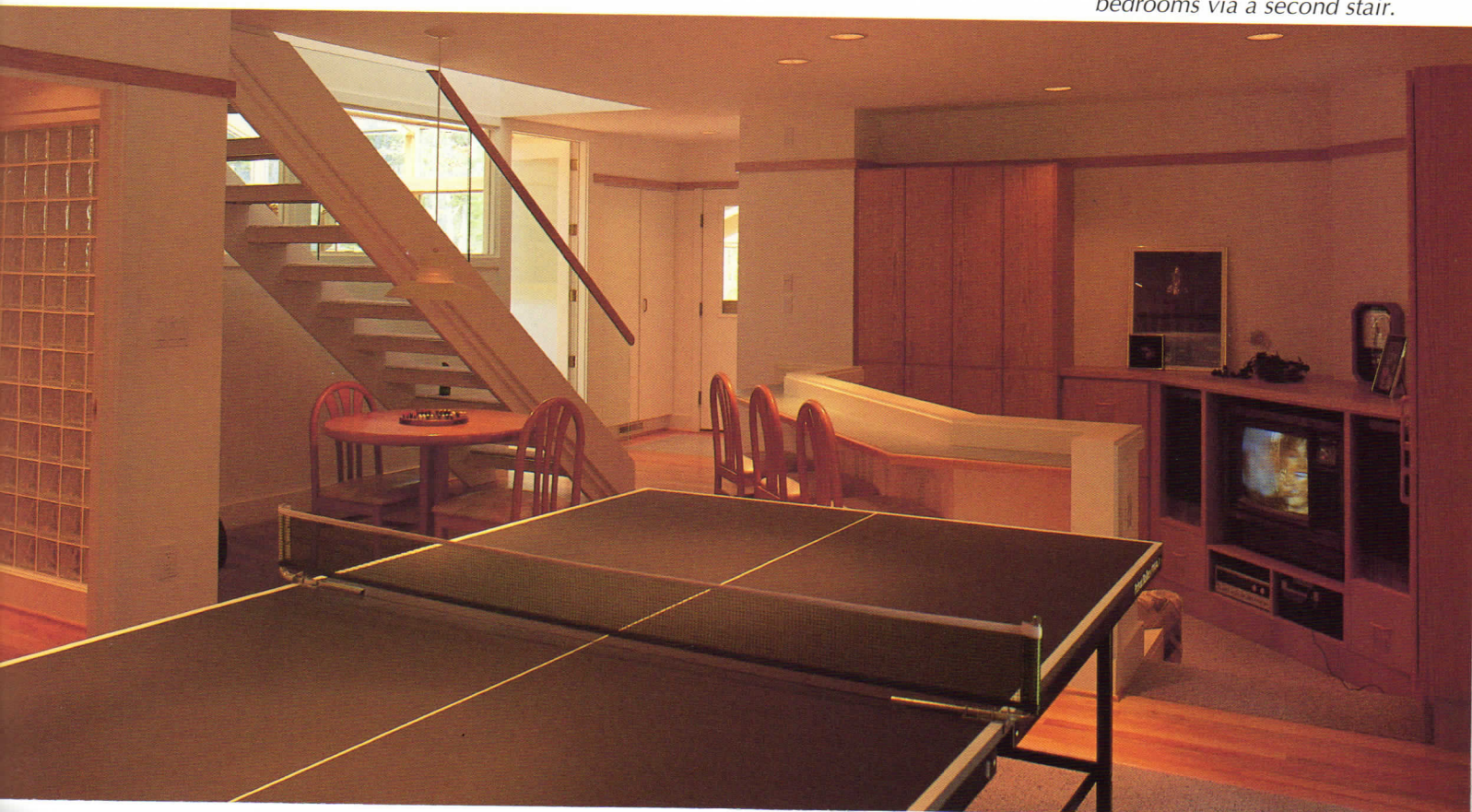
Mitered glass corner at the entry showcases the sculptural stair, and invites visitors to come inside to explore.



View across living area toward sculptural stair highlights the custom oak cabinets and the floating feeling of the bridge



Children's den offers direct access to their upstairs bedrooms via a second stair.



SMART HOUSE TECHNOLOGY

THE FUTURE OF HOME DESIGN

By: Keith T. Brown

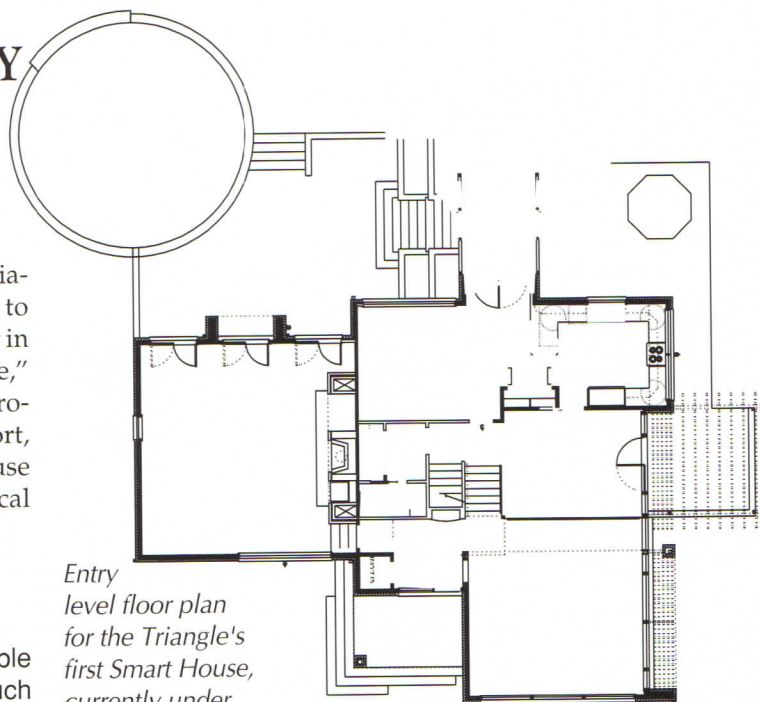
Sun Forest has been selected by the Home Builders association of Durham and Chapel Hill and Duke Power to present the Research Triangle region with a new concept in housing. This new innovation, termed "Smart House," features a revolutionary new wiring system that will provide homeowners with unprecedented levels of comfort, convenience, safety, and energy conservation. Smart House is the first major enhancement to residential electrical systems in fifty years.

There are four basic features in the Smart House:

- 1 Wiring systems in a home (electrical, telephone, cable TV, security systems, and minor additional wiring such as that for doorbells, thermostats and audio) which are now separate will be united in a single system that allows two-way communication between controls, fixtures and appliances.
- 2 Delivery of electric power to fixtures and appliances will be controlled and constantly monitored by a low-powered signaling link running between circuitry in the fixture or appliance and circuitry in the Smart House network interface.
- 3 The system will include an internal communication network that will link all appliances with each other, with internal control devices, and with the outside world.
- 4 The system will have future capability of delivering more than one type of electrical energy. This capability is called programmed power.

Controlling the many benefits allowed through this new technology will be possible through any touch tone phone in the home. If desired, keypads with a text display (similar to a security system keypad) can be located at convenient points within the home. Video "touch screens" may even be used if desired instead of or in addition to the keypads. Because you can access your home's communications network through a touch tone phone, this means you can call your home and "turn it on." After logging in a personal security code, you would be able to communicate with the home's computer to activate security, lighting, heating and cooling, entertainment systems, etc.

Since the integrated wiring of a Smart House is a two-way system it means that you will be able to "talk" to your house. Present wiring methods are one-way systems. By flipping a light switch you are telling the connected light to



Entry level floor plan for the Triangle's first Smart House, currently under construction at 2934 Buckingham Road, Durham, NC

turn on or off. In the Smart House you will be able to tell the light to turn on, and, if desired, it will be able to ask you, "how bright?"

The Smart House will allow you to design different lighting modes for the rooms in your house. You might wish to establish a morning mode when you first awake that turns on the lights in your bedroom, bathroom and kitchen. This mode could begin with the light levels dimmed slightly to allow your eyes to adjust and then as the morning proceeds they would brighten to full intensity. Similarly, you can preset the lighting in your living area at levels appropriate for television viewing, a party or late night snuggling. Each of these modes can then be recreated automatically by the Smart House at a predetermined time, or manually at the touch of a button.

In a Smart House the image from a video tape being played on the recreation room VCR can be sent to any television in the home. Similarly, a remote camera mounted outside for security reasons, or in a baby's room for visual control, can have its signal viewed through any television in the house. By plugging speakers into the Smart House wiring you would be able to send your favorite music from a centrally located stereo system anywhere in the home.

The Smart House controller has a built in clock and telephone answering machine. The clock allows you to designate specific times when the television can come on, when the dishwasher runs, when the water heater turns on and off, etc. The variety is endless and limited only by your imagination. The built-in telephone answering machine allows you to send the messages through any speakers plugged into the Smart House and also allows security control over who can listen to the messages.

Another feature possible through the Smart House is intelligent heating and cooling. HVAC systems (heating, ventilating and cooling) developed specifically to enhance Smart House technology will allow you to save energy while maximizing comfort. In the Smart House you will be able to control which rooms receive heated or cooled air according to the desired comfort level. If only the living room and kitchen need air conditioning, then the air handler will only blow at a small percentage of its maximum capacity. By utilizing the Smart House controller's built-in clock you can also specify the times when electricity is at its highest cost and direct it to turn the air conditioner off during those hours.

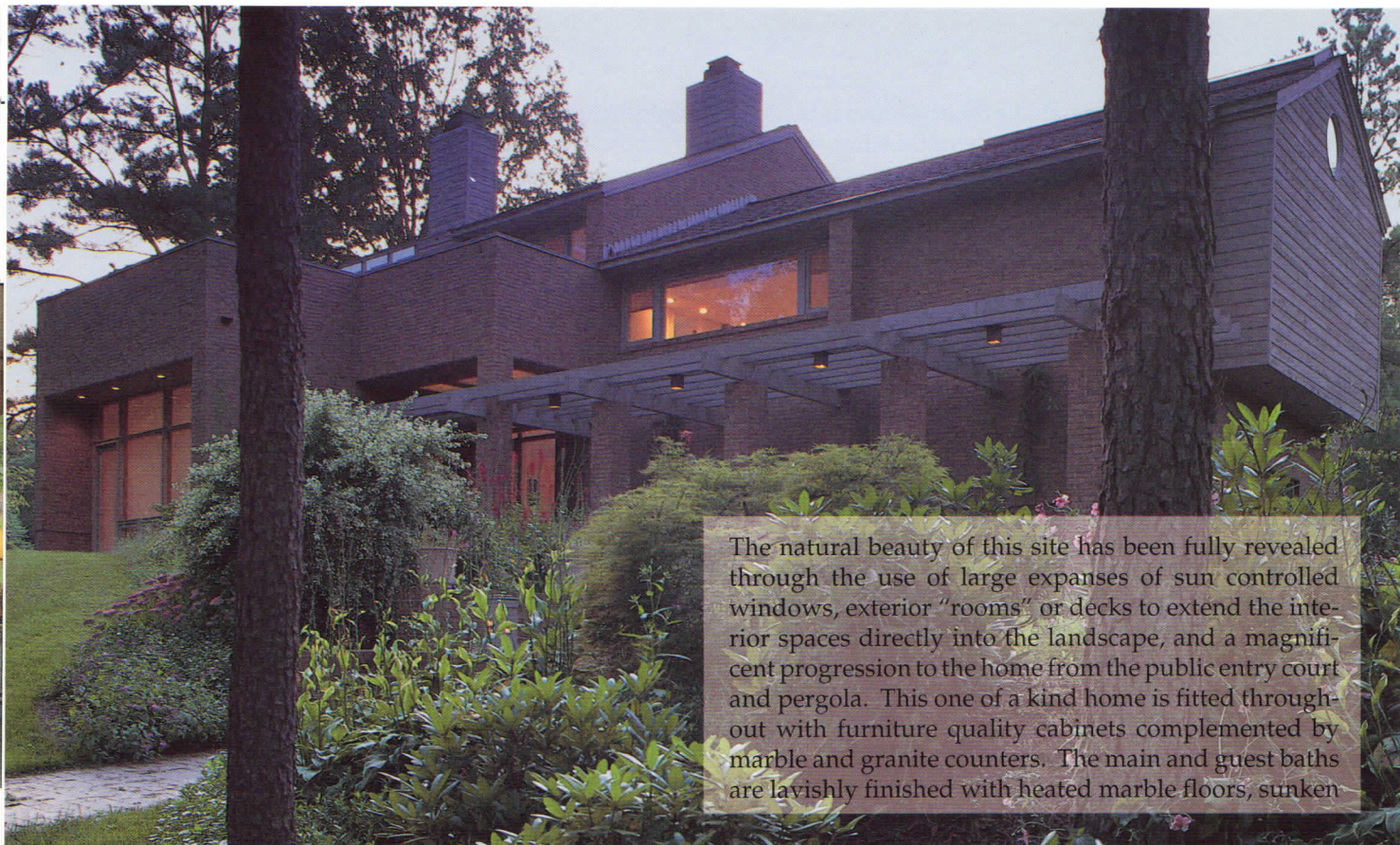
As more and more intelligent appliances and fixtures become available, the flexibility of the Smart House concept will allow you to reap maximum benefits from them. For instance, your security system zoning will be controllable from your office (via touch tone phone) so that you may allow a workman to come in the back door and service your water heater. However, the rest of the security system can be left operational for peace of mind. After the workman leaves a phone call resets the entire system. Other safety features possible include stoves that keep watch over heat levels so pots do not boil over and ovens, ranges and dishwashers that can be locked off.

Currently under construction, this residence will be The Triangle's first Smart House.

Sensors connected to the Smart House controller will allow your landscape irrigation system to know whether there has been enough rain to keep the lawn and gardens alive. If not, it will turn the water on until the prescribed amount has been absorbed. Sound sensors in children's bedrooms can activate remote cameras with the signal being sent to your bedroom television at night or the kitchen television while preparing dinner. With the two-way communication process you will be able to check security status from your bedroom before going to sleep at night. If the back door is unlocked you will be notified and can lock it remotely from the bedroom. Room occupancy sensors can turn lights on in the hall and kitchen, if you get up for a midnight snack. The potentials are endless and because the Smart House is a modular system backed by the National Association of Homebuilders, future benefits not yet conceived will be able to simply plug into the wiring.

The day is here for the home of the future and Sun Forest along with the Home Builders Association of Durham and Chapel Hill and Duke Power will be presenting the first Smart House in this area. Our Smart House is now under construction and is scheduled for completion in May of 1993. **Watch for Triangle area news media coverage of the project, and look for a personal invitation from Sun Forest in your mailbox. We will be holding a special open house soon after completion.**





The natural beauty of this site has been fully revealed through the use of large expanses of sun controlled windows, exterior "rooms" or decks to extend the interior spaces directly into the landscape, and a magnificent progression to the home from the public entry court and pergola. This one of a kind home is fitted throughout with furniture quality cabinets complemented by marble and granite counters. The main and guest baths are lavishly finished with heated marble floors, sunken

Southern facade from entrance drive

1715 FAISON ROAD

NATURE IN THE SUBURBAN ENVIRONMENT

Photography by Keith T. Brown



Detail of entry garden and trellis







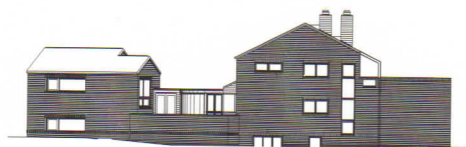
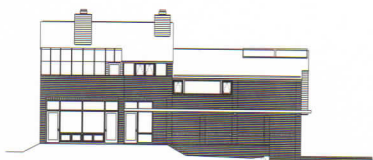
View of the kitchen highlights the granite counters and pass through to informal dining area. A major feature of all Sun Forest homes is the custom cabinetry, as seen here in these pickled finish cabinets. It is one of the many distinguishing elements of our design work.

whirlpool tubs and separate glass showers. Each of the four bedrooms has ample space for relaxing in privacy, walk in closets and private baths. Pickled oak flooring and light colors are used throughout the home to create an open, airy feeling. The sky-lit gourmet kitchen has been equipped with top of the line Thermador and Sub-zero appliances. Fully engineered heating and cooling systems allow quiet comfort with no drafts. As a further indication of our commitment to quality and energy consciousness,

this home offers a guarantee that the heating and cooling costs shall not exceed \$119.00 per month with maximum temperature differentials from the lowest level to the highest level of no more than three degrees. Other special features include a fully heated and irrigated greenhouse, central vacuum system, drinking water purification system, and reduced toxicity construction methods. The landscape is fully irrigated with a sod lawn complemented by a lush variety of flowering trees and vegetation. Brick patios and wood decks have been designed to enhance the experience of the natural beauty of the landscape. Secluded on the rear patio adjacent to the den is a six-person gas fired hot tub. To further remove the potential stresses of home ownership, we provide a lifetime structural guarantee and a maintenance program for all Sun Forest homes.



View of living area toward stair and marble covered fireplace



A SENSE OF COMMUNITY AN EXCLUSIVE SUN FOREST DEVELOPMENT



Sun Forest has been building single family residences since 1983. When it became clear that we, as the architect, could not find local contractors willing to build with the quality of construction we required, we became the contractor also. As a result, we build all of the homes that we design. This allows us a greater degree of control over our product than is found elsewhere.

Together our companies form a team consisting of a Registered Architect, a General Contractor, an Engineer, an Intern Architect, an Interior Designer, a Job Superintendent, and an Accountant with an MBA. With our varied backgrounds and education, we have developed a team of great strength and talent.

This creative edge has attracted many clients of a demanding nature. To further offer the most advantageous conditions for our clients and our homes, we are working on a tract of land for the purpose of creating an environmentally

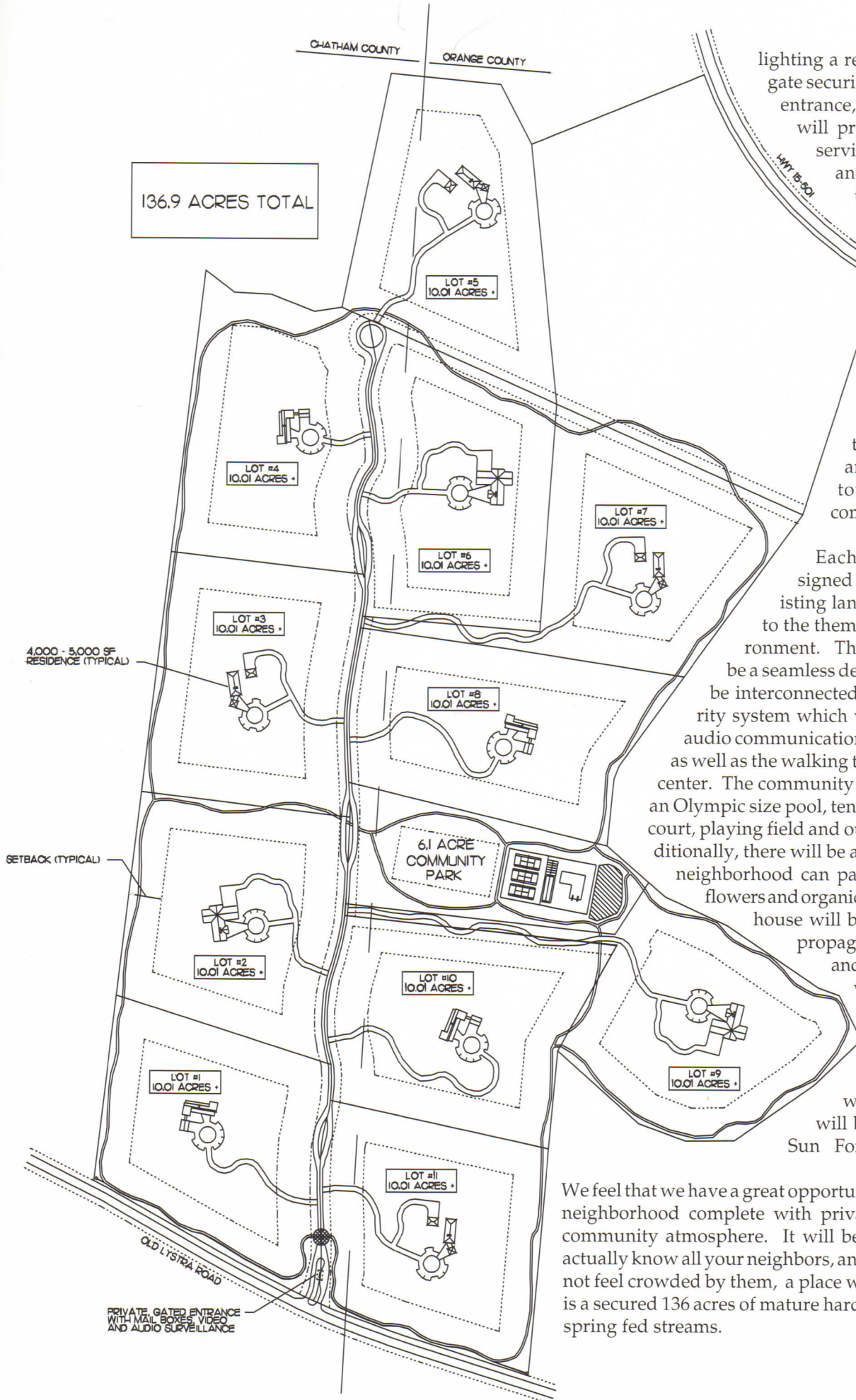
sensitive neighborhood. This tract of land is on Old Lystra Road in Chapel Hill. It is approximately three miles from UNC Hospitals and the UNC campus, twelve minutes traveling time from Duke University and fifteen minutes to the airport. Located within the Chapel Hill city school system and now very accessible to the new four lane 15-501 highway, this area is rapidly growing in popularity. Fortunately, we have been able to acquire the land at a "pre-discovered" price.

Each individual home will be sited on a ten acre lot within the overall project so as to offer maximum views and privacy. The lot lines defining each property have been determined so that each home sits in the most appropriate location in relationship to the environment and to other homes.

The community entrance will be designed to emphasize stone and an array of wild flowers and perennials high-

One of several spring fed streams to be enjoyed along the trails to be incorporated into this neighborhood





lighting a remote controlled iron gate securing the premises. This entrance, off Old Lystra Road will provide access to mail service and a central video and audio communication system connected to each home.

Within the community there are eleven ten-acre lots with a six-acre central park, three miles of running and walking trails, central security system and a design oriented toward reinforcing a community spirit.

Each home will be designed in tune with the existing landscape and sensitive to the theme of the natural environment. The neighborhood will be a seamless design. The homes will be interconnected by the central security system which will allow video and audio communication between each home as well as the walking trails and community center. The community center will consist of an Olympic size pool, tennis courts, basketball court, playing field and outdoor pavilion. Additionally, there will be a garden in which the neighborhood can participate in growing flowers and organic vegetables. A greenhouse will be at this location for propagation of wild flowers and perennials which we will periodically plant across the property. Maintenance of each yard and private grounds as well as maid service will be available through Sun Forest at a fee.

We feel that we have a great opportunity to create an ideal neighborhood complete with privacy, security, and a community atmosphere. It will be a place where you actually know all your neighbors, and at the same time do not feel crowded by them, a place where your back yard is a secured 136 acres of mature hardwoods and flowing, spring fed streams.

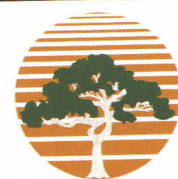




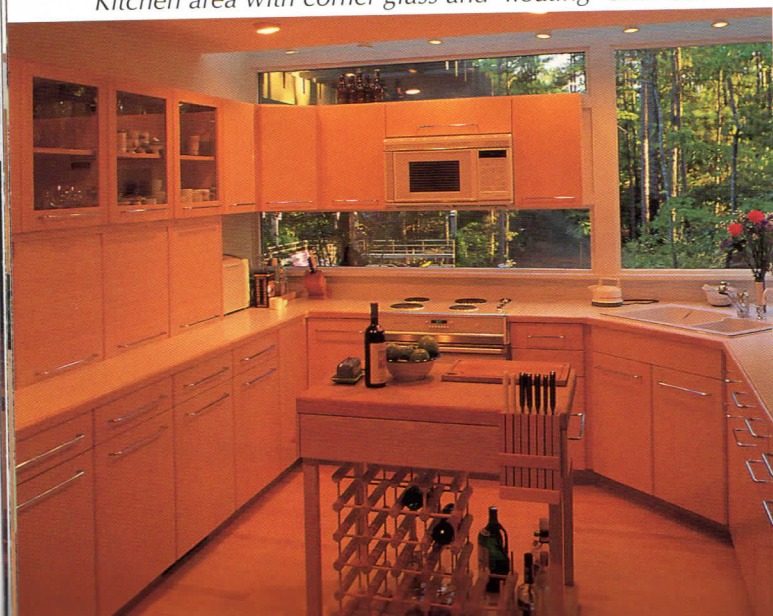
View across pool toward southern facade.

288 HIGHVIEW DRIVE THE EVOLUTION OF A CONCEPT

Photography by Keith T. Brown




Kitchen area with corner glass and "floating" cabinets.

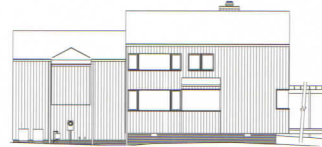


View through north trellis toward main bedroom balcony and music room patio.





This home is an example of Sun Forest's continuing effort to develop specific ideas in residential design. It was created as a speculative project having the potential to be modified for many different site conditions. It can also be changed to accommodate the differing needs of clients while maintaining the basic integrity of the design. 288 Highview Drive is just one of our "Concept Homes." Each time we begin a project based on the ideas in one of these homes, we work to refine the concepts and develop our understanding of the whole.

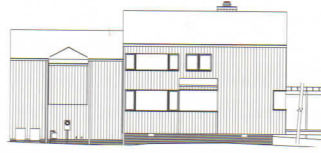


View toward fireplace shows the dining area overlooking the living area.

View from the dining area clarifies the transparent relationship between inside and outside spaces.

Hardwood, tile floors, and glass handrails accentuate the pervasive quality of materials and craftsmanship evident throughout this home. We have reached a level of quality unequalled in the area. Every detail is designed and constructed to fit precisely, eliminating the need for mouldings to cover up mis-alignments and imperfections. Large areas of fixed glass, along with operable windows create the connection between the outdoor elements of the design and the interior spaces. This integration brings a feeling of openness seldom achieved in residential design. Homes with large areas of glass are typically dismissed as too costly to heat and cool. This is only true if the mechanical systems of the home are created through the traditional "rule of thumb" method. Our homes are carefully designed, and the heating and cooling systems are engineered to provide optimum comfort for the least possible operating expense. All of our homes are available with a guaranteed maximum heating and cooling cost, which is typically far lower than comparable homes without large glass walls. This level of efficiency benefits the owner, and is consistent with our commitment to environmentally conscious design. Less cost means less energy is required, reducing the overall environmental impact of the design.





efficient house with maximized window walls, almost 5,000 square feet of high volume space and a guarantee to cost no more than \$228.00 per month to heat or cool! This system has been applied to over 800 homes in our region and no home has exceeded the guaranteed maximum cost. Most, like this one, have averaged one half of the maximum.

DESIGNING SUCCESSFUL WINDOW WALLS FOR COST EFFECTIVENESS

Windows in typical wood frame construction are formed by grouping one or more short studs (jacks) next to full length studs to form a column. The jacks support each end of a beam which spans the opening to allow the glass to exist without supporting a load from above. This typical framing method creates the appearance of a solid wall with holes punched in it. No matter how many windows you place together, you still end up with a heavy, massive feeling in which the trim around the windows is the dominant feature - not a very transparent feeling at all. We recognized this problem and set about creating a wood structural system with a lace-like, delicate structure of mullions (columns separating panes of glass) that make the roof system appear to float on glass.

Windows and window walls are typically the most costly components of a residence with respect to creating a closed, conditioned environment. Because of this budgetary aspect we took particular care to consider the alternatives available to us to keep these costs in line. After careful review of the high quality window manufacturers in the market, we discovered several important issues with respect to this type of project.

To begin with, there are a couple of reputable manufacturers who claim their facilities are fully oriented toward affordable custom windows of any shape, size or configuration. We discovered this to be untrue. Some did have a wider range of standard windows than others, but upon comparing prices we discovered a custom sized window costs significantly more than a similar sized standard window.

We also came to the full realization that these manufacturers simply created fixed glass units with the same pieces utilized to manufacture their operable units. In a more traditional home with windows designed as "punched" holes in the otherwise dominant solid skin of the house, this may be a desirable trait. However, in designing a wall whose chief goal is transparency and view, the thickness of a manufactured window glass stop and jamb trim becomes obtrusive. The chief problem here is one of scale. A typical manufactured window (operable or stationary) has approximately 3" of wood surrounding a piece of glass on all sides. Add to this a structural mullion from a 4x4, the suggested 1/2" shim space on either side, and the result is a solid mullion 10 1/2" wide!

For a glass house this was unacceptable. For budget and construction reasons a steel structure with commercial glazing systems (2" wide mullions) was unacceptable. So we had to determine a means of utilizing wood framing techniques and site built glazing systems that would achieve the desired results.

DESIGNING A WOOD STRUCTURE FOR A GLASS HOUSE

Perhaps the biggest difficulty in achieving a wood framed residence with this much glass is the problem of diagonal bracing. In a typical house either the corners or a significant portion of the walls are solid so that let-in bracing or plywood sheathing can provide the necessary stiffness to keep rectangular walls from becoming parallelograms. Though it is possible to utilize a lot of the interior walls for this purpose, most of these were also glass in this project. So we set about with careful detailing and construction to utilize the few solid interior walls for this purpose.

On the long (east-west) axis of the home we were able to utilize the quantity of column and beam connections and the available solid wall areas to develop the required stiffness. In the short direction of the home both major end walls were primarily solid, but there was a distance of 100 feet between them. We took advantage of the functional desire to separate parents, children, and public activities into independent living zones and sheathed one side of two of the interior walls with 1/2" plywood, glued and nailed to the studs. This allowed us to link the entire wall from the lowest floor up to the cathedral ceiling with a strong diaphragm provided by the plywood.

Along with determining the form of the house and the extent of window walls, we began to consider how to detail the window walls to maximize transparency. Due to the importance of the main public spaces, the central volume of the home was detailed to allow the glass units to slot into the sheetrock cathedral ceilings with the use of no glass stops. This resulted in three different conditions.

The first condition is in the living area and the south face of the light monitor where the window mullions are a kind of post and beam system. Here, the rafters were doubled-up and spaced at 4' on center to align over each of the window wall mullions. This meant there would be no load bearing over the glass itself. We utilized 3/4" tongue and groove plywood for the roof sheathing to deal with the 4' span between rafters. On the bottom of the joists we ran 2x4 purlins at 16" o.c. to yield a good backing for the 1/2" thick sheetrock ceiling finish.

The second condition is along the north, or entry side of the house. Here, it was desirable to extend the roof overhang to create an entry porch. We often utilize 2x12 rafters in cathedral ceiling areas to allow the use of 10" deep batt insulation while still maintaining the necessary air flow area above. Since our spans were well within the capabili-

ties of the 2x12 rafters, we were able to cut a slot in the bottom of each to allow the glass to slide up into the ceiling, again with no glass stop trim.

The third condition was perhaps the simplest. These are the areas where the window wall runs up and down the roof slope. When this occurred, we installed a double rafter with 1" thick spacers to allow the glass to slide up between them. This occurred on the north side of the house where we were able to utilize a typical 16" on center rafter spacing. The extension of the roof overhang in this area to form a porch along the front of the house offered a useful structural solution. By placing the beam necessary to catch the roof load out at the edge of the porch, we were able to wrap the glass line back and forth to create the desired room arrangements. This meant the columns supporting the edge beam could be at any spacing desired rather than the 4' centers imposed by the doubled rafters on the south side of the home.

With the rafters thus bearing out at the edge of the porch we were able to space the window wall mullions further apart. This served to accentuate the transparency of the glass handrail on the entry stair and to position the desired double entry doors leading into the foyer.

FORGET ABOUT ENERGY EFFICIENCY, BUDGET AND STRUCTURE - WHAT ABOUT GOOD DESIGN?

We learned long ago that single-minded energy conscious design quite often results in a reduction in the quality of life for the new homeowner. One of the key reasons is the constant glare created by south facing window walls. Architects sensitive to the fact that you can design with daylight have recognized this for centuries, and we, too, are continuing to learn the art of designing with light (both daylight and artificial light). One of the keys is the recognition that light must come from at least two distinctly different directions to create balance. This reduces glare by filling in harsh shadows from each individual light source. With experience and an eye for pleasing lighting conditions we have found this capability to be a qualitative aspect that sets our work apart from our competitors.

Our desire to integrate all aspects of design and construction into a seamless, flowing project requires a high level of concentration and a willingness to continue fine-tuning the design even as it is under construction. In the schematic design phase we recognized an opportunity afforded by the program

requirements that would also solve the issue of glare. The layout of the plan is something like a barbell. Each end is a two-story wing and the middle is a one-story connector.

The program called for all of the main public spaces, the "important rooms," to be in this connector. We felt it inappropriate for the literal and figurative center of the home to have the lowest roof. Rather, the exterior of the house should express the importance of the main entrance and interior function. We solved this issue by lifting the center of the roof to create a continuous two-sided clerestory. We refer to it as a light monitor because it is a form in itself rather than the opening between two opposing roofs. Beneath this is a bridge connecting the two wings at either end of the home. Thus, we were able to introduce daylight from above into the very center of the house to wash down and fill the shadows otherwise caused by the north and south window walls.

DETAILING THE WINDOW WALL TO MAXIMIZE TRANSPARENCY

To accentuate the transparency and feeling of inside space flowing freely into exterior areas we applied USG soffit board to all exterior soffits. With a smooth finish and painted white, this gives the appearance that the ceiling of the room continues through to the outside. In fact, under many lighting conditions, it appears that there is no glass.

In effect, as utilized in this detail, the sheetrock and its edge beads are the glass stops. This makes the application and installation of these stops very important. To begin with, the typical "J-bead" you may be familiar with does not

View from bridge toward kitchen and entry foyer.



work. The steel thickness reads quite strongly against a smooth sheetrock ceiling and defines the interface of the glass to ceiling slot in a detracting manner. Even if you apply joint compound over the bead and effectively feather it back to cover the bead thickness, the compound will crack at the bead and, once again, detract from the glass to ceiling interface.

The best solution is to use the specialty beads offered by USG. These are referred to as types 100-A and 100-B. These trims are formed with a bumped-out corner just like a corner bead, but are specifically made for covering the edge of the boards. One is shaped like an "L" and is useful for protecting the edges of sheetrock when it can be precisely cut to fit the opening. The other (much more functional one, we found) is shaped like a "J" and allows for imperfect cuts in the sheetrock.

The wood mullion systems were another area requiring a great deal of thought to integrate their many functional and aesthetic requirements. These members needed to act sometimes as structural columns, sometimes as valences to

Bridge across the formal spaces is topped by a two-sided clerestory.



hide window treatments when retracted, and even as cantilever beams to support the stacked glass corner detail used throughout the home.

Because of the structural requirements imposed upon the mullions (both vertical and horizontal) we needed 4x4 members for the framing. Over the past several years we have experimented with this system and have discovered that there is no readily available, cost effective lumber grade or species that is suitable for such a complex array of requirements. The chief problems are those of plumb and true. A 4x4 section of wood is too unstable across the course of a construction project and tends to twist and warp. The shim spaces required and the time spent shimming and squaring them up compromises the construction schedule and the aesthetic desire for a lace-like, narrow appearance.

As a result of these past difficulties we decided to set up a "mullion shop" on site. We created built-up 4x4s from a continuous piece of 1/2" plywood material sandwiched between a pair of 2x4s. We purchased the 2x4 material with a high allowance for waste, picked through the bundles to get the straightest sections, and used the rest for blocking and furring material. This makes for a very stable cross-section and offered several added advantages as well. In particular, we were able to pre-cut the plywood to allow tongues, or flanges to stick out and weave together with the doubled rafter beams on the south roof areas. This stabilized the mullion to rafter connection and returned some diagonal bracing that we had lost by creating window walls.

At the stacked, cantilevered glass corners we needed to break the vertical mullions to allow the horizontal members to cantilever beyond them. This normally makes for a very weak vertical condition that tends to kink back and forth at the broken joints. By cutting the plywood interlayer into "T" and "L" shapes we were able to successfully link and bond all the members together.

One of the greatest benefits to this system is the ability to create a plumb and true gridwork of mullions that stays that way through the course of the inclement weather inherent to construction before the framing is dried in. In this way we were able to apply our glass stops and trim directly to the built-up 4x4s. This one fact removed 50% of the overall thickness of each mullion.

Several issues that surfaced in the programming phase for this home later became an integral part of the window wall design and, in fact, the entire house. The clients desired the option of privacy from the surrounding neighborhood, but with the ability to still look out at the trees and sky. They also requested a lot of high-ceiling areas, light-filled spaces and clear finished oak wherever possible. At the same time, they desired to hide the window treatments when they were not being used.

We took this challenge as an opportunity to solve several design issues presented by their desires. One of the challenges in designing high ceiling areas is the cavernous, scaleless feeling they impose upon people. While often pleasant to walk through, or to enjoy during a stand-up party, they are generally oppressive and uncomfortable to relax in. On the other hand, the ability to look up into or down from one space to another is quite dynamic and allows a desirable communication between spaces.

The solution to these various issues was deceptively simple. First, the window walls in the main living areas were set at 10 to 12 feet high so the lower roofs could rise in gable fashion toward each other from the south and north walls until they were at a normal ceiling height near the central bridge. Then the light monitor would lift up approximately 6 feet at this point and sit off center over the bridge. By shifting the south wall of the light monitor farther down the south roof slope a clear view was introduced from the front door, up through the house to the tree tops above.

We also introduced a horizontal mullion in all window wall areas at a height equal to a typical 6' 8" tall door head. At this condition we oversized the window sill trim board to extend approximately 2 1/2" beyond the face of the mullion. By placing a 1x5 trim on the face of this extension we created a pocket to hide fully retracted horizontal and/or "Duette" type blinds. Where desired, it would also cover the operating head pieces of vertical blinds or draperies. When privacy is desired, the family can close the window treatments and block all views from the neighbors or from the street. However, since the glass continues above this trim line to the ceiling, they can still look out at the trees and sky.

In utilizing clear red oak for the offset face piece we also created a distinct horizontal line that links all windows and doors. By extending this intermediate trim accent around all the rooms we then created a distinct visual reference that offers a more intimate scale to the spaces with high ceilings. This trim accentuates the horizontal in a very powerful way and tends to draw the eye around the flowing spaces of the home.

USEFUL LESSONS LEARNED DURING CONSTRUCTION

As you may expect, a home of this unique nature and design means a lot of fine tuning and learning during the construction process. For the benefit of those that may consider utilizing some of the ideas presented here, I will elaborate on a few of the key lessons we learned.

As mentioned, we wanted to make the interface between the outside and inside disappear where the glass slots into the ceilings. To this end we discovered that it is most desirable to size and install the glass units so the black band that bonds the double glazing together is pushed up into the slot far enough that it is not visible. This presented two

problems in itself. Without sizing the glass slot in the framing too large to properly secure the glass, the glass will bind when trying to slip it up into the slot. We solved this by ripping the inside framing member 1 1/2" shorter than the rest of the rafters. This allowed us to nail on a 2x2 filler after the glazing had been installed. The other problem was created by hiding the black band inside the ceiling cavity. Since you can see through the glass to the sheetrock bead, the unfinished metal was glaringly obvious against the ultimately white sheetrock ceiling. By pre-finishing these beads to match the ceiling color prior to their installation, the transparency is maintained.

Though USG soffit board (a denser type of sheetrock specifically designed for exterior application) has a rather widespread use, we looked upon its use in our project with some trepidation. Here in the southeast coastal region the summers are very humid. We were concerned that moist conditions would harbor mold and mildew on these surfaces. It is not that the same would not occur to wood clad soffits; rather, our concern stemmed from the fact that these were to be smooth, white surfaces matching the interior ceilings.

Many projects produced from the offices of the well known architect, Fay Jones have inspired us in our work. In fact, they have done many projects utilizing the design elements mentioned here. Deciding that experience was better than theory, we called them up and asked if they could offer any guidance. It turns out that they had done a project on the coast of South Carolina several years back utilizing white painted soffit board. The humidity conditions in that area are more severe than our region, but there had been no evidence of mold or mildew problems. This gave us some peace of mind, and we pressed ahead feeling more certain that we would have a successful detail with a long life span.

From a job scheduling standpoint we found that extra pump jacks can make a big difference. We saved time by having the carpenters hang the exterior soffit board while they were up on the pump jack walkboards. Once this was done, they could trim the exterior of the window mullions which run right up to the soffit. After installing any trim in the area, they could move on to the next area and the sheetrock finishers could immediately follow behind them. Since we pre-prime all surfaces of our trim and siding, this means only one further coat of stain is applied once the siding and trim is up. By leaving the extra pump jacks and walkboards in place, the finishers could chase the carpenters and the painters could chase the finishers around the house.

This idea of "chasing" is quite common in commercial construction jobs, but is seldom possible in residential construction. The problem is really one of scale. Only so many people, tools and equipment can fit in a room or on a platform at one time. In a large home like this, however, scale becomes a benefit and each work stage does not have to wait until the other is complete before the next can begin.

As to the clear oak intermediate trim, the subtle differences in door heights between interior and exterior doors, tile floors versus hardwood or carpeted floors, and the inherent imperfection of foundation and framing work were significant challenges to a successful installation. We found a water level to be an indispensable tool during this process. In many areas the intermediate trim is uninterrupted by intersecting walls and runs above varying floor materials, interior and exterior doors, fixed glass and operable windows. This was complicated further when we found it necessary to use different door and window manufacturers. Unfortunately, short of significant modifications to many of the pre-manufactured elements, these units required differing rough opening head heights. To solve this issue we simply let the intermediate trim run at the higher level (where the majority of the rough head heights aligned) and milled 3/8" thick trim boards to cover any gaps between the door head and intermediate trim.

PROVIDING EXCEPTIONAL QUALITY AND SERVICE

Perhaps this article points out the depth of knowledge and intensity of commitment that goes along with a Sun Forest project. This is unusual in a region like the Research Triangle where such a level of skill and control over a custom designed residence is rarely achieved. In the rather

narrow niche of the high-end custom home market it takes more than good design and excellent craftsmanship to excel. As the Architect Builder we have full control over all aspects of the design and construction of our projects. As a result we can offer a lifetime warranty on the structure of the house and a ten year warranty against leaks. This puts us many steps ahead of our builder competition constructing homes from an independent architect's plans. After all, a builder will not guarantee that the architect's detail is correct. Likewise, the architect will not guarantee that the builder has constructed the detail properly.

Ultimately, clients who can afford houses of this scale and quality expect high levels of attention. To this end we have developed a low cost maintenance program. The owners of our homes can opt to have us perform a thorough spring and fall "check-up" on their residence. In this review we check all aspects of the construction, weathering and settling in of the house to determine if any warranty work needs to be performed. At the same time we provide the homeowner with a list of non-warranty items (generally cosmetic issues) they may wish to carry out. If any non-warranty work is desired, we will contract for the work, supervise it, and assure its consistent quality with the rest of the home.

Our marketing strengths and the level of quality control we achieve are a direct result of the fact that we are the architect and the builder. We have found that potential clients are very receptive to this combination. After all, aren't most people looking for someone who can provide a high qual-

View from the informal dining area toward the entry porch.



ity, carefully designed house? If something goes wrong, who wants the hassle of the architect claiming it was the builder's fault and vice versa? To deal with one company from land selection, through design, financing, construction, and actually living in the house is very appealing to the discerning client. We have discovered, however, that the typical client is confused about the benefits of engaging an architect and a builder rather than just a builder. This confusion is the result of a gradual, but significant change in the art of building that has occurred in the last 100 years.

THE DIVERGENCE OF ARCHITECTURE AND CONSTRUCTION

We suppose at one time or another all architects (and perhaps builders, too) look up the definition of the word "architect." In Webster's unabridged dictionary we find that an architect is "one skilled in the art of building; one who designs buildings, draws up plans, and generally supervises the construction." A close inspection of the architecture and construction industries of today will reveal that this definition is no longer applicable.

In our education as architectural students we were taught the importance of the Architect/Contractor/Owner relationship, each individual party performing the checks and balances necessary to keep the project in line. As Keith and I worked in the separate architecture and construction industries the significant problems with this system became increasingly clear to us.

During the last half of this century the legal and insurance communities have established precedent setting cases and liability coverage requirements that have pushed the allied building professions further and further apart. Based upon these pressures the American Institute of Architects renamed the critical "Construction Administration" phase of an architect's responsibilities to "Construction Observation." The purpose, obviously, is to reduce the architect's liability for work performed by a separate company, the general contractor. The result is a building project where the architect is fearful of offering definitive advice to further the design intent during construction due to the legal implications.

Our age of rapid change and ever increasing complexity has caused architects and builders, by necessity, to become specialists just like medical doctors. The result is a series of increasingly disparate professions, each with its own agenda, forced to work together to try and create a coherent built environment. Unfortunately, the big losers are the clients and the general public who must live and work in the resulting buildings.

THE POWERFUL TOOLS OF COMPUTERIZATION

Ironically, the rapid changes and increasing complexity that have caused the separation of design and construction have also created the means by which the necessary confluence of professions can be effected. Through the

powerful tool of computers, the time consuming processes required to design and build can be brought under control. In our own offices we realized the usefulness of computer aided drafting (CAD) and implemented this powerful process immediately. We were not so fortunate in our desire to implement computerization to run the business side of construction.

After a protracted study of the builder specific software available it became quite clear that they were all, at best, glorified accounting packages. This frustrated us greatly, for we knew that accounting was only the tip of the iceberg in running a successful construction project. Ultimately, we worked in tandem with a software developer called UFAB (an acronym for "User Friendly Application Builder") to create a seamless, integrated, builder specific software package. This product is called BUILDSOFT and it is presently one of only eight builder specific software packages recommended by the National Association of Homebuilders to its membership.

The unusual feature of this program, and what makes it perfect for the construction industry is its scheduling. All parts of the program interact and flow through the CPM (Critical Path Method) scheduler. Though a company can use it for something as mundane (yet useful) as writing checks, accounting and maintaining job cost, it really excels on the complex tasks. By pre-planning a construction project we can develop the project schedule and perform all of the materials take-offs and subcontract negotiation up front. Once the project manager has logged this information into the system the rest is automated.

With a system like BUILDSOFT each purchase order and subcontract is tied to a specific work stage in the schedule and this is linked to a daily calendar. Each day the project manager turns on the computer and pulls up the calendar to determine what materials must be ordered, which subcontracts must be sent out, what subcontractor should be notified of schedule changes, etc. By recording progression of work on the individual work stages (supplied by the site superintendent) the schedule is automatically updated and new calendar entries created to inform the builder of the need to adjust material delivery dates, e.g. The flexibility and success of this program has proven to be limited only by the imagination of the user. Through the proper use of powerful new business tools such as personal computers we were able to more clearly perceive the negative aspects of the separate architecture and construction professions.

THE RESULTS OF DISPARATE PROFESSIONS

So often architects lament a builder's lack of care in following the drawings and specifications to realize the design intent. Similarly, contractors lament unusual details or unknown conditions resulting from the architect's design. Since the goal of the architect is to provide the client with the



View of the kitchen looking toward the glass acoustical wall separating it from the children's den.

best possible design and the contractor's goal is to build the project in the shortest plausible time frame at the lowest possible cost, this is certainly understandable. These different professional goals are too often at odds with one another. We discovered that the only thing achieved for the typical construction project performed under the separate Architect/Contractor/Owner relationships is a watered down version of what could have been, at a cost higher than it should have been. This does not serve the client or the public at large very well.

We recognized that general contractors, in their more realistic understanding of the importance of cost in a client's project, created and encouraged the "design/build" concept. That the design/build approach has experienced such success as to be incorporated in government projects to "save money and time" is a strong indication of its merit and its purpose. However, this process does not promote high quality design.

THE ADVENT OF THE ARCHITECT BUILDER

There is an old adage that states, "General contractors know everything about nothing and architects know nothing about everything." This speaks to the fact that architects are trained as generalists. No other field within the allied building professions is schooled in understanding the integration of all aspects of the built environment. To us

it seems clear that the architect and general contractor should be equal in any design/build project, but as a part of a single office of professionals working together. The contractor should not hire the architect and the architect should not hire the contractor. Rather, the architect and the contractor should be one and the same company, the Architect Builder.

The term Architect Builder does not necessarily mean that one person is licensed to do both things. In fact, it seems very unlikely that any individual could successfully provide the myriad services required to design and build anything but the simplest of projects. What we advocate is the coming together of these professions in a single office where the architect and the contractor are equals working together toward the same goals.

The cross-communication between the two professions vastly improves the design and documentation process by adding much needed building and cost analysis skills at the conceptual design level. The construction process is vastly enhanced as a result of the addition of real construction administration whereby the architect takes responsibility for the realization of the design intent.

The Architect Builder provides a one point source of responsibility to the client. No longer is the client caught with a wonderful design that cannot be built within the allotted budget, or a watered down, mediocre design that

meets the budget through every cost (and quality) cutting measure available to the contractor. It seems clear that this combination offers a better service more attuned to the client's needs and ultimately to the public at large.

It can be argued that bad design and construction are a result of bad architects and builders. It can also be argued that the quality of a design and construction project is relative. If the building meets the building code requirements and the client's needs, is not too hot or cold and does not leak, then it is a good building. If it does all of this and offers something pleasant to the client that was unexpected and below the expected price, then it is a better building. If it is perceived as a wonderfully designed and executed building by nearly everyone who comes in contact with it, then it is a truly exceptional project. Because design is the art of compromise, the less you have to compromise the better the design becomes. Similarly, the fewer compromises made during the construction process the better the built project. Each compromise makes the outcome of the completed building something less than it could have or should have been.

Through the Architect Builder concept we are able to remove the otherwise uncontrollable compromise of the separate and divergent goals of the architecture and build-

ing professions. No longer does the architect have to worry if the successful bidder will be capable of properly executing the design. No longer does the contractor have to worry that the incomplete set of construction documents will compromise the rapid completion and profitability of the project. The Architect Builder will orchestrate the integration of the increasingly specialized information provided by the consultants while simultaneously analyzing the cost and construction implications. As a result, project quality, buildability, and realization will increase.

At Sun Forest, we believe we are on the cutting edge of the new generation of Architect Builders that will reinstate the cohesiveness and consistency offered by the architect of Webster's definition. We have proved it in our own office and are excited at the opportunity to spread the word to others through our built work.

The house discussed in this article is one such work. All in all it was a significant challenge from the very beginning. The results, we hope, speak for themselves. We are pleased that the high quality design and construction which is our hallmark has been successfully translated into a dynamic, unique structure which elicits much happiness from the owners.



View from the kitchen up toward the children's bedrooms and the clerestory.



SNEAK PREVIEW

By the time you read this, the house at 2207 Vintage Hill Drive in Treyburn should be completed. This home is a departure from previous Sun Forest projects in that it is classically styled and derives its form and planning from Southern plantations. It is strongly connected to past traditions of detailing and scale. This home will be featured in the next issue of AB Magazine, but **LOOK FOR YOUR INVITATION TO OUR OPEN HOUSE ON THE TEAR OUT TAB IN THIS ISSUE OF AB MAGAZINE.**



View of the main entry.

RECENT PUBLICATIONS AND EVENTS

Sun Forest Homes have continued to be recognized in a variety of publications. Sun/Coast Architect/Builder, displayed the Van Dyke's home on the front cover of the August '92 issue. We were also their feature article with a center page layout of the residence. Additionally, Custom Builder will be featuring the home built at 288 Highview Drive in their November issue cover article.

Keith T. Brown is becoming nationally recognized for the utilization of computer technology in the building business. Most recently, Keith has been invited to speak in seminars on computerization and business organization for the small to medium volume home builder at the Cus-

tom Builder Symposium in St. Louis, the National Association of Home Builders Show in Las Vegas, the South Eastern Builders Conference in Orlando and the Pacific Coast Builders Conference in San Francisco. In September Keith was invited to participate as a judge for the nation's best designs in Custom Builder Magazine's yearly design competition.

Sun forest is currently working on projects in the Governor's Club, Treyburn, and independent lots in Chapel Hill and Durham. Look for these and other projects in future issues of AB Magazine.

BUILDING A SAFE HOME ENVIRONMENT

By: Keith T. Brown

A tremendous benefit we have realized through our Architect Builder practice is the quality of the completed project. The extreme level of control we achieve means far fewer compromises are made in design and construction. Not only do we address the client's functional and aesthetic desires, but are also able to successfully meet a client's needs with respect to comfort level, noise levels, air quality, water quality, etc. One of the most critical compromises made in today's typical home construction is the unnecessary introduction of toxic building materials.

Over the past twenty to thirty years, it seems that we have been moving away from the natural environment, fast approaching the point where our built environment is foreign to our basic physical needs. In the past, few synthetic materials were used in construction, and homes were designed around the use of natural ventilation and daylighting. However, in the last several decades our built environment has been filled with synthetic products and unsympathetic electrical and mechanical equipment. At the same time, we have made our homes tighter, sealing in the fumes from these materials. There is rapidly growing evidence that the further we get away from the natural environment, the higher the incidence of irritation, stress, and environmental disease. Extended periods of exposure to toxic conditions and chemical irritants are causing physical and psychological stress, as well as chronic problems we can often confuse with our natural aging process. At Sun Forest we recognize there is a safer and more appropriate approach. Design a **Natural Environment**.

Products are often promoted as "non-toxic." Some construction may even be labeled "non-toxic." At Sun Forest, however, we consider this term a misnomer. Since each individual has varying degrees of sensitivity to chemicals, combinations of chemicals, and even natural substances, the term "non-toxic" is relative to the individual. We prefer to describe our homes as "reduced toxicity construction," utilizing products known to be as "non-toxic" as possible. If a client comes to us with known sensitivities, every effort is made to avoid the products which contain the offending elements. When each item in the building process is evaluated on this basis, the finished home will be as environmentally clean as current development allows. To assure *significantly* reduced toxicity in construction requires a high degree of control over a project. Beginning with design and specifications, then continuing through to the selection and purchase of materials and proper, controlled application, each step is critical. The slightest error can make an otherwise reduced toxicity detail become just the opposite. Because of this our details and construction techniques evolve with each project as we fine tune and perfect this process.

A good example is the installation of tile. It has become quite common to install ceramic and quarry tiles utilizing thinset epoxy grouts and resins. In the early days of our company we followed the industry standards and set floors and walls in this way. It was not long before researchers discovered that the chemicals in these products are toxic to humans. Their outgassing vapors cause depression of the immune system, drowsiness, and, for the sensitive individual, debilitating sickness. By utilizing cement based, rather than epoxy based setting beds, tile can remain a reduced toxicity finish material. Many of the mildew retardant chemical additives utilized in tile grout joints are also quite toxic. We discovered that these toxic substances can be replaced with Borax to yield a less harmful solution to the problem.

Prior to beginning the design process for a natural environment one must be aware that every aspect of the home is important. Interestingly enough, one facet of building design often left out of discussions on reduced toxicity construction is daylight. There are significant data suggesting that the quality of natural and artificial light in our homes is critical to our physical and emotional health. Daylight is sometimes used in treating depression since it stimulates our biological clocks, produces essential vitamins, increases calcium absorption, and even regulates gland and brain functions. This very important element is too often left to chance in the design of homes even though it is essential to our health.

All quality conscious designers and builders certainly feel they are providing proper natural light in their homes. There are laws describing the minimum window area required per room. This is for ventilation, however, not for lighting purposes. The design which comes from regulations such as these is generally the minimum acceptable, with little thought given to the quality and control of natural light. With proper shading devices we can allow a space that might be unbearable in the summer to be quite pleasant all year around. Walls of glass on the southern exposure can be readily controlled to allow desires for energy and daylight to be integrated while creating a space with optimal comfort. Daylighting should also be considered with respect to the activities taking place in a home. A kitchen or breakfast room can be rejuvenating in the morning if the eastern sun is allowed to enter, though a bedroom may be more pleasant with indirect morning light.

It is our feeling at Sun Forest that a safe environment begins with the choices made from the first day of planning a new home. We are dedicated to the notion that reduced toxicity is not just a buzzword to be used in selling homes, but is essential to the health of our clients. We hope that our commitment to this idea will help to move the industry as a whole in the direction of a cleaner environment.



