



The First Optimum Performance Home™ project scope part one

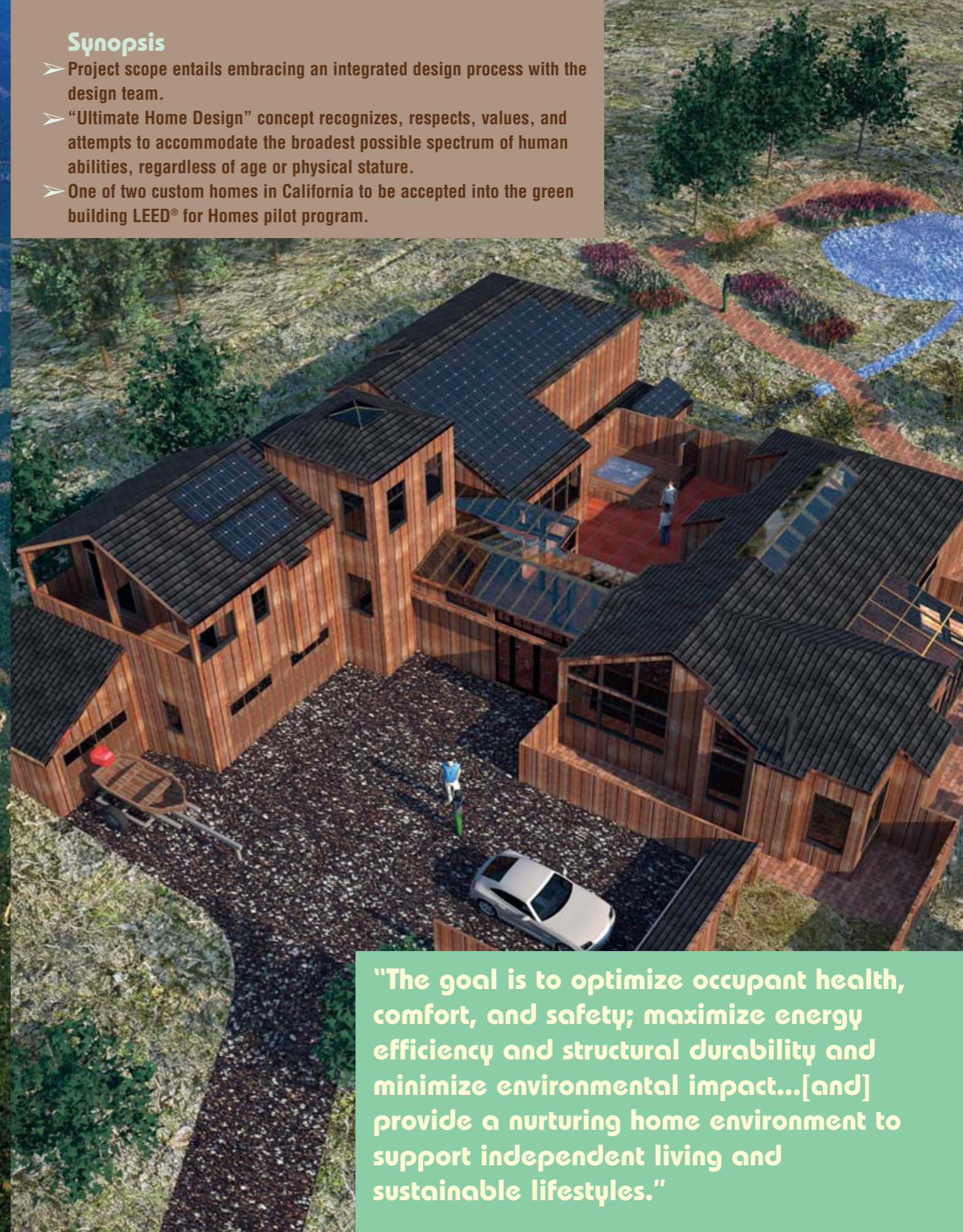
Gary Reber

Introduction

The first Optimum Performance Home™ will be built at The Sea Ranch, located in Sonoma County along the Northern California coastline of the Pacific Ocean. The showcase project is exemplary of the “Ultimate Home Design™” concept, which integrates universal design with the best sustainable building practices while exerting minimal impact on the environment. A building science systems approach to home building is the cornerstone of the project with emphasis on the relationships between the home’s components and its environment. Also paramount is good stewardship—proper regard and respect for the rights of neighboring homeowners and the surrounding natural environment. The goal is to optimize occupant health, comfort, and safety; maximize energy efficiency and structural durability; and minimize environmental impact. As well, the goal is to provide a nurturing home environment to support independent living and sustainable lifestyles.

Synopsis

- Project scope entails embracing an integrated design process with the design team.
- “Ultimate Home Design” concept recognizes, respects, values, and attempts to accommodate the broadest possible spectrum of human abilities, regardless of age or physical stature.
- One of two custom homes in California to be accepted into the green building LEED® for Homes pilot program.



“The goal is to optimize occupant health, comfort, and safety; maximize energy efficiency and structural durability and minimize environmental impact...[and] provide a nurturing home environment to support independent living and sustainable lifestyles.”



California Highway 1 coastal route to The Sea Ranch driving north. Two other routes provide access, one from the north on Highway 1 and one exiting Highway 101 and driving directly west through forest and vineyards.

The home design integrates all of the concepts advocated in *Ultimate Home Design*. I conceived the "Optimum Performance Home" and "Ultimate Home Design" concepts, and had a vested interest as this would not only be my home but my office as well. My goal was to demonstrate how today's products and building methods can make life safer, more comfortable, and more enjoyable. The science of optimum performance homes is about building structures that use less energy, are quieter and more comfortable, have fewer decay problems, provide clean air and water, and do less damage to the environment. As an integrated holistic design, the house will serve as a home for many people and serve in many phases in one's life.

Ed Rose, of Rosebud Studios in Monte Rio, California, is the implementing architectural

designer. Ed masterfully made the preliminary and final construction plan designs work within the requirements, restrictions, rules, and guidelines imposed by the Design Committee of The Sea Ranch Association.

Bill Wilson, Environmental Planning & Design, LLC in Mill Valley, California, is the environmental designer/engineer who designed the environmental aspects of the home and the site's conservative renewable water features.

Both were challenged by the scope of the home design but approached this project with enthusiasm and skillfulness.

Susan Mack of Homes For Easy Living, a Certified Aging In Place Specialist (CAPS) and occupational therapist based in Murrieta, California, provided refinements for the universal design features in the home.

I, having a university education in architecture, community planning, and economic development planning and a past consultant, provided the vision and headed the design team through every stage.

A spectacular portion of the rugged Pacific Ocean coastline at The Sea Ranch



A view of The Sea Ranch looking south with the Golf Links 18-hole golf course in the foreground.

Gary Spierings of Dimensions 4 Engineering, Inc. based in Santa Rosa, California, provided the septic system engineering. Keith Colorado of Bace Geotechnical in Santa Rosa performed the site soils analysis. Daniel Del Carle, also based in Santa Rosa, served as the structural engineer on the project.

Ronald Devesa, an architectural illustrator based in Santa Rosa, provided the architectural illustrations for the project.

The Sea Ranch Design Committee, whose Director of Design Review is Richard Whitaker, oversaw the project from the conceptual to the final construction plan stages.

An integrated design process was embraced, which involved myself, my wife Marlene, and the entire design team in discussions and decision-making from the earliest stages of the project. This dynamic approach fostered communication and innovation and encouraged productivity, creativity, efficiency, participation, and commitment from each member of the team. The project thus benefited

from a shared and consistent vision of opportunities and constraints, full systems analysis and integration, cost effective decisions, and shared information and education.

From the initial site review with Richard Whitaker, the home design and review process has taken three years. Construction is expected to begin in February 2006 and be completed by early 2007.

The home is one of two custom home projects in California to be accepted into the LEED® for Homes (Leadership In Energy & Environmental Design) pilot program. LEED for Homes is the newest green building rating program initiative of the U.S. Green Building Council (USGBC).

The Sea Ranch

The Sea Ranch is an internationally known 5,000-acre residential development situated within a pastoral coastal enclave and nature preserve about 100 miles north of San Francisco. This stunning development, now celebrating its 40th anniversary, straddles a 10-mile stretch of Highway 1 ending at the northern tip of Sonoma County and the south bank of the Gualala River.

The Sea Ranch project location is widely regarded as a unique and remarkable residential development. The development was conceived and designed by architects and landscape architects and provides a harmonious mixture of custom homes and pristine natural Northern California landscape in oceanfront, meadow, and forest environments. In fact, The Sea Ranch concept and its architecture are recognized in schools of architecture around the world. Indeed, architectural schools frequently use The Sea Ranch for case studies in environmental and architectural design. Single-family development occupies 2,500 acres with no fence delineation of property lines. The remaining 2,500 acres are permanent greenscape commons and trails for walkers, bicyclists, and equestrians. Each home is custom designed by an architect/designer following site-specific design guidelines and situated off a private road network without curbs, sidewalks, or streetlights. The Sea Ranch is a very unique residential development with a tapestry woven among buildings and nature, with a sense of environmental preservation. The development encompasses 2,289 lots for single-family custom homes, with 584 remaining to be developed (1,705 already developed). The Sea Ranch is managed by The Sea Ranch Association, a Community Interest Development, and supported with numerous volunteer committees.

The Home

The home's 3,200 square feet living space (4,500 square feet including garages, covered walkways, courtyard, and decks) will be arranged in a three-building compound using a well-sealed, well-insulated, super-tight building envelope that reduces temperature fluctuations and enhances overall energy efficiency. The home is designed with differing spatial experiences throughout to encourage exploration. The home will display innovative interior design and be furnished in a contemporary Frank Lloyd Wright style appropriate to its dimensions. The home

OPTIMUM PERFORMANCE HOME AT THE SEA RANCH, CA



SITE PLAN
SCALE: 3/32" = 1'-0"

- | | |
|---------------------------|---------------------------------|
| 1 Septic Tanks | 8 Aquatic Culture |
| 2 Building #3 | 9 Stream |
| 3 Low Woodland Understory | 10 Accessible Path |
| 4 Fern & Rock Garden | 11 Marsh Meadow Vegetated Swale |
| 5 Building #2 | 12 Building #1 |
| 6 Meadowland | 13 Water Feature |
| 7 Redwood Grove | 14 Pervious Driveway & Parking |

The site plan for the Optimum Performance Home at The Sea Ranch showing the relationship of the three-building compound to the site

design connects the indoors and the outdoors with covered walkways, a courtyard, decks, and a garden to expand livable space, without requiring heating or air-conditioning. There is abundant and excellent use of natural light and natural indigenous landscaping planned.

The main floor living area is designed to accommodate the capabilities of all occupants without any challenging physical barriers, even for the elderly and disabled. The home design features a ground-level, open plan for the living room, dining room, master bedroom suite, and spacious kitchen with solarium, exhibition cooktops, and home management system.

The second building in the compound is designed to accommodate a large state-of-the-art Optimum Performance Home Theatre™ with integrated rear-screen projection room and a home office.

The third building will include a two-car and boat garage, workshop, main level guest bathroom, and laundry room. The second level of this building will have two guest bedrooms, a bathroom, and a dedicated study/library/surround music room distinguished by a high-tower feature. To insure universal access to this floor, the design provides for a future elevator, should this be required.

The entrance and walkways that connect the three buildings and the solarium will be enclosed with insulated- and solar gain-reduced-glass. There will be a floor sink and seating area at the vestibule entrance to the home. The main entrance vestibule will serve as an oversized mudroom. The driveway, area around the garage, guest parking, and entrance to the home, as well as all paths are designed in accordance with The Sea Ranch's guidelines governing exterior hard-surfaced paths. All such surfaces are pervious to virtually eliminate water runoff. There also will be a dedicated utility room off the courtyard, which accommodates the radiant heating apparatus. The backup generator will be located behind the garage within the fenced dog run in a separate weather-resistant enclosure.

The home site is nestled on an almost-acre parcel at the edge of a forested area of The Sea Ranch overlooking the Pacific Ocean, offering distant water views. Some of the home's features will include a slate-floor center courtyard, two hardwood deck areas, in-ground hot tub, Finnish sauna, and underground wine cellar. The orientation of the home on the site is designed to take advantage of natural lighting and passive solar heating and cooling. Good site and land planning



An architectural illustration by Ronald Devesa depicting the home's shapes and spaces situated on the site

results in minimal land disturbance and preserves natural features and environments.

Landscaping will consist of The Sea Ranch-approved indigenous vegetation with low-water requirements and unique water conservation features, including two ponds and a stream supported by rainwater catchment and captured runoff. Site grading has been specifically planned to enhance the project's placement in the watershed, and the design incorporates the principles of Low Impact Development (LID) to minimize runoff from impervious surfaces and mimic the natural hydrology in overall effect. The resultant water harvesting will then minimize the use of irrigation, and the increased infiltration and retention will passively support the native landscape.

Ultimate Home Design Concept

The Sea Ranch Optimum Performance Home embraces the "Ultimate Home Design" concept, which recognizes, respects, values, and attempts to accommodate the broadest possible spectrum of human abilities, regardless of age or physical



An architectural illustration by Ronald Devesa depicting one view of the home from the road

The floor plan of the Optimum Performance Home delineating the three-building compound arrangement and covered walkways



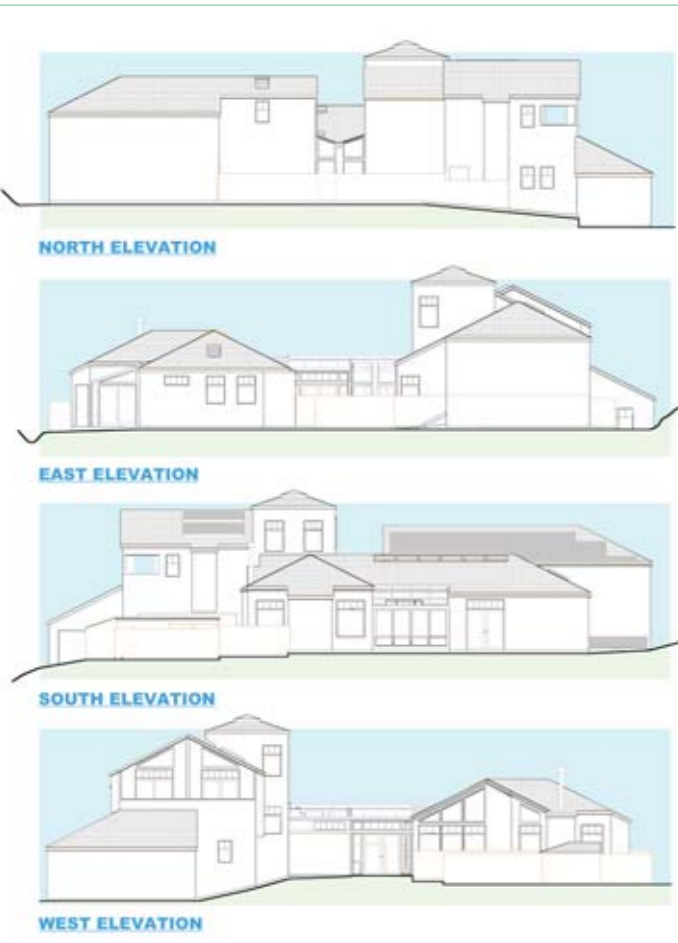
UPPER FLOORS

- | | | |
|-------------------|--------------------|-----------------------|
| 1 Garage | 11 Wine Cellar | 21 Deck |
| 2 Future Elevator | 12 Hot Tub | 22 Solarium |
| 3 Dog Run | 13 Courtyard | 23 Living Room |
| 4 Workshop | 14 Vestibule | 24 Garden |
| 5 Laundry | 15 Dining Room | 25 Guest Parking |
| 6 Vanity | 16 Kitchen | 26 Covered Deck |
| 7 Covered Walkway | 17 Utility/Storage | 27 Guest Bedroom |
| 8 Home Office | 18 Sauna | 28 Guest Bath |
| 9 Projection Room | 19 Master Bath | 29 Library/Music Room |
| 10 Home Theatre | 20 Master Suite | 30 Equipment Access |



LOWER FLOORS

OPTIMUM PERFORMANCE HOME AT THE SEA RANCH, CA
SCALE: 1/16" = 1'-0"



The elevations of the Optimum Performance Home at The Sea Ranch



Above: A perspective of the southwest view created by architectural designer Ed Rose.
Opposite Page: Four perspective views of the Optimum Performance Home at The Sea Ranch

infants to grandparents, all of whom benefit from a home that imposes fewer restrictions on daily activities and maximizes independence and safety.

The method of green building to be used in the home incorporates environmental considerations into every phase of the home building process. That means that during the design, construction and operation of the home, energy and water efficiency, lot development, resource efficient building design and materials, indoor environmental quality, material durability and homeowner maintenance, and the home's overall impact on the environment are all taken into account.

The home will feature extensive green building techniques, which include water efficiency through gray water recycling and rainwater harvesting; using renewable or recycled-content building materials; preserving natural indigenous vegetation; conserving natural resources; improving indoor air quality and reducing pollution; lighting naturally; reducing home maintenance and enhancing durability; and recycling construction and demolition waste.

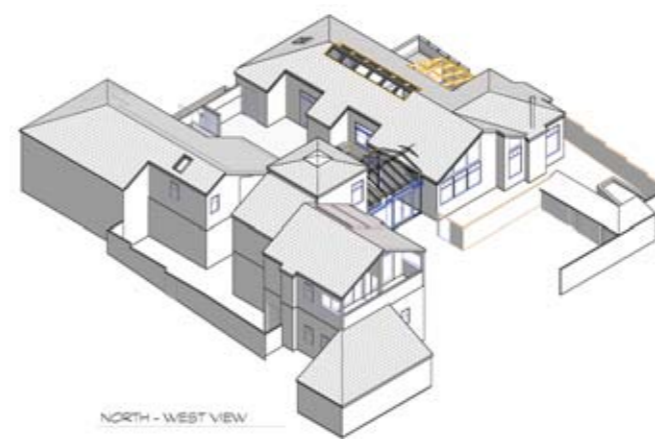
Even the heating system for the home is designed to be energy-efficient. A zoned radiant floor heating system will turn the entire first and second floors into primary, low-temperature heat sources that deliver radiant energy evenly across each room to its occupants and surrounding objects, but not the ambient air, resulting in a significantly healthier interior environment. The smoke alarm, PEX plumbing, and fire sprinkler systems will be integrated into the home's electronic control of lighting and sound to optimize inhabitant safety.

Smart Home Features

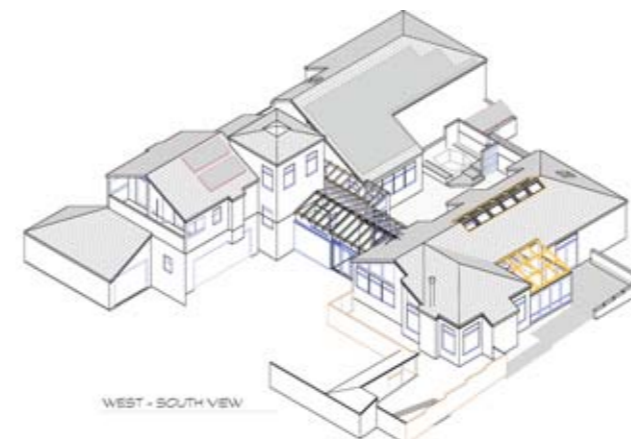
The entire home will support a live-work scenario with an infrastructure of advanced broadband hard-wired and wireless Wi-Fi and Local Area Network (LAN) systems that facilitate home networking room-to-room and out-to-the-world-at-large through the Internet. A comprehensive whole-house structured wiring system will be incorporated for distribution and control of audio, video, phones, videoconferencing,

stature, in the ergonomic design of products and environments that are easier to use and more aesthetically appealing, while optimally integrating sustainable green building practices and minimizing the overall impact on the natural environment.

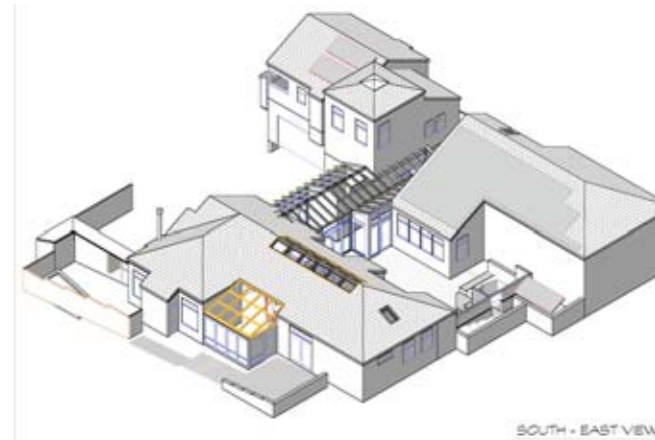
The design and integration of the home supports a more inclusive user-based design because it takes into account the abilities and needs of the widest range of people. The human-centered design expresses a more holistic view of lifespan and people's changing abilities throughout their lives. While there are two guest bedrooms and a study/library/surround music room on a second level planned, the main occupant living area—home theatre and office, master bedroom suite, laundry room, workshop, and garages—are all to be located at ground level with accessible provisions aesthetically disguised in the architecture with no step or bump barriers to inhibit maneuverability. Entering the three-building compound through the entry vestibule will be on-grade with no access barriers or steps from the outside making the home fully "visitable." This "age-friendly" home will accommodate family members at all stages of life, from



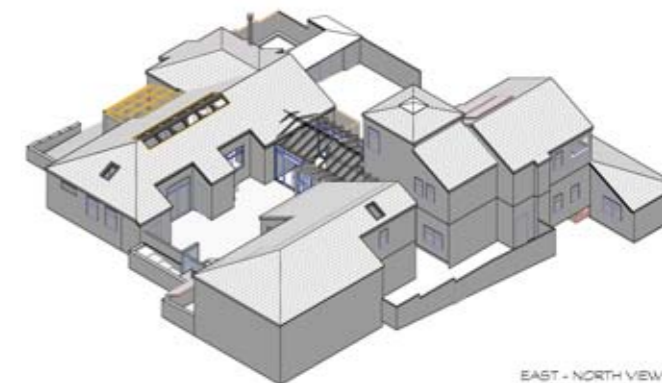
NORTH - WEST VIEW



WEST - SOUTH VIEW



SOUTH - EAST VIEW



EAST - NORTH VIEW

intercoms, and computers. Stand-alone multi-room, multi-source/multi-zone studio-quality multichannel audio and high-definition video distribution systems will be featured throughout the home, operated by zone-controlled in-wall keypads and LCD touch panels. The system will integrate with Microsoft's Windows® Media Center and is future-expandable over CAT6 using an Ethernet network. Core product areas will include multi-room/multi-source controllers, distribution amplifiers, in-ceiling/in-wall/on-wall loudspeakers, infrared distribution systems, and user interfaces. A large dedicated state-of-the-art Optimum Performance Home Theatre, video game, and surround music room will be a special feature of the home, as well as a dedicated stereo surround high-end audiophile system free-standing in the study/library/surround music room. There will also be home theatre systems in the living room, the home office, and all of the bedrooms. All wiring will be concealed in

the architecture through conduit and the use of wiring channels beneath the floors and within the wallboards. There will even be a whole-house security system that uses remote-monitored inconspicuous infrared video cameras. Other smart home features will include any-room control of all of the lights and lighting schemes, and electronic-controlled window shades and blinds.

Zero Energy Home

The home is designed as a "Zero Energy Home" (ZED) based on the Solar Buildings Program of the U.S. Department of Energy. The energy-saving home will feature a 5.7-kilowatt solar electric system with photovoltaic (PV) panels integrated into the roof. Inverters will convert the DC power into AC power. Hot water will be provided by solar collectors on the roof, boosted when needed by efficient, tankless water heaters. The home is designed to cut its energy use with

efficiency, and then meet the remaining needs with renewable energy sources. Net metering allows the electric meter to spin backward and forward, meaning that at times the home will pull (and pay for) power from the grid and at others it will produce more energy than it will need, with the excess being sold to the electric company, resulting in an annual net-zero energy cost. It is expected that the home will generate more electricity than it uses. The system also is designed to continue functioning even during blackouts.

LEED® For Homes Pilot Program

The growing interest in sustainable building design and construction, and energy efficiency and environmental conscientiousness, now in the initial stages of understanding as it relates to building performance and the environment, has seeded a number of green building rating systems

whose initial focus has been on commercial and multi-residential buildings. The goal of these systems is to reduce the impact a building has on the environment by encouraging energy-efficient, environmentally responsible choices in the design and build process.

The LEED for Homes program is an example of a rating system for single-family residential buildings with the most stringent rating criteria. LEED (Leadership In Energy & Environmental Design) is a program of the U.S. Green Building Council (USGBC), a national non-profit organization. LEED Providers are local and regional organizations that provide support services to builders of LEED Homes and verify that homes built under the Rating System meet the requirements. Based on a model pioneered by the Residential Energy Services Network (RESNET) for home energy ratings, the LEED for Homes Program Providers will play a crucial role in the delivery of the LEED for Homes Rating System. The LEED for Homes pilot program, which follows the successful LEED for New Construction (LEED-NC) program, was formally announced in mid-July 2005 with the fully-chartered program to begin in early 2007.

The Sea Ranch Optimum Performance Home is one of two custom home projects in California to be accepted into the LEED for Homes pilot program. The home fully embraces the green building practices advocated by LEED. In order for the Optimum Performance Home project to qualify, the home must meet certain performance tests. When all of the required features have been verified by a third party, a LEED for Homes rating certificate will be issued. The certificate will distinguish the home as a bona fide green home.

For more information, visit www.usgbc.org/leed/homes or e-mail leedinfo@usgbc.org.

Integrated Design

While there have been homes designed with one or two of the concepts described above, there has never been a home, that I or our design team are aware of, whose

design integrates so many leading-edge concepts and technologies. This is an integrated design that achieves a truly high-performance building and provides for safety, comfort, fire protection, security, aesthetics, buildability, environmental design, and acoustics, along with efficient energy use and resource efficiency.

The Optimum Performance Home at The Sea Ranch will be featured in *Ultimate Home Design* in a series of articles that will cover the various stages in the building process and serve the educational purposes of the magazine. It will also be featured in other magazines and media.

The following sections of this article describes the design concepts and approaches represented in the design of the home.

Summary

We hope that our Optimum Performance Home will serve as an exemplary prototype to encourage architects, designers, builders, and developers to adopt similar design principles. Such home designs as ours embrace a new dynamic philosophy of home design that meets the needs of people of all ages and all abilities while adopting building practices that promote independent living and environmental and lifestyle sustainability.

Over the course of several issues of *Ultimate Home Design*, the various construction stages with descriptions of the building materials and their application will be featured. As well, a multi-episode high-definition video documentary is in development and will be made available to our readers.

Members of our design team will have featured articles in future issues of *Ultimate Home Design* related to the Optimum Performance Home. **UHD**

The First Optimum Performance Home™

sustainable lifestyle

Synopsis

➤ **Personal requirements and needs should dictate the rooms and spaces to accommodate activities designed for sustainable and independent living.**

Introduction

The Optimum Performance Home at The Sea Ranch is designed to support and stimulate the lifestyle of Marlene and I. We are among those seniors who plan to relocate for retirement and “age-in-place” in a different area than we now live. And we are determined to age independently and successfully.

The pristine oceanside development called The Sea Ranch has been a decades-long desire for the site of our ultimate dream home. The Sea Ranch is a community of supportive neighbors and a place of exemplary Northern California natural environmental beauty, with 2,500 acres of the 5,000-acre development a permanent nature preserve (www/tsra.org). There are miles of walking trails, gardens, horse stables and riding trails; three recreational facilities with heated swimming pools, tennis courts and saunas; a community center; community garden; Golf Links, an 18-hole Scottish-link style golf course; nine separate beaches; and 10 miles of rugged coastline where the Redwoods meet the Pacific Ocean.

There are three driving routes one can take to The Sea Ranch. The coastal route is the most beautiful and spectacular. The Sea Ranch also has a private air strip for small aircraft accommodations. Furthermore, The Sea Ranch is located within not more than a couple of hours drive from the beautiful Napa Valley, Alexander Valley, and Sonoma wine producing regions. Mendocino is less than an hour’s drive north along the Pacific Ocean coastline, and Jenner, at the mouth of the Russian River, and Bodega Bay are about a half-hour to three-quarters-hour south along the coast.

Our idea has always been to build our dream home so that as we grow older the home can be adapted to fit our changing needs and allow us to remain in our home for as long as possible. The home will be electronically equipped for the delivery of healthcare services and is designed to accommodate a live-in caregiver should that be required.

As with other aging homeowners, our investment in this home will be substantially more than in our previous home in Southern California. The Sea Ranch development and community is witnessing a movement of “age-in-placers,” like us, who want to be surrounded by natural beauty yet still be engaged in a productive and sustainable lifestyle. As a result of this transition to owner-occupied, full-time residents (historically The Sea Ranch was a second home development), demand for homes with sustainable lifestyle features will increase along with social services in the community. This transformation will allow “baby boomers” in their prime to remain in their new homes, with support services such as in-home chore work and transportation services provided for hire. This also is driving The Sea Ranch planners to make it a more livable community, based on the Principles of Universal Design that promote community involvement and interaction. The Sea Ranch is one of those special communities that encourages independence and contributions of older people and allows older people to age with dignity and purpose.

Independent Living

We extensively designed our Optimum Performance Home to optimize “independent living” with a focus on a live/work environment that minimizes overburdened tasks and stress. We have designed the home to stimulate us to be as productive as possible for as long as possible. We wanted a home design that would nurture us during our old age, avoiding potential institutionalization. We expect to be mentally and physically nourished by our home and the surrounding beauty of the natural environment for the next 20 to 25 years or for the remainder of our lives. At that time the home will become our legacy and be inherited by our four children and 11 grandchildren.

Staying Productive

Marlene and I own Ultimate Home Design, Inc. and WSR Publishing, Inc., two magazine publishing businesses. As well, we are co-owners of a theme-oriented ocean cruise company, which produces week-long cruises and conferences at sea for special interest groups. I also am a writer and intend to complete several books in our residence at The Sea Ranch. And from time to time I enjoy producing and recording performing artists for concert video productions. While the physical plant and staff for our publishing businesses are located in Southern California, the home is designed with advanced high-definition video conferencing and Ethernet technologies that will allow us to manage our businesses from afar via e-mail and the Internet.

As such, our personal requirements and needs dictated having rooms and spaces to accommodate our productive activities. Our home is designed for sustainable living and to nurture our home office-based enterprises.

We like to think that our home design and approach was a smart decision. We wanted to not only provide for such lifestyle design features to optimize independent living but also incorporate healthier green

building materials and energy-saving approaches to achieve “zero-energy cost” home operation, water conservation and minimized environmental impact, as well as comprehensive electronic automation control features that enhance sustainable lifestyles. Our home is designed to be accessible and usable by people of all ages and all abilities, an important attribute with such a large extended family.

We are among the people who have benefited by the electronic age of convenience, independent thinking, and unlimited possibilities. Like others, we demand more from our home than builders are presently delivering. While there are selections of homes at The Sea Ranch that occasionally become available for purchase, none of the homes have met our requirements. Because we will increasingly spend more time at home, we wanted features such as a large home office; a large exhibition kitchen to entertain our extended family, friends, and guests; a dedicated Optimum Performance Home Theatre designed to serve as a reference room matching our reference room in Southern California for *Widescreen Review* (one of the magazines we publish); a combination study/library/surround music room; a workshop to house an extensive Lionel® Train layout (the grandchildren’s fascination and mine too); and a solarium to enjoy breakfast and reading in a glass-enclosed, sun-filled environment. We also wanted to be able to entertain on a courtyard with a hot tub, Finnish sauna, and captured rain-water-sourced showers. A dedicated garage will house a flat-bottom fishing boat for excursions on the Redwood-lined rivers that empty into the Pacific Ocean along the California coast, and on the region’s lakes. Shared with the fishing boat will be an exercise workout space. There will be two ponds to enjoy; one, a part of the living garden environment for our pet turtle, Henrietta. And a dog run for our two dogs, Ralph and Missy will also be a joy to experience. (Our two cats, Tar and Star, are indoor cats.) An underground wine cellar also was desirable

since The Sea Ranch is within an hour and a half by car of the wine regions of Sonoma, Alexander Valley, and Napa Valley. And we wanted to provide enough room for our extended family so that when the whole family gets together, everyone can be together for as long as possible.

While this home will be bigger and has more amenities than most of The Sea Ranch homes at present, it is not among the largest homes nor will it be out of place with the site and the immediate neighborhood. The design is site-specific and approved by The Sea Ranch Design Committee. The Design Committee worked with our team during the design stages to make refinements that supported The Sea Ranch design philosophy. **UD**

Introduction

“Universal Design” is otherwise referred to as “Accessible Design,” “Inclusive Design,” “Design For All,” and “Age-Friendly Design.” The idea behind universal design is to design and build homes that have no physical barriers, thus sustaining people of all ages and all capabilities in a functional, comfortable, and aesthetic lifestyle. The term, “Universal Design,” was defined in 1993 by the late architect Ron Mace as: “An approach that incorporates products, as well as building features and elements, which, to the greatest extent possible, can be used by everyone.”

Universal design is not yet the norm in home architectural and interior design. Building codes are written and homes are built with the person of average capability in mind. Countertops, handrails, cabinets, appliances, and plumbing fixtures, and just about everything else, are installed according to specifications that meet an average person’s physical stature and abilities. Thus, traditional homes are designed for people who never age or experience a disability.

Nonetheless, for readers of *Ultimate Home Design*, we recommend that you prepare early to make your homes accessible from the beginning in the design phases by embracing the concept of universal design. Doing so is logical and practical, and just common sense, but this realization often comes too late, when homeowners begin to understand the existing environment does not accommodate normal age-related physical changes or disabilities. This is because homeowners tend to have unrealistic expectations about their physical abilities as they grow older, and they underestimate the costs of growing older and do not adequately plan for their future. No one really wants to think of himself or herself as someone who would ever get old and develop a disability, which universal design was originally created to serve. But time stands still for no one.

The Americans With Disabilities Act and the Fair Housing Act have subsequently raised public awareness of how not-so-average people have trouble living and functioning in

any home. While many people will first associate universal design with serving the needs of people with disabilities, think about the elderly and the day-to-day challenges they face living and functioning in the typical home. Perhaps you are one of our elderly readers, or a son or a daughter of elderly parents; you can relate to such challenges you or your parents face daily. Think about the so-called “baby boomer” population, which consists of approximately 79 million Americans who, in 10 years, will turn 65 years old. These baby boomers are now caring for their elderly parents and are becoming well aware of some of the everyday problems that are encountered in the home. Anyone in that position can certainly relate to the sensible, practical, and functional approach to home design that can be achieved incorporating universal design features. Also realize that people are living longer than they used to, with life expectancy now at 87 years old for many people. That means there is at least 20 years of healthy and productive living awaiting a majority of our population after they reach retirement age. We need to design homes that incorporate functional live/work environments that nurture sustainable lifestyles and help people “age-in-place.”

As noted, universal design is not simply for those who may use a wheelchair, have impaired vision, or have limited use of their arms or hands. Universal design homes are “barrier-free” and provide sustainable living for anyone healthy or ill, from short to tall, young to old, small to big, and everyone in between. Universal design optimizes independent living, thus minimizing the negative impact and emotional stress that non-universal design homes otherwise neglect. Universal design homes can be enjoyed by people who are very different and those homes will be there for all inhabitants, even when their needs change. Universal design is really all about designing a supportive home environment.

The old ways of planning homes just don’t work anymore because they are limiting in their design. This is not to say that there is one home design that will be functional and comfortable for everyone, but rather that anyone can design

a smart home that will meet his or her own personal requirements and needs. These homes should look like other stylistic homes but be much easier to live in than the homes to which most of us are accustomed. We refer to such homes in *Ultimate Home Design* as Optimum Performance Homes™. These are homes that not only provide for universal design features but also incorporate sustainable green build materials, energy-efficiency build quality, ENERGY STAR® appliances, on-site power sourcing, water conservation features, and comprehensive electronic lifestyle features that add comfort, stimulate creative or productive work at home, provide for in-home health monitoring and the delivery of services, and help to achieve a “zero-energy cost” home operation.

We advocate an all-inclusive approach to home design that is holistic and optimizes human-centered sustainable living. The idea is to adopt home design features that make

a home environmentally optimized, safe, and comfortable for everyone, young or old, whether they have a disability or not. And, as well, to use innovative design techniques that offer visual appeal and increase appreciation value and the “curb appeal” for the home.

The Home’s Universal Design Features

In the Optimum Performance Home at The Sea Ranch, the following universal design features will be incorporated:

- Zero-step entries will be provided so that no one needs to use steps or stairs to enter the home, move through the home’s main rooms, navigate around the home, or enjoy the courtyard, deck, or a walk outside to the garden, ponds, and stream. Anyone will be able to get out of a car and into the home without running into any barriers. The design supports full “visitability,” with no restriction to social

interaction due to physical environmental barriers, thus allowing people of all abilities to freely interact and socialize in the home.

- The three-building compound is designed to be barrier-free with one-story living for the homeowners; only the guest bedrooms are on a second floor, and this provides for universal design features and a future elevator, if required. If needed, this second floor could provide flexible living space for a live-in caregiver.

- The set of stairs leading to the guest bedrooms, bathroom, and study/library/surround music room will feature treads 11-inches deep so that your entire foot can rest on the stair. The treads will be 36 inches wide, just wide enough to install an electric/battery-powered stairway chairlift in the future if someone needs it. Stair risers will have a height of seven inches.

- Handrails will be provided on both sides of the interior staircases—one to the second level and one in the garage—and exterior staircases down to the underground wine cellar.

The First Optimum Performance Home™

universal design

Synopsis

- Traditional homes are designed for people who never age or experience a disability.
- Universal design needs to become the norm in home architectural and interior design.
- Prepare early to make your homes accessible from the beginning in the design phases by embracing the concept of universal design.
- What universal design features to incorporate?

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- Doorways will be at least 36 inches wide to make it easier to move big things in and out of the home and to let wheelchairs pass through.

- Insulated, solar-gain-reduced glass-enclosed hallways will be eight-feet wide, and the main walkways will be five-feet wide throughout the home, allowing easy movement from room to room.

- While floor space will be quite efficient, it will be very functional and, combined with the cathedral ceilings, create a comfortable feeling of space.

- All floorings will be non-slip surfaces to help people stay on their feet.

- One gradual sloping ramp will be provided from the interior of the garage to the glass-enclosed walkway with handrails on both sides of the ramp. While wheelchair users need ramps to get in and out of buildings, ramps can also assist other people regardless of age or strength.

- Bathroom and shower spaces will be constructed with non-slip surfaces and feature architecturally and aesthetically designed 250-pound-support textured grab bars around toilets, tubs, and showers. Telephones will be placed within reach of the toilets, tubs, and showers.

- All toilet seats will be elevated 17 inches off the floor for easier seat entry/exit.

- The master bedroom suite's bathroom will feature a roomy walk-in/roll-in/curbless shower and sunken Japanese soak tub with a flat ledge where one can sit and slide over into the tub. Full-spray hand-held showering units will provide optimum flexibility and accessibility.

- Bathroom vanities will be adjustable between 34 and 36 inches off the floor with knee space beneath. A single-lever handle will control hot and cold water.

- All thresholds will be flush with the floor to make it easy for people to get through a doorway or passageway. They will also keep people from tripping and facilitate easy wheelchair maneuvering.

- The lighting design provides focused light where it is needed to help people see better as well as help people with poor vision. Floor lamps and nightlights will be positioned to direct light where it is needed. The stairway

to the second floor will function as a lighted art gallery. All outdoor walkways will be well lit using down-facing lights. All lighting can be electronically programmed to turn on automatically and according to a particular ambiance. Light switches will feature large rocker controls, which are easier to turn on and off. There will even be applications in the home that use photo luminescent materials that provide a low-level glow that can be used to mark paths and home automation controls.

- The home is designed with extensive use of robust sliding pocket doors, which disappear inside the walls. They provide more room, especially in small rooms.

- All door handles will be levers or "D" designs, and light switches and whole-house controls are designed for people with poor hand strength and poor vision. In fact, the handle and control designs are better designed than knobs or standard switches and make it easier for everyone to operate.

- Closets will feature future-proof adjustable shelves to accommodate the reach capabilities of different occupants and are thus, adaptable to changing needs.

- The bottom shelves of wall-mounted kitchen cabinets will be 48 inches from the floor to allow better reach access. That's 12 to 15 inches above the rounded corner countertops. Cabinets and cupboards will be equipped with sliding drawers to reduce the amount of or need for reaching and bending. A very large floor-to-ceiling custom lazy Susan revolving pantry will provide easy access to pantry-stored food and portable kitchen appliances. The revolving shelves will be deep and adjustable.

- Cooktops and ovens will be positioned for functionality. The controls will sit at the front of the two cooktops, and ovens will have push-button controls.

- The two ovens and the microwave oven will be mounted side-by-side with controls at no higher than 48 inches above the floor.

- Kitchen countertops with pullout cutting boards are designed so that everyone in the family, no matter what limitations they may have, has a workspace that optimally fits them.

So when everyone wants to help with dinner, grandchildren, children and guests feel comfortable assisting. Thus, most countertops will be 36 inches from the floor with a couple at 32 inches from the floor. The lower countertops will have enough knee space under the counter to pull up a chair or wheelchair.

- The button-controlled dishwasher will be raised eight inches off the floor to make loading and unloading the dishwasher easier.

- The shelves of the large side-by-side refrigerator will slide in and out, and the refrigerator will feature door-accessible water and an ice dispenser.

- The kitchen sink will be about six inches deep and adjustable between 34 and 36 inches high off the floor, with knee space under the sink. A single faucet mounted to the side will control hot and cold water with one lever handle, not knobs.

- All electrical outlets and computer terminals will be positioned on walls for better access and to make it easier for people with limited reach capability. They will be positioned between 15 and 27 inches off the floor, with some 30 to 44 inches from the floor.

- Laundry appliances will feature universal design raised comfort heights and will be front-loading for easier operation. The controls will be at the front so the washer and dryer can be used while seated. Such new machines, now available, are energy efficient and use less water.

- Kitchen appliances will be designed to optimize reach and function capability.

- All appliances will be ENERGY STAR-rated to be energy-efficient.

- The home will be extensively electronically smart to conserve energy. One of the safety features will be that smoke detectors, whether battery or electrically-powered, when triggered, selectively turn on lights to show escape routes.

This approach to design can make any home future-proof and adaptable to a family's changing needs while providing added value. It epitomizes the idea of building a home for life.

For more information on universal design, please visit the Center for Universal Design Web site at www.design.ncsu.edu/cud. **UHD**

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The First Optimum Performance Home™

electronic lifestyles

Synopsis

- Whole-house electronics and home automation control are aspects of the “digital home” and the essence of a lifestyle based on convenience, entertainment, and safety.
- Designing for smart automation controls and electronics throughout the entire home.

The Digital Home

Whole-house electronics and home automation control are aspects of the “digital home” and the essence of a lifestyle based on convenience, entertainment, and safety. Structured wiring provides the means to have smart automation control and electronics throughout the entire home.

In the Optimum Performance Home at The Sea Ranch, home entertainment products



will be extensively deployed and strategically placed throughout the home for optimum performance. Not only will there be a dedicated Optimum Performance Home Theatre, but studio-quality home theatre components will be integrated into the design of the living room, home office, master bedroom suite, guest bedrooms, and the study/library/surround music room. As the publisher of *Widescreen Review*, a premiere home theatre magazine, and a recording engineer/music video producer, experiencing movies and HDTV programming in a performance widescreen home theatre is an important requirement in my lifestyle. Not only will the home feature home theatre spaces, but it will also be wired extensively for distributed high-resolution multichannel audio and high-definition video. There will be high-end projectors, rear-screen projection monitors, direct-view professional CRT displays, and thin flat-panel video displays in different spaces in the home. Both the widescreen rear-screen projection system and the three-sided fireplace are designed to be in direct view from the living room, dining room, and kitchen. Also, a whole-house Ethernet network will be provided so that computing and outreach to the Internet is facilitated in every room of the home. This network will also feature wireless capability throughout the home, in the courtyard, and on the grounds.

The home theatre/surround music systems will be high-end standalone, in-wall, and on-the-wall installations. The in-wall and on-the-wall systems are intended for casual listening and viewing, while the dedicated systems are for a serious audiophile and videophile experience. The home theatre systems will also feature high-end video gaming capability. HDTV reception will be provided by satellite, which will be fed to every room of the home with a widescreen television monitor. A networked system will be integrated with Microsoft's Windows Media

Center and will be future-expandable over CAT6 using an Ethernet network. Core product areas will include multi-room/multi-source controllers, distribution amplifiers, in-ceiling/in-wall/on-wall loudspeakers, infrared distribution systems, and user interfaces.

The home office will be equipped with a high-definition videoconferencing system so that Marlene and I can enjoy visual contact with our staffs and our family and friends. This system will be integrated into the distributed video system in the home.

An infrastructure of advanced broadband hard-wired and wireless Wi-Fi and Local Area Network (LAN) systems will facilitate a live/work scenario with integrated home networking from room-to-room and out-to-the-world-at-large through the Internet. A separate whole-house structured wiring system will be incorporated for distribution and control of audio, video, phones, videoconferencing, intercoms, and computers.

Efficient illumination design and lighting systems will be used. Extensive lighting automation controls will be distributed throughout the home to create ambient effects and to conserve electricity. For example, occupancy sensors, which are motion activated, will operate in the vestibule and glass-covered walkways, laundry room, garages, and other spaces. Natural light-filtered fluorescent lamps, which burn cooler and last longer than incandescent bulbs and draw a quarter of the electricity, will provide a significant amount of lighting in the home. The lighting will be well-controlled so that the interior lighting does not illuminate the outside of the home, and all exterior lighting illuminates downward toward ground surfaces rather than up, allowing for a star-speckled sky.

There will be various home control technologies used in the home in addition to the Ethernet network, including Internet protocol (IP) and radio frequency spectrum (RF) networks. Various networked products, including lighting, HVAC, appliances, and security will be controlled using these technologies, and they will communicate directly. These

networks will encompass control of temperature, points of entry, garage doors, window coverings, smoke detectors, and other household devices, even home entertainment. One of the interoperability features of the home's control networks will be to selectively turn on the lights when a security alarm or smoke detector is triggered.

All wiring will be concealed in the architecture through conduit and the use of wiring channels within wallboards and beneath floors. There will even be a whole-house security system that uses remote-monitored tiny infrared video cameras, which will be inconspicuously placed. Other smart home features will include any-room control of all of the lights and lighting schemes, and electronic-controlled window shades and blinds.

A number of safety measures also will be implemented around the home, such as monitoring and communications that are user-friendly. The role of these electronic devices is to enhance the safety of people who live alone at home by monitoring their health and behavior. These include “smart phones,” now in development, which contain miniaturized computers for programming opening and locking doors, turning on or off appliances, giving audible instructions or reminders regarding medication, as well as alerting people when assistance is required. This is accomplished using a computer network and sensors that monitor changes in occupants' lifestyles, which can serve as caregivers to alleviate anxiety of family members who live far away. The same computer network, called a “digital family portrait,” can visually display the occupants' activities. The home device tracks activities by small, radio frequency tags worn by the occupants. Antennas hidden in various places in the home pick up the signals and transmit them to the computer, accessible on the Internet.

Electronically, this will be an extraordinarily equipped and featured home with lots of user-friendly technology. **UHD**

The First Optimum Performance Home™

green building

Synopsis

- “Green” building is the process of incorporating environmental considerations into every phase of home building construction, including site-specific positioning, environmental impact, use of sustainable and renewable materials, energy-efficient building techniques, water conservation, indoor environmental air quality, and self-generation of energy to effectively achieve “zero-energy net cost” operation.
- “Green” building is all about designing homes that perform better yet use fewer resources to build and operate.

Why Build “Green?”

Stories abound in the media about environmental degradation, shrinking natural resources, and evidence of global warming. While so many stories on the environment are disheartening, there is much to be encouraged about, if not inspired, as an ever-increasing number of people are tackling these issues as they relate to their own housing and living environments. In its simplest

definition, “green” building is the process of incorporating environmental considerations into every phase of home building construction, including site-specific positioning, environmental impact, use of sustainable and renewable materials, energy-efficient building techniques, water conservation, indoor environmental air quality, and self-generation of energy to effectively achieve “zero-energy net cost” operation. Green building is all about designing homes that perform better yet use fewer resources to build and operate. Compared to a traditional home, a green-designed home is more durable, more comfortable, less expensive to operate and maintain, and a healthier place to live.

Known as “green building” or “sustainable building,” the awareness and the movement to spread this awareness began in the 1960s. Then, as is largely the case now, custom builders have been at the forefront, building homes that use greener building practices and products. Measures have ranged from the obvious desire to site and orientate a home to harvest light and warmth from the sun, to more technical and sophisticated systems, such as geothermal heating, and power from the sun and wind.

As a magazine that encourages green building practices, it is becoming increasingly evident that some form of application of these principles can be readily incorporated into any mainstream building practice, resulting in a more energy-efficient home due to reduced energy consumption and lower operational costs. We advocate creating low-energy, low-impact, non-toxic homes that are, above all, comfortable and aesthetically pleasing.

While most people buy homes to live in for five years, there is demonstrable benefit across the board, in terms of marketability, cost-savings, reduced energy consumption, and healthier, non-toxic environments, to build green and keep your home longer. This also adds value to a home's appreciation.

No doubt, architects, designers, developers, and builders are increasingly becoming more astute in the vocabulary of green building, which is stimulating new green



homebuyers on quality, comfort, energy, accessibility, and health in housing. There are no national or regional guidelines that describe what comprise environmentally optimum performance home systems. This lack of standards puts homebuyers in the position of not knowing what to look for and reduces builder trust of new approaches. Green homes can look like any typical home and thus are hard to spot from the road.

True green builders can be even harder to find. Plus, there aren't

build home designs that incorporate sustainable and renewable materials, efficient energy use, and clean (non-fossil fuel derived) energy production. But what will really drive this movement and redirect most American's short-term attitude toward their homes, is homeowner education—the prime mission of *Ultimate Home Design*.

Getting there will not be easy. Our society has a propensity for not carefully digesting information that is more involved than a few simple sentences. We intend to provide synopses of articles that are written in-depth with the idea that they will inspire our readers to delve deeper into the subjects covered in *Ultimate Home Design*.

Our advertisers also do a good job of stimulating our readers to inquire further as to their options as homeowners who want to better their living conditions and standards.

As a deeper green environmental movement becomes stronger, subdivision builders are beginning to include more environmentally friendly features that their informed homebuyers are asking for. As a magazine, our mission is to better educate

presently many green homes out there, especially homes designed to integrate all of the concepts advocated in *Ultimate Home Design*, although a sort of "critical mass" is certainly being reached. The numbers are growing, as the building industry is now prone to develop and sell green products that are more viable. Furthermore, certification programs such as the new LEED for Homes rating program will offer home buyers guidance in creating demand for homes that feature systems-oriented and holistic architecture.

We all need a roadmap, and it is our sincere hope that *Ultimate Home Design* can help provide one. Look to future issues of the magazine for an indepth dissection of the design approach and the building elements that are employed in bringing to life the Optimum Performance Home at The Sea Ranch, an exemplary green build home designed for lifespan living. **UD**

The Author

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