



# The First Optimum Performance Home™

site planning part III

Gary Reber

## synopsis

- At the core of The Sea Ranch concept is a set of guidelines for development with a strong sensitivity to environmental stewardship.
- The intent is to reduce the environmental impacts and harm to natural systems, enhance environments and human health, and avoid, minimize, and mitigate the adverse effects of modern construction practices.
- The Optimum Performance Home is designed to be a building that touches the earth lightly during both construction and day-to-day operations once built, respecting the beauty and diversity of the natural setting.

## Introduction

This is the third article in the series documenting the design and construction of the first Optimum Performance Home™. The project has been selected by the U.S. Green Building Council (USGBC) for inclusion in the national Leadership In Energy & Environmental Design (LEED®) for Homes pilot program, their new green build certification initiative. The hme will achieve LEED platinum-level certification.

The 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 age-friendly universal design with the best sustainable building practices while exerting minimal impact on the environment. Universal design is the inclusive, non-discriminatory design of products, buildings, environments, and urban infrastructure, as well as information technologies that are accessible to and useable by (almost) all. With respect to home design, the idea 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.

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 the envelope they create. Also paramount is good stewardship—proper regard and respect for the rights of neighboring homeowners, resource efficiency, and the surrounding natural setting. The goal is to optimize occupant health, comfort, and safety; maximize energy efficiency and structural durability; and minimize environmental impact. In addition, the aim is toward providing a nurturing home environment to support independent living and sustainable lifestyles.

Part I of this case study series appeared in Issue 1, January/February 2006. The introductory article extended to 16 pages and covered extensively the project scope. Part II appeared in the March/April issue and focused on site planning and preparation. Part III expands on the approach to Low-Impact Development (LID) for the site.

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

"A frequent observation in the environmental design community is that codes and established methods often present barriers and restrictions on projects that are attempting to be more resource efficient or accommodate a better environmental 'fit.'"



The Sea Ranch  
Sonoma County, California

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 problems with materials degradation, 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.

## A Case Study

The approach I am taking with this series of articles on designing and building the Optimum Performance Home at The Sea Ranch is to present a case study, which details every



## Site-Specific Design And Low-Impact Development

Gary Reber & Bill Wilson

At the core of The Sea Ranch concept is a set of guidelines for development with a strong sensitivity to environmental stewardship. These guidelines, which were thought out and incorporated into The Sea Ranch Declaration of Restrictions, Covenants and Conditions (CC&Rs), embody the principles that development of home sites are to embrace. These principles are expressed as design criteria and rules interpreted by three (six, including alternates) Design Committee members appointed by the property owner-elected Board of Directors of The Sea Ranch Association, a Common Interest Development.

Over the years, the implementation of the guidelines, which are, for the most part, subjectively interpreted, has resulted in greater demands on recent projects and their owners who have endeavored to design and build their dream homes under the same rules that applied to other property owners who engaged in the design process before them. As with any "planned" development, especially one sensitive to environmental impact, one should expect refinements to the subjectively interpretive design guidelines and rules over time, while adhering to the founding principles expressed in the CC&Rs. The impact is that property owners in the design process are subject to new interpretations, rules, and limitations that were not imposed on homeowners who bought property and made plans under earlier interpretations of the guidelines, particularly now that the development is in the build-out and "infill" stage. As well, precedents may be applied differently than in the past. The Optimum Performance Home project could be argued to be a microcosm of the design and building chal-

lenges facing participants as the development approaches build-out.

During the last few years, new thinking about the use of sustainable and renewable materials and building science approaches and techniques, and on-site energy generation, have been taking hold on a national level. This new thinking is the future of environmentally-responsible housing development, aimed at better stewardship of Mother Earth. The Sea Ranch planners and designers are faced with this new reality, which is challenging them to expand their thinking and application of the long-standing guidelines, which were envisioned to protect The Sea Ranch concept from degradation of the natural environment and the perceived blight of typical subdivision development, done without regard to good site-specific design.

When one purchases a lot at The Sea Ranch, one must assume, as does the community, that responsible property owners will respect and adhere to the philosophy and requirements of the Design Manual and Rules, as well as The Sea Ranch CC&Rs, which read:

"It must be assumed that all owners of property within The Sea Ranch, by virtue of their purchase of such property, are motivated by the character of the natural environment in which their property is located, and accept, for and among themselves, the principle that the development and use of The Sea Ranch must preserve that character for its present and future enjoyment by other owners.

"It is also assumed that those who are entrusted with the administration of The Sea Ranch will discharge their trust in full-recognition of that principle and, to the extent consistent therewith, will foster maximum individual flexibility and freedom of individual expression."

It has always been the intent in designing the Optimum Performance Home at The Sea Ranch to respect and adhere to the philosophy and

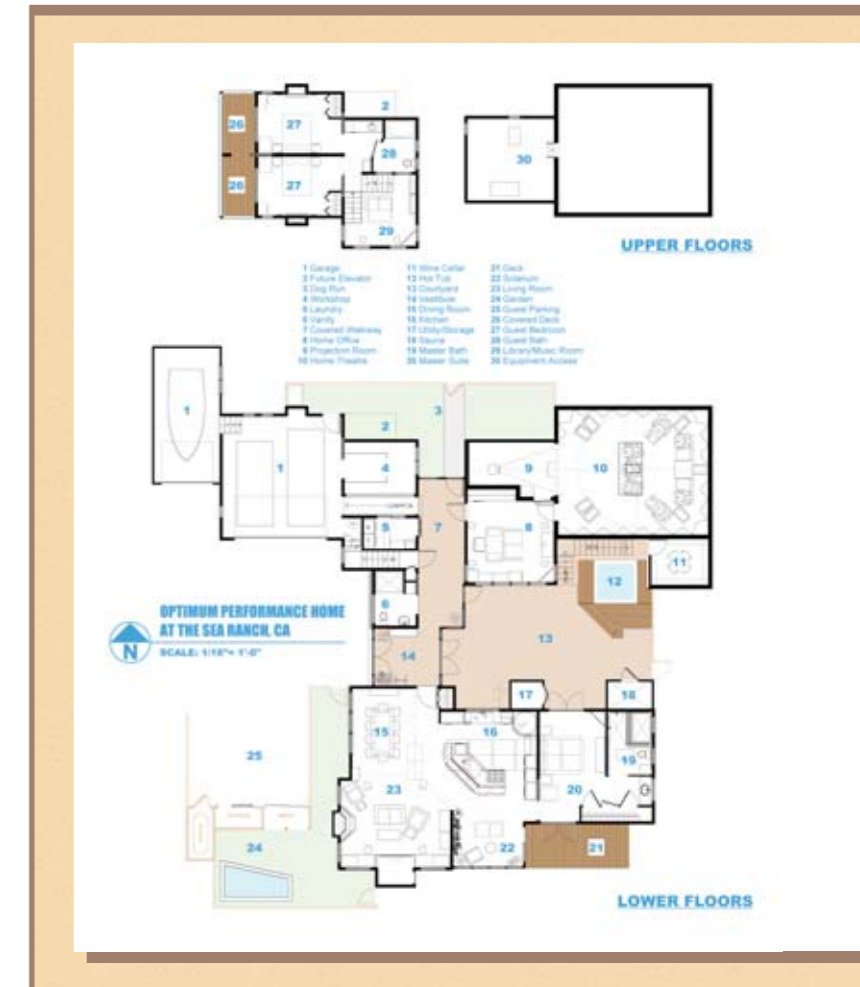
requirements of these documents in terms of natural settings, simplicity and modesty of development, and sustaining the predominance of nature.

With respect to the preservation of the character of the natural environment, the guiding principles in the environmental design and site preparation and development has been to employ resource-efficient sustainable design and development practices. The intent has been to reduce the environmental impacts and harm to natural systems, enhance environments and human health, and avoid, minimize, and mitigate the adverse effects of modern construction practices.

Just as the Low-Impact Development (LID) design features seek to foster a healthier watershed

and, hydrologically speaking, approach "zero impact," so is the intent to improve the energy performance of the proposed home in such a manner that it effectively will be nearly a net "zero-energy home." To accomplish these twin goals, site design includes saving indigenous trees and unique natural vegetation, constructing on-site storm water retention/infiltration features to integrate with the natural hydrology, orienting buildings to optimize solar resources, use of active renewable energy systems, optimizing passive solar design, and making water and energy conservation choices in fixtures and appliances.

The Optimum Performance Home is designed to be a building that touches the earth lightly during both construction



phase in the design and building of this platinum LEED home project.

For our readers who have not personally experienced such a process, we believe that this serialized documentation will be enlightening and beneficial to approaching your own home design and building project (see "The Architect's Role As Designer And Implementer" in Issue 2, March/April, 2006 and "So You Want A LEED® Home" in this issue).

Of course, this is our experience and not all aspects of our approach will apply to your project. Nonetheless, there will be aspects of our approach that will be educational and useful. I hope that, as a result, you will be rewarded with a better appreciation of the extent of commitment necessary to successfully design and build a new home with as much respect for the natural environment as this project demonstrates.

A frequent observation in the environmental design community is that codes and established methods often

present barriers and restrictions on projects that are attempting to be more resource efficient or accommodate a better environmental "fit." And while this particular project must comply with a distinct set of guidelines and rules and pass before a design review committee, most green building projects will have a similar experience in adjusting to codes and going before planning commissions. In addition, members of planning commissions and design committees are frequently architects or design professionals themselves, and may have strong opinions about how a project should look or what the standard of practice should be.

Please understand that this is a real-life, real-time project, and, to date, we have yet to break ground and lay the foundations. Therefore, expect that some issues of *Ultimate Home Design* will have more coverage of this project than others, depending on the construction stage we are in at any given time over the course of the next year.

and day-to-day operations once built, respecting the beauty and diversity of the natural setting.

These measures are at the center of designing and constructing green homes that satisfy the human physical and psychological need for contact with nature. At the core of the architectural design of the Optimum Performance Home is a built habitat that is full of daylight, sunlight, natural fresh air ventilation, outdoor views, and indoor and outdoor green spaces—a habitat that achieves a harmonious relationship between its occupants and the natural environment.

(Please see Julie Stewart-Pollack's introductory article in this issue on biophilic design to achieve direct, indirect, or symbolic contact between people and nature in the built environment. Biophilia is the idea that people possess an inherent affinity for nature, and when applied to the built environment, it enhances people's physical and mental well-being through positive connections to the natural environment.)

### Environmental Plan Options

Our approach, in essence, strives to adapt the planned development to the background hydrology at the site, the regional hydrology that affects the site, and the site's position in the overall watershed. (See Bill Wilson's article in this issue entitled, "Watershed Planning & Low-Impact Development: The Challenge Of 'Fitting-In.'") The ultimate goal in utilizing this approach is to balance necessarily impervious surfaces such as building roof area with enhanced infiltration and storage of rainfall and runoff, eliminate unnecessarily impervious areas like driveways and walkways and replace them with pervious paving, maintain high water quality, enhance infiltration and groundwater recharge, enhance interflow, and maintain the incremental contribution over time to the base flow of regional streams.

Another aspect of the type of watershed planning that is expressed in the overall proposal for the Optimum Performance Home at The Sea Ranch is that the various components of water use are not looked at separately, as is the common practice, but are analyzed and coordinated in an integrated manner. This integrated analysis includes uses of piped or potable water in the household, uses of water in the landscape, water conservation, wastewater, possibilities for water harvesting or recycling, enhancement of site and regional hydrology and habitat, and beneficial management of storm water and runoff using LID methods that seek to mimic natural hydrology.

Thus, the selection of water-saving fixtures in the home will greatly reduce the amount of potable water consumed, which will reduce the amount of wastewater produced. The wastewater in turn will be intermittently dosed to The Sea Ranch-approved off-site leach field on designated commons over the entire 24-hour day rather than in large batches, as is usually done. These small micro-doses will allow the soils in the leach field to dissipate the effluent evenly and by capillary action, and enhance the ability of soil organisms to polish the effluent, and for soil porosity to recover and maintain aerobic conditions. This intermittent dosing method also makes more effluent available for uptake in the root zone and by surrounding trees and plants.

A cistern is planned to retain roof runoff from interior roof areas, and these will be guttered. On other eaves, Rainhandler® grids are planned to shatter and re-suspend roof runoff, spraying it to the adjacent mulched landscape areas to facilitate infiltration. All impervious roof surface areas that produce runoff are mitigated. The entire landscape is planned as a permaculture system, with mulch covering all surface areas, and all levels utilized by native plants, including the ground covers,

and the understory, middle story, and tree canopy.

Because of the unique hydrology of the site, it is anticipated that the background moisture and retention methods inherent to the permaculture system will support a higher order of landscape over longer periods between rainy seasons, with minimal supplemental irrigation. This landscape will, in turn, interact with the LID elements necessitated by the seepage and shallow groundwater to produce greater habitat value, lush perimeter screens, and provide a sort of botanic refugium for a number of native bulbs and plants that are much rarer in the thick forest and dry meadows generally found at The Sea Ranch. Thus, the landscape plan aims to effectively limit water and energy demand while preserving and enhancing the natural environment.

In summation, an LID plan seeks to distribute runoff at every opportunity, as close to the source of the runoff as possible. In contrast, conventional drainage planning generally collects runoff from different sources and discharges it off-site through a pipe, or more recently with some sort of accommodation being made to water quality and detention requirements, such as a detention basin or infiltration trench.

Since LID is a distinct departure from the conventional drainage plans that have previously been implemented on The Sea Ranch, in which runoff is directed to the drainage in more direct ways, and because of the unique hydrology of the subject parcel, the proposed LID environmental plan requires consideration and study to form an impression of how the integrated systems will work and to better understand the project in context. It is admittedly difficult to derive this kind of information piecemeal from a set of finely-scaled drawings. In appreciation of this, the following will attempt to clarify the elements of the environmental plan that were presented to the Design

Committee during the current Final Construction Plan submittal stage. The current status of the project is Preliminary Plan approval with conditions for Final Construction Plan approval. Following a final plan submittal, the Committee issued a letter dated February 2, 2006, which contained issues that the Committee wanted us to address. What follows is our response to their issues.

### Screening And Reduction Of Apparent Building Mass

Two mitigating elements were requirements of the Design Committee in the Preliminary Plan approval stage: a) "the visual screening of the development provided by both existing and proposed on-site vegetation," and b) "the reduction of building mass provided by 'digging' the structure into the grade at the east side of the lot."

It should be noted that the site was originally host to a dense overstory of mature pines, which had become blighted and damaged. Many of them blew down two years ago, and the property was designated a windthrow area, with a special directive to remove damaged and hazardous trees and to not replace them with inappropriate species in future plantings.

The other major constraint has been the generally wet condition of the site, which is subject to sheet flow from adjacent properties as well as having groundwater moving across the bedrock, only five or six feet below the surface. To deal with this, a curtain drain or French drain was designed that would, along with a very gentle reshaping of the topography, intercept the sheet flow and groundwater and direct it around the building pad.

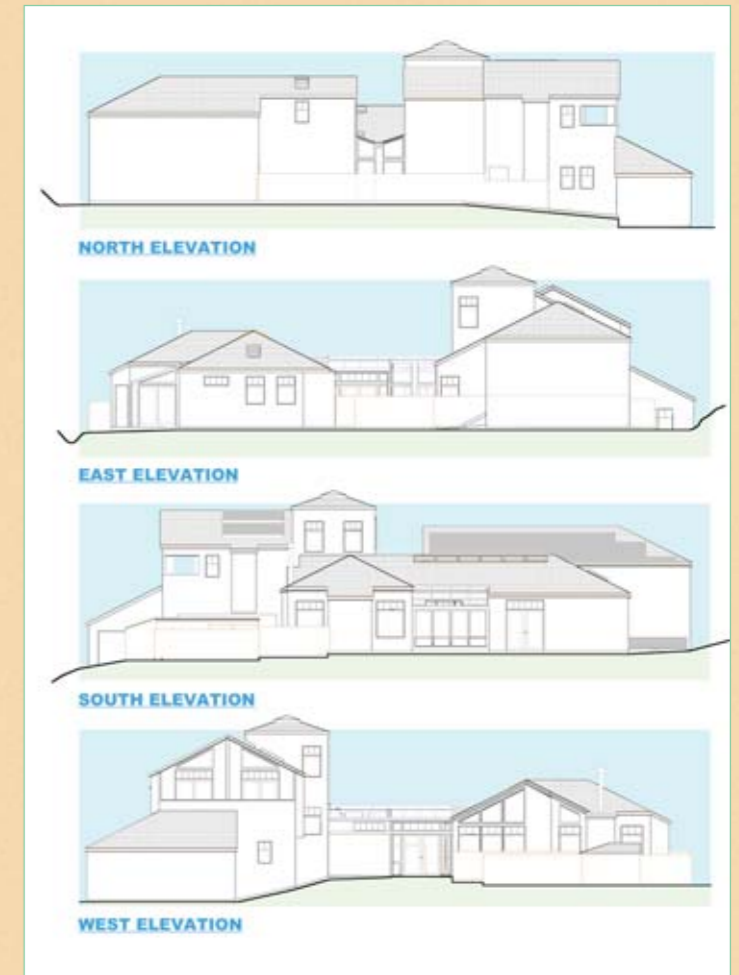
Once the water reaches the front of the building, Infiltration chambers were designated for shallow burial across the front of the property, in an open area between the house and the

frontage trees and shrubs. This band of Infiltration chambers would provide an optimized way for excess water to be re-integrated with the groundwater and the natural gradient, and actually correct a pre-existing problem that contributed to the downing of several large pines and the nearly continuous saturation of parts of the surrounding area and frontage.

Unfortunately, the use of the Infiltration chambers and their location relative to the remaining understory tree screen across the frontage was not clearly understood at our Final Construction Plan submittal, leading to the following exchange:

### a) Frontage screening and operation of the Infiltration chambers

The Design Committee recognizes "that due to both forces of nature and safety management efforts" that we conducted following the designation of the lot as included in the Windthrow Hazard Area, "a significant amount of the on-site vegetation has been removed, leaving the site exposed to view from the road. Though an extensive replanting plan is proposed as required by the Committee, the location of the proposed Infiltration chambers along the road-front property line (the entire width of the parcel) jeopardizes the remaining existing trees and the



The elevations of the Optimum Performance Home at The Sea Ranch



feasibility of the replanting proposal, and thus their screening capabilities. It is also noted that there is no provision of a specific planting plan where individual plant specimens are located, identified by species and size, and provided with deer screens and drip-irrigation system to promote survival. It is critical that the site be reforested per the Roberts revegetation plan to ensure that the bulk and scale of this home be screened as originally intended." The reference to the Roberts revegetation plan is a reference to the Design Committee-adopted Vegetation Management Plan. For a complete look at this document, please see The Sea Ranch Web site at [www.tsra.org](http://www.tsra.org).

The reference to "the site exposed to view from the road" relates to a portion of the road when driving north, and this observation actually involves adjacent private properties butting up to the site that are also included in the Windthrow Hazard Area, with a significant amount of the on-site vegetation removed.

In response, the Design Team pointed out that the band of Infiltration chambers that is planned across the property frontage is part of the integrated system designed to balance the perched shallow groundwater, seepage, and sheet flow that move across the property from the neighboring south and east properties. The purpose of the Infiltration chambers is to work in concert with the French drain that will intercept groundwater behind the house and return it to the groundwater in front of the house.

The shallow French drain that has been designed for the cut house pad immediately behind the house is the least disruptive method for intercepting the groundwater, seepage, and sheet flow that cross the property from the adjacent properties. The other option is to construct a curtain drain from grade to at least one foot in depth into the bedding formation, which is generally

about six feet below grade across the site. This would result in a trench approximately eight-feet deep across the site during installation, with appropriately sloped sides—a considerable excavation.

This brought up the issue of an earlier rendition of the home design (depicted on the approved Preliminary Plan) that showed it as earth-banked to set it deeper into the ground and reduce the apparent bulk in the now-deforested landscape. The drawings submitted for final approval changed the earth-banked option to one that included a cut pad at the same elevation and depth into the ground as the earlier version, but instead sloped the ground away from the foundation in the rear portions of the home that were below native grade.

The reasons for selection of the sloped grade adaptation behind the house pad cut, instead of the earth-banked design originally contemplated, were as follows: Our desire was to minimize slope disturbance, as well as to minimize soil disturbance and erosion, and to better protect the building materials from the hydrostatic pressure and potential long-term damage due to the constant moisture. Part of the decision included a determination that construction of the deep curtain drain would, in balance, be just as disruptive as the extension of the house pad cut by a few additional feet, and would result in a less reliable method of protecting the home and building materials from the continuous presence of groundwater and seepage. This was arrived at based on the geology and soils report provided by Keith Colorado, EIT, a project engineer with BACE Geotechnical, based in Santa Rosa, California.

In addition, with either option, the pad cut would have to be cut back as shown regardless of whether or not the ultimate construction would be earth-banked in order to construct the foundation, and then backfilled with engineered fill.

The Infiltration chambers are to be carefully installed and set back toward the house from major tree roots and the existing screen of trees and plants that currently exists at the site. The trench bottom is to be shot dead level (with a transit), so that any excess water that is introduced to the Infiltration strip will redistribute evenly across the site, and infiltrate back to groundwater, which is perched across the site at approximately five-feet below grade at the boundary of the overburden and bedding formations. The trench bottom for this Infiltration strip will be approximately 2.5- to 3.5-feet below grade.

The Design Committee correctly noted that the subject property is a windthrow property and has been heavily impacted by the maturation and subsequent collapse of the inappropriate tree cover that was originally planted by the developer of The Sea Ranch, several decades earlier. Removal of these large naturally damaged and diseased or fallen pines has opened up the site considerably. However, there is still a screen of understory trees and shrubs along the frontage, and the landscaping plan includes preserving and building upon this base and developing similar screens along the southern, eastern, and northern property lines. The native understory trees, shrubs, and ferns that remain will form the basis of the palette for development of the side screens, augmented in particular by native rhododendrons and dogwoods, which are generally available from nurseries in larger sizes.

The Design Committee expressed concern that the installation of the Infiltration chambers somehow will be deleterious to the remaining screening shrubs and conflict with the establishment of the landscaping plantings. To the contrary, the Infiltrators are to be installed between the frontage screen and the residence, outside the drip line of any trees, and without damage to



Current view of site looking south from road with tree screening in place



Current view of site looking north from road into interior of site after tree clearing due to windthrow conditions

any supporting root laterals. As with all aspects of this project, a great deal of care and attention will be placed in the construction of the home. The intent and design of the Infiltration chambers is to preserve the native hydrology and enhance groundwater recharge, and this will prove beneficial to the landscape, existing or planted, rather than detrimental.

The Vegetation Management Plan (the Roberts vegetation plan), for management of windthrow properties, has been closely studied and adhered to in the careful environmental design of this site. The Vegetation Management Plan clearly supports the use of understory trees, such as willows and wax myrtles, in the manner in which the site's environmental plan intends to establish them, as well as the selection of redwoods for the rear of the property to the east. (See Vegetation Management Plan blowup of the subject lot with a legend indicating the types of vegetation permissible.)

In addition, the Vegetation Management Plan recommends against such screening trees on wetter properties, and the interception of cross-site sheet flow and seepage will actually help to preserve the remaining frontage vegetation, which is subject to

extended periods of soil saturation. The integrated system for handling this cross-site water, including the Infiltrator chambers, will eliminate the present condition, in which sheet flow overflows and onto the street along the entire Fly Cloud Road frontage, along which the site is located. This sheet flow begins on the property to the south of the subject site, and is present for much of the year, creating saturated soils around the entire existing screen of trees and shrubs.

The existing frontage plantings consist of a mix of Douglas firs, madrones, myrtles, laurels, and ferns, with some pines (targeted for removal) remaining in the overstory. As expressed in the landscape plan, the frontage screening is to be enhanced by infilling this remnant screen with dogwoods, maples, rhododendrons, and azaleas, and a lush understory of ferns and native irises. Except for the driveway entry, the goal is to completely screen the home to well above eye level. Additional screenings are designed for the areas between the Infiltration chambers and the house, creating multiple layers and a very effective visual masking of the home itself.

The landscaping is expected to require only spot irrigation during the

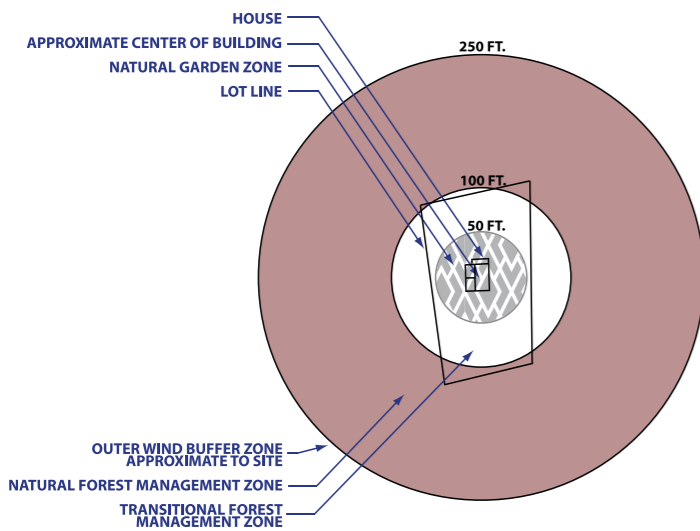
late summer and during the hot period, usually occurring in the fall for the first two years, and then be self-sufficient.

#### **b) The building pad and rear exposure**

A level "pad" is to be created below the building footprint as part of the age-friendly universal design requirements for the residence, regardless of whether the walls of the home are exposed or earth-banked. Instead of the Preliminary Plan proposal showing an earth-banked building edge, the Design Committee correctly pointed out that the Final Construction Plan shows "a cut bank at the uphill side...pulled away from the edge of the building and steeply sloped (or terraced) back up to meet natural grade." The Committee noted that "this excessive proposed grading" had not been presented to the Committee on earlier submittals approved by the Committee, and that "this approach is in strong contrast to the site development philosophy at The Sea Ranch as described in Section 7.1 of The Sea Ranch Design Manual and Rules," which reads:

"Since it is expected that the design of the house will be tailored to the site, not the site to the house, excessive lot grading is discouraged and usually not allowed." And: "Appropriate grading will

## REVEGETATION ZONE DIAGRAM



minimize site disturbance, retain the maximum amount of undisturbed topsoil, avoid major excavation, avoid significant engineered cut or fill slopes, and avoid creation of depressed floor areas or low areas of poor drainage that will negatively impact existing vegetation, impede growth of new plantings, or create future drainage problems.”

As noted previously and here again stressed, it has always been the intent in designing the Optimum Performance Home to respect and adhere to the philosophy and requirements of this document, as well as The Sea Ranch CC&Rs.

Please know that during the design process, the Design Team and the Rebers have been viscerally committed to the philosophical underpinnings as well as the practical and regulatory aspects of The Sea Ranch CC&Rs and all design guidelines. The design of the building pad was undertaken specifically to “build to the site,” to not involve excessive grading or excavation, and to not involve engineered slopes or excessive fill. This includes the following elements of the plan:

- The design plan is to preserve native topsoil and hold any graded topsoil aside for replenishment of areas that have been damaged by the tree removal activities and any areas exposed during construction. Just the tree removal has resulted in an almost completely disturbed site, and the plan anticipates mixing cut soil with mulch, spreading it in a thin layer, and re-establishing regenerative topsoil.

- The entire water handling system is designed to alleviate existing problems at the site, which were to some degree responsible for the downing of major trees and are even currently impacting the paving materials of Fly Cloud Road.

- The drainage plan is designed to positively impact existing vegetation and foster beneficial growth in new plantings by removing excess saturation,

while preserving ambient soil moisture and healthy topsoil conditions.

- The drainage system is designed to deal with the existing problem at the site and prevent future drainage problems.

- In a very elaborate and detailed way, the house is “tailored to the site, not the site to the house.”

The rationale for not earth-banking the building is elucidated below:

- The environmental and geological analysis of the site revealed a thin-perched groundwater gradient beneath the property, at the boundary between the terrace deposits that comprise the topsoil and overburden, and the bedding formation that composes the bedrock. There is also sheet flow and infiltrating water that originates on the properties to the east and south.

- A hydrologic plan has been developed to intercept the water that moves across the house site, transfer it around the house, and return it, through Infiltration chambers, to the natural hydrology in front of the house, using a pond as a stabilization feature on the whole system. This should effectively address the movement of water from the neighboring properties across the site, providing a dry pad, while at the same time maintaining the existing natural hydrology.

- Following the environmental assessment and geological investigation of the lot and surrounding area, it was decided that due to the hydrological regime of the site it would be extremely challenging to construct an earth-banked building and insure that it would remain dry and sound over time.

- It is very difficult to engineer durable moisture protection into a building that is subjected to constant hydrostatic pressure, as would be the case in this instance, and guarantee the future preservation of the building materials.

- The bank that would be created at the rear of the home is not an engineered

cut, nor is it a steeply sloped barren scar or retained wall. The sloped bank to the rear of the house will not be retained or faced in any sort of formal way, but will rather be incorporated into the landscape plan and intermittently spotted with natural boulders. Native ferns, rhododendrons, and bulbs will be planted in between the “randomly” placed rocks. Because of the moisture in the area, this should produce a lush natural transition from the house pad to the natural landscape behind the house.

- The earth-banking of the home would require the construction of a curtain drain from grade to bedrock across the back of the property, which would disturb just as much of the site as construction of the banked option, but without the reliability, in terms of drainage, that exposing building materials at the rear of the house provides. The shallow combination French drain/foundation drain that has been designed covers all of the requirements in a less-intrusive manner.

- The construction of the foundation would have entailed the complete removal of all soil materials down to the bedding formation, replacing them with engineered fill. The lowered pad allows for conventional footings that are tied into the bedrock, without the excessive excavation and fill that would have otherwise been necessary.

- The view of the home from the north will be across existing grades, masking any impression of a “cut” and making the rear of the home seem shorter and actually “earth-banked” and sunken into the landscape. The same will be true for views from the neighboring properties to the north, south, and east, which will view the home through landscaping from a down-slope angle, again making it seem “sunken” into the terrain. The desired visual effect, of reduced bulk, will be the same as it would be in an earth-banked design.

- It is the intention of the Design Team to set the home down somewhat into the slope of the site and create a completely naturalistic return to native grade at the rear of the house, making it attractive both to the residents and to any incidental views from adjacent areas, while dealing with the other environmental challenges that the site presents.

- One of the factors that has influenced the design is the easement for power lines along the entire northern property line. This necessarily has pushed the home over to the southern side of the property. This creates a false impression that the lot is smaller in size than it actually is and that the home is larger than it actually is. In reality, there is a significant belt of open space along the entire northern side of the property. This affects the impression of the size of the proposed pond also, when one is simply dealing with a two-dimensional plan drawing and not considering the site as a whole.

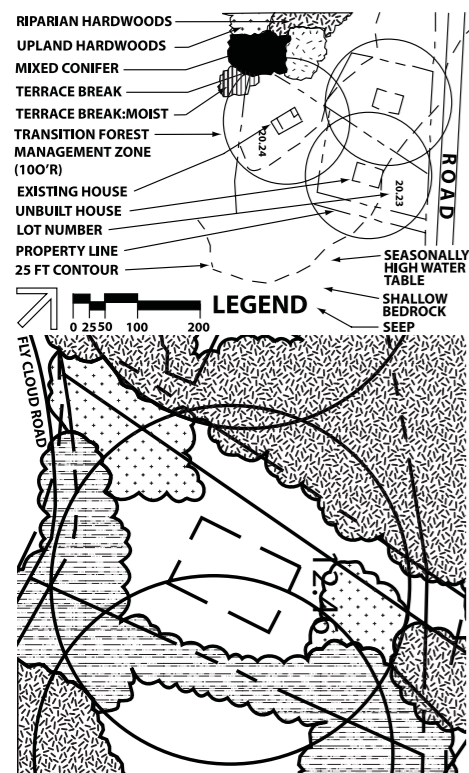
We hope that the preceding explanation helps to clarify the interaction between the intended house pad, the drainage issues encountered, and the placement and function of the Infiltration chambers.

### The Pond

The Design Committee has expressed concern that the proposed pond “may pose a safety risk...the pond and stream now become major features of the site.” Further, the Committee stated: “their proposed locations at the high side of the lot are contrary to the patterns of nature and appear artificial and ‘forced.’ In addition, the grading plan implies over a six-foot total depth posing a risk to both humans and animals, and potential liability issues.”

In response, we pointed out that the design of the proposed pond intends to both celebrate and accommodate the excess presence of moisture moving

### OPTIMUM PERFORMANCE HOME™ SITE VEGETATION MANAGEMENT PLAN



Selected Species Recommended In The Vegetation Management Plan For Planting At The Optimum Performance Home™ Windthrown Site

#### Trees

Vine maple, Bigleaf maple, Red alder, Pacific madrone, Chinquapin oak, Pacific dogwood, Tanoak, Red willow, California nutmeg, Douglas fir, and Redwood

#### Shrubs

Holly-leaved barberry, Blue blossom, Toyon, Oceanspray, Labrador Tea, Bush Monkey Flower, Wax myrtle, Coffeeberry, Rhododendrons (California rose-bay and Western azalea), Red flowering currant, Wild Rose, California blackberry, Red elderberry, and Huckleberry

#### Vines

California honeysuckle and Common snowberry

#### Ferns

Five-Fingered Fern, Lady Fern, Deer Fern, and Chain Fern

#### Ground Covers

Wild Lilac and Sand Strawberry

#### Low Growing

(Herbaceous/Perennial)  
Wild Ginger, Giant Horsetail, Douglas iris, and Monkey Flower



across the site, and originating on the property to the south, which drains surface runoff from what appears to be surfacing perched groundwater somewhere on that site. In reality, the pre-existing site conditions created a pond at the house site. In addition, the pond is designed to act as a hydraulic stabilization feature by storing and managing excess moisture crossing the site, including some of the perched groundwater, and to create habitat value for native and migratory wildlife.

At the time of the Preliminary Plan approval, the engineering for the pond had not been completed and a smaller pond was shown on the site plan that was approved. In the Final Construction Plan submittal, the fully-engineered pond was shown.

The proposed pond, as designed, is 45 feet rim to rim and six feet in depth, with a volume of approximately 45,000 gallons, a little bigger than a standard backyard swimming pool. The bottom maintains a 30-percent slope, a configuration that is generally accepted as a safe slope in case of accidental immersion, with no sudden drop-offs. The free-board and top of the rim are sloped somewhat more steeply, to provide about a foot of free-water access around the rim to allow fish to predate any mosquito larvae that attempt to

become established in the pond, and to provide for a foot of freeboard between rain events during the rainy season. A passive level control weir will regulate water level in the pond.

A "beach" with subsurface horizontal geotechnical drains (provided by Smart Drains) will be installed at the "upper" or southeast corner of the pond, overlain by coarse sand and rock chips, to intercept seepage and runoff from the neighboring property and recharge the pond. The "beach" will be perched at the freeboard limit, and will also act as a non-eroding overflow or bypass "spillway" for the pond, in the event that the pond is full and the level control structure is blocked, and water continues to come into the pond. Overflow that may occur this way would flow by the surface overland flow route along the existing, natural drainage course that goes along the southern property line of the site, with the modification that the upper part of this flow route will be set further into the subject property than it is at the undeveloped lot.

The recirculation stream water feature is to be a completely natural and landscaped functional element, without any visible non-natural materials, and with a natural and informal character, heavily landscaped with native bulbs,

ferns, moss, and ground covers. The purpose of the stream feature is to continuously recirculate the water in the pond, providing aeration and nutrient removal from fish waste and from nutrients that may be present in the infiltrate. This will prevent algae formation and maintain high water clarity and water quality.

A gravel filter is to be installed on the bottom of the pond, consisting of a manifold of Infiltration chambers buried in gravel and rock chips. Water to feed the recirculating stream is to be drawn from this underdrain, as will overflow water discharged by the level control structure in the pond. Similar to an under-sand filter in a home aquarium, this will insure that water is drawn down through the pond bottom, removing particles and providing aerated water for resident bacteria, which will consume wastes and nutrients, and out compete algae that might otherwise become established in a stagnant pond.

The pond is to be stocked with native fish species, selected in accordance with State Fish & Game guidelines. The six-foot deep pond provides significant depth for the fish to escape from predators, including raccoons, herons and egrets. The pond's depth is sufficient to maintain cooler waters during the late summer, when temperatures in a smaller pond may become elevated.

The pond is to be constructed as a dip in the topography, without any constructed berm or engineered containment and sealed with a vegetable oil polymer (provided by Seepage Control) that is completely non-toxic and used for this purpose, and the pond will not leak. The pond is to be natural in appearance and completely landscaped with native wetlands plants and bulbs, many of which are now found at the site, and will be shielded or screened from neighboring properties. The pond is intended to be both entirely functional and to be a real

amenity to the area, in affect making the best use of and actually augmenting a difficult situation in regard to excess moisture at the site.

During the dry months, it is anticipated that seepage will continue to recharge the pond. In addition, water collected from the French drain can be pumped to the pond, if there is capacity, and this is expected to be available year-round. There are hundreds of ponds in Sonoma County, with a wide variety of sizes and shapes, including several other ponds at The Sea Ranch and in the immediate area.

### Objections And Ambiguities

The above recommendations of the Design Team were presented in a letter to the Design Committee on February 10, 2006. A meeting to discuss these remaining issues and our approach was scheduled for March 3, 2006. At the commencement of the meeting, the the Committee members seemed unfamiliar with the site constraints and the written responses that had been provided and after two hours and forty minutes, there was no clear direction provided by the Committee. Three weeks later, by letter, the Committee stated they appreciated the opportunity to meet with us and reiterated that the purpose of the meeting was to provide us with an opportunity to present the rationale for the December 29, 2005, Final Construction Plan submittal and the January 19, 2006, revised site plan, which were denied by the Committee.

The Committee again expressed their concern for the proposed grading plan and water management scheme we proposed. They continued to perceive that the pull-back grading proposal "results in a level building pad that coupled with the high exterior walls [home theatre] contributes to the apparent bulk that in prior submittals had been visually hidden because the building was nestled into the site." No

mention was made of the equivalency of the earth-banked and pulled-back grading options in setting the building down into the slope to diminish its visual impact, nor of the explanation that our revised grading plan was the better option to protect the natural environment.

It is now clear that the Committee will only accept the less than optimum earth-banked solution that was first indicated on the approved Preliminary Plan.

The letter also appears to read that the Committee will not approve the "natural" landscaping scheme we proposed related to the pond and the associated stream with rock and fern landscaping. To the Committee, our effort to adapt to difficult pre-conditions and restore a damaged piece of land seemed contrived, artificial, and "parklike."

With respect to the pond, the Committee stated: "the expanded size and depth of this feature constitute a major change from the plans that were the subject of the Design Committee's preliminary approval. The expanded pond constitutes a major alteration of the natural topography, which is inconsistent with maintaining the character of the natural environment as envisioned by the Restrictions and the applicable design criteria. In addition, the expanded pond raises hazard and liability issues...For all these reasons, the Committee cannot approve the pond as now proposed."

What is not clear is whether or not the Committee will approve the smaller-sized pond shown on the approved Preliminary Plan. Or, will the Committee not approve the pond even if it is redesigned to be smaller? This has not been made clear but we hope that the Committee will be open to approving the same size pond indicated on the previously approved Preliminary Plan.

For our next Final Construction Plan submittal, we will present a more detailed landscape plan, as requested, specifically showing the areas depicted

on the John Roberts Associates "reforestation" plan and the details of vegetation we will plant in accordance with that plan.

Lastly, in the Committee's summary of issues discussed at our meeting, they stated: "Revisions of architectural plans were presented and discussed. Items discussed included: changes to openings/detailing of deck enclosure above garage; extension of roof over workshop and off of tower to accommodate elevator; use of rake windows and elimination of muntins; and, use and detailing of Hardipanel/battens/trim."

With respect to the stated architectural plan issues, the Committee did not say what they would or would not approve.

The Committee did not address any other issue with respect to the water management or Infiltration chambers proposed.

Thus, you will have to wait until the next installment in this case study article series to find out what happens. We are preparing to submit another Final Construction Plan to the Committee for review on April 21, 2006, in which we will hopefully satisfy the Committee and obtain final approval so that we can then proceed to file with the Sonoma County Building Department for their review of structural and Code issues, and finally obtain a building permit.

### Conclusion

A geology report has been conducted and has been used to address the solutions to the problems presented by this site. The presence of groundwater is duly noted by the geology report. In addition, direct observations of the site have been made during wet and dry seasons for the past two years and used to develop this water-handling plan. The plan is directed toward improving conditions at the site to make construction of a home possible, and to mitigate the concentration of

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water at the roadside and curb on the road. In return, the plan is designed to essentially intercept and redirect excessive site water around the home and return it to the natural hydrology, with the pond used to balance flows.

As always, our intent is to make this project consistent in every way with the spirit, philosophy, and diversity found at The Sea Ranch. Our commitment is to excellence.

We are in the Final Construction Plan submittal stage of approval with conditions. The outcome of the decision of the Design Committee to move forward with construction will not be known until after this article has been published.

The design review process for the Optimum Performance Home at The Sea Ranch is now in its fourth year (three-years, four-months as of April 2006). No one should have to endure such a lengthy process, but a check with other property owners and designers involved in other projects reveals that this is more common than not. As a case study, our project is instructive with respect to dispelling the often unrealistic expectations about the design process and the multitude of challenges facing leading-edge projects, and serves to educate prospective homeowners about the realities of building.

Moreover, the "indeterminate sentencing" that sometimes takes place before planning commissions is not unique to The Sea Ranch. Vague

guidelines with subjective interpretations, changing personnel, and strong notions as to what constitutes good design lead to many projects getting "hung up." To add to the problem, most Boards of Supervisors do not give proper direction to their Planning Departments or work to clarify ambiguous design guidelines, resulting in a "tail wagging the dog" situation. To further complicate matters, there may be a subtle bias against "growth" and further development, even on vested lots. The inconsistency and constantly moving target can result in a frustrating experience for the prospective home-builder.

No doubt, the process itself has weighed us down over this unexpectedly long period of time. But I want to assure our readers that while our resolve to overcome the many objections and challenges has been sorely tested, we are committed to achieving success in the building of the first Optimum Performance Home, even though it appears that extraordinary amounts of money and energy are still required to achieve our dream. **UHD**

#### The Authors

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#### Acknowledgements

Ed Rose is a residential architectural designer. His company is Rosebud Studios, based in Monte Rio, California. Ed has been designing homes and remodels on The Sea Ranch and surrounding areas since the late 1980's. His skill in listening to and understanding his client's architectural program and then translating that into a workable and pleasing design acceptable to the rigorous philosophy of The Sea Ranch Design Committee is responsible for the final successful approval of the First Optimum Performance Home at The Sea Ranch. This included the fairly new design concepts of universal access and aging-in-place, use of "green" materials, and meeting the exacting guidelines for a residential LEED® designation. It wasn't until Ed joined the Design Team that real progress was made with the Design Committee in this challenging process. Ed provided all of the images of the site plan, floor plans, elevations, and isometric perspectives for the magazine. His extensive education and experience span numerous disciplines from architecture to industrial and graphic design to technical illustration, photography, and painting. Ed can be reached at 707 865 1146 or 707 785 9180 or rosebud@thegrid.net.

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