

SUSTAINABLE LIVING BY THE SEA

by Matthew Nilsson



Living on the water—especially in places as beautiful as Cape Cod, Martha’s Vineyard, and Nantucket—is a privilege. Part of that privilege gives homeowners the chance to build their own personal dream house by the sea. Homebuilding is inherently challenging, but doing so on the water with pressing environmental concerns presents a unique set of challenges requiring skillful hands and minds like those of the team at Boehm Architecture in Boston.

Environmental sustainability has been a common thread throughout schooling and work experience of Bill Boehm, principal of Boehm Architecture. When Boehm began his architectural studies at the University of Colorado in the late 1970s, the first wave of innovations in environmental architecture was just breaking—including lots of experimentation with solar power and alternative building materials.

After college, Boehm built homes and communities throughout the United States and as far as Malawi in eastern Africa, where he worked as a Peace Corps volunteer, before he decided to pursue graduate studies at MIT with a focus on communities and housing across cultures and income levels. From there, Boehm became involved in several organizations in Boston working on community development before starting his own firm.

“Environmental sustainability is a central focus of my work and the Cape and Islands are places where sustainable design is of the utmost importance,” says Boehm.

This environmentally sensitive approach is a cornerstone of all projects undertaken by Boehm Architecture. Founded in 1997 as Miller Boehm Architecture, the firm completed their first project on Cape Cod in 2001. “The ecosystems of the Cape and Islands are cherished, but fragile. The seasonal population surges are ever increasing, as are climate change-induced weather extremes,” says Boehm. “Those of us fortunate enough to build here carry the responsibility to do so in the most sensitive and thoughtful ways possible.”

At the most fundamental level, this means not creating or furthering erosion of the dunes, or destroying native fauna. There are also environmentally sensitive building methods that can lessen construction impact as well. This is where “building science” comes into play. Boehm shares his thoughts about what role building sciences play in the design and construction of an environmentally sustainable waterfront home.

“Building science is the study of how buildings perform physically. The roof, walls, windows, and foundation of a house, otherwise known as the envelope, are major building science topics. The way the building is thermally controlled—heated, cooled, and ventilated—is the other major topic. A hot issue among building scientists right now is how to make a building very well insulated and tightly sealed, while still having fresh air for the occupants.”

“It is possible to build houses that are so heavily insulated and tight that they need virtually no mechanical heating system—the occupants’ body heat, solar energy, and occasional electric heat is all that is needed and fresh air needs to be brought in to the house mechanically, with fan systems that warm the incoming air with the air that is being exhausted. This is known as ‘heat recovery ventilation.’ Such houses are referred to as ‘passive houses’—a movement in extreme, energy-efficient construction that comes from Germany. If you use solar panels to provide all the electricity such a house uses, it is feasible to create a ‘net-zero house’—one which produces as much energy as it uses.”



Building on the water means facing intense environmental forces—wind-driven rain, snow, debris and saltwater, and its corrosive effects, as well as the extreme atmospheric pressure conditions. The major window manufacturers produce lines of windows particularly for coastal locations—with tempered glass and tighter seals—for this reason. Roofs and walls must be able to withstand intense wetting and drying cycles. Centuries ago, cedar shingles were discovered to work well in this climate zone.

“We’ve updated the traditional details, to use ‘rain screens’ that allow the roof and walls to dry from both sides, and building membranes that ‘breathe’ like a Gore-Tex jacket, for example,” explains Boehm.

The Massachusetts Department of Environmental Protection, local Conservation Commissions and Building Departments are all charged with overseeing and controlling coastal construction. These organizations require that all coastal homes be built above the 100-year floodplain. Depending on how close the land is to the water, homeowners may need to build on pilings. State building codes require that structures built in coastal zones be professionally engineered to ensure structural resistance to the wind and wave surges. “We’ve all seen the images of coastal homes toppling into the ocean after storm surges, so the rationale is obvious,” says Boehm.

When configuring the layout of a new home, especially on the water, architects grapple with the same forces technically in the construction of the home that are also enjoyed in the milder seasons—sun, wind, and water. With skillful architecture, each of those challenges is carefully considered and helps

determine the configuration of the house on the land. For each project his firm undertakes, Boehm considers questions including: Where will we see the sun rise and set in the summer? How can we capture the short hours of sun in the winter? Where does that cool evening breeze come from? How can we dampen the noise of neighbors to hear the rustling of dune grasses?

“For most of our clients, outdoor living is as, or more important, than the indoor. We collaborate with landscape architects to create ‘outdoor rooms’ that are carefully designed spaces adjacent to indoor living areas that are defined by vegetation. Each of those areas can have a special role,” explains Boehm. Imagine having a cozy outdoor living area that could serve as the perfect spot to wake up with a warm morning coffee, take a mid-afternoon nap, or enjoy an evening around a campfire.

Of course, the most sustainable home is the one that is already there and properly renovated. The amount of energy expended in material extraction, transportation, and construction is enormous. “When a client comes to me to build a new home, we first explore the opportunities of saving an older structure,” says Boehm. “When the conditions are right, we are able to renovate and retrofit older homes in ways that create modern, comfortable living spaces, while retaining character that is impossible to re-create.”

There may be no more sublime location for a dwelling than one facing a sunset or sunrise across a body of water, especially one as beautiful as Cape Cod Bay or Nantucket Sound. To begin the day with a short jog to the beach for a morning swim, to pass idle hours on a broad veranda watching seagulls and boats pass by, to end the day sitting outdoors with the dim light of the kitchen behind you and the stars glittering over the ocean beyond—these are the delights of waterfront living.

The home behind these delights merits the creativity, skills, and hard work of experienced architects and builders like those at Boehm Architecture. Living on the water comes with “the responsibility of living as lightly as we can within the fragile ecosystem of the Cape and Islands,” Boehm concludes.