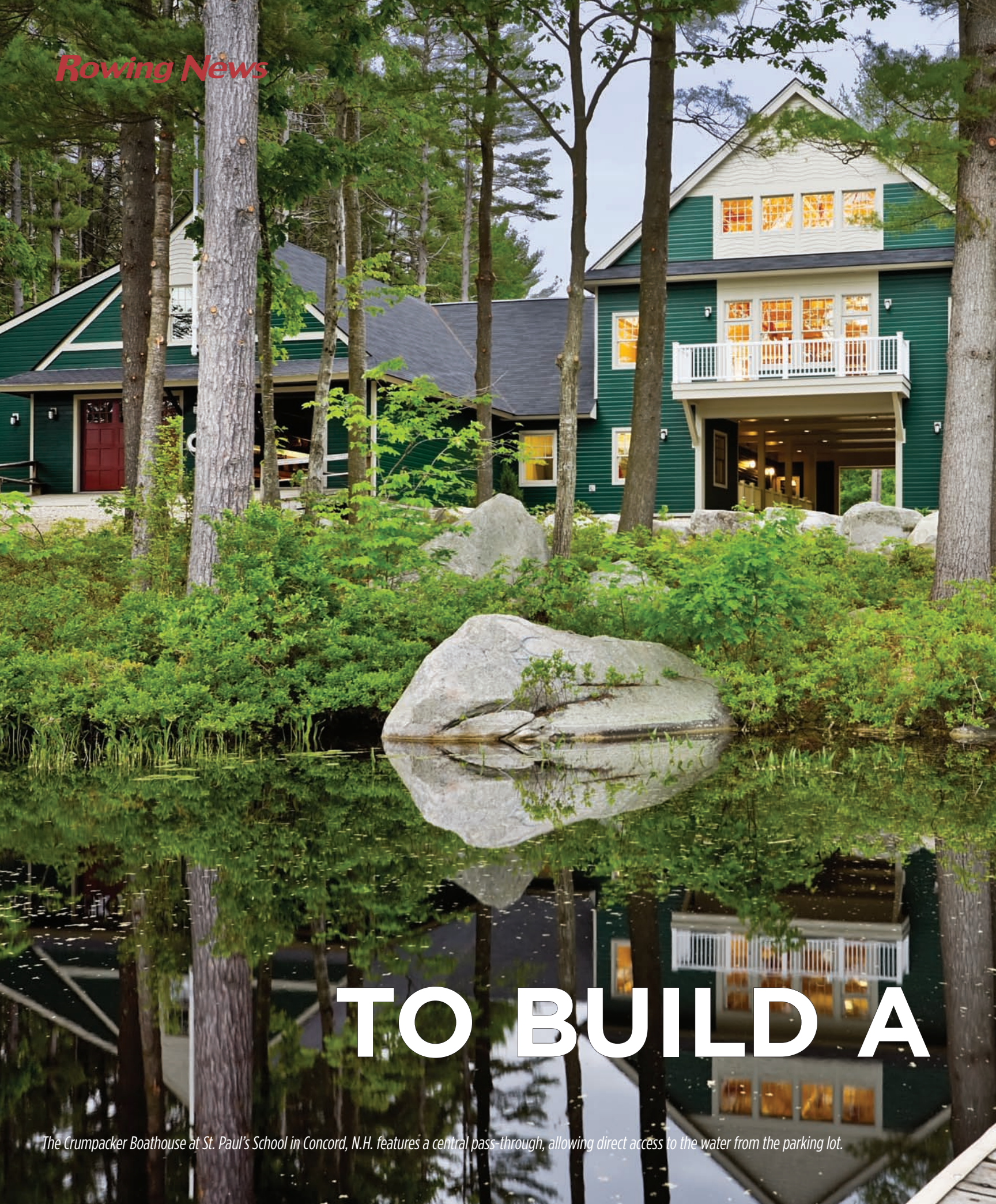


TO BUILD A

The Crumpacker Boathouse at St. Paul's School in Concord, N.H. features a central pass-through, allowing direct access to the water from the parking lot.

BOATHOUSE

BY JEFF PETERSON

During my freshman year in high school in 1976, it became clear that I wasn't good enough to play basketball anymore; it was time to find a new sport. Fortunately for me, Simsbury High School had a crew. Unfortunately, as we discovered on a cold day in March, the school stored its boats on racks nailed to trees in the woods off of Route 185.

Even at 14, I knew this was not an ideal situation.

That summer, Simsbury Crew took a big step forward when it built a new boathouse on land next to the town's sewage treatment plant. Although it was really just a shed with two boat bays, an office, and two tiny changing rooms, the boathouse made a huge difference for the program. The crew had a home. In the following years, Simsbury Crew grew dramatically in numbers and in success. It helped a lot of kids grow and succeed as teenagers. Since that building was completed, hundreds of athletes have moved on to row in college, with a considerable number rowing at the international level. I wonder whether all of this would have happened if the kids were still storing boats amongst the trees?

While rowing experienced an early wave of popularity in the late 19th and early 20th centuries, it has exploded in the last 10 to 15 years, fueled in large part by Title IX. Today, many high school and collegiate programs find themselves in situations similar to the one Simsbury was in 32 years ago. Rowing participation has vastly outstripped the facilities necessary to accommodate it; universities that spend millions of dollars to help their athletic programs compete at a national level store their boats on outdoor racks, protected by nothing but chain link fence. Yet the growth shows little sign of slowing. Indeed, at many NCAA schools, the scramble to fill available scholarships can be frenetic. Growth means more rowers, which means more seats, which means more boats—expensive boats. All this precious equipment needs to be protected.

With more people rowing than ever and some older boathouses also in need of repair or replacement, there are lots of programs in need of new facilities. This is problem. Building a boathouse is no simple matter. There are obstacles to overcome and few people with the experience to deal with them. How does one find a place to build? Prioritize the needs of the building? Deal with the avalanche of questions and issues? If you are planning to build a boathouse, these are all decisions that can have a direct impact on the quality of your facilities, and even affect the success of your crews.

This, in a nutshell, is what I do. As an architect and a rower, I have designed a number of rowing facilities and watched them develop from sketches on trace paper to homes for their crews. This is never a solo effort. Civil engineers, permitting consultants, and other specialists may be necessary to deal with a project's specific issues.

Let's assume that you are a coach contemplating building a boathouse. It would be helpful if I could provide a series of specific steps to reach that goal. However, the needs of different programs are so varied, the situations so diverse, that no two projects endure the same process. Nonetheless, every boathouse project needs to confront several basic decisions before specific design work can begin. First, where to build it? Second, what should the boathouse include? Finally, how much money is available for the project?

These are complex and inter-related matters. For different projects, they may carry different weight or they may need to be considered in a different order. They may need to be adjusted to work coherently with each other. In some sense, it is like cooking a multicourse meal, where you have to alternately attend to each course in order to serve them together.

All complexities aside, in the simplest scenario, the process would begin with finding a site and determining that there are no hurdles to building on it. Then, the needs of the building would be determined, leading to a table of spaces and sizes known to architects as the building program. With this information, the project's costs can be estimated and a project budget can be developed. If all the issues are still under reasonable control, the design process can proceed.

The Shoemaker Boathouse at Tufts University has a strong presence on the water.

There isn't much point in having a boathouse without good water to row on. If you are thinking of a boathouse, you have probably already found some. But when it comes to the big step of building a permanent home for your shells, it makes sense to think about the water. This is the first part of evaluating a boathouse site.

In many cases, there aren't a lot of alternatives. At my old high school, the narrow, twisty, shallow Farmington River is the only feasible body of water within reasonable distance of the school. Most programs have similar constraints. Many have to travel long distances to get to their rivers or lakes. Still, when considering a possible boathouse site, think about the water. Have you considered other bodies of water? When Yale rebuilt their boathouse in the late 1990s, they considered all options within a reasonable distance of campus. Ultimately, they determined that the Housatonic was still the best place to be and they built their new boathouse on the same site as the building it replaced.

Consider the following variables regarding rowable water: How far can you row? Do conditions get rough? Can you find decent water during different wind conditions? How many turns need to be navigated? Is there a decent 2K course? Are bridges an impediment? Is the current strong? Is it consistent? Is the water deep enough? Are there dams or other obstructions? Does the water flood frequently? Is there much boat traffic? Is it salt water, requiring the need to rinse boats after use? Are tides a potential problem?

It's nearly impossible to find water that meets all of the criteria above. If you are considering different bodies of water or different sites on the same body of water, try to evaluate them with these constraints in mind. On top of that, look at the relationship between the water and land. Can the water be reasonably accessed from terra firma?

Before Tufts University settled on the site for their recently completed boathouse, rowing director Gary Caldwell and I spent a day kayaking the Malden River comparing half a dozen possible sites. We focused on water depth and water access from the site as well as the potential presence a boathouse

might have. Our observations suggested that one site seemed better than the others. Ultimately, the university was able to work out a reasonable long-term lease and the success of the building has reaffirmed the observations we made from the water long before the first nail was driven.

Waterfront property is inherently desirable, so it can be difficult (and expensive) to obtain. However, some waterfront sites also sit within the 100-year floodplain, where the allowable building types are generally limited. (Such limitations are typically contained within the state building code, but are derived from FEMA floodplain regulations.) This is one place where boathouses may actually have an advantage in competition for precious waterfront sites; boathouse storage is generally allowed within a floodplain, as "storage" occupancy and as a "water-dependent use."

Size and configuration of the site is a critical consideration; it needs to be large enough to accommodate the navigation of 60-foot long shells. The boats need to be able to get into and out of the site, delivered on trailers whose overall length and turning radius are comparable to a tractor-trailer truck. Many projects need to compromise when it comes to the ease of trailer access.

Compromise is less desirable when it comes to the path from dock to boathouse; it needs to be easy enough to allow for the youngest and smallest crews to safely carry their expensive shells even after a grueling practice. Banks can be steep so this requires careful consideration. Depending on the specific qualities of the site, steep slopes can be addressed with shallow stairs, fixed pier structures, bulkheads, textured concrete ramps, or other measures. The shoreline area is particularly environmentally sensitive and all means of access will be carefully scrutinized by the permitting authorities (there are likely to be several for this kind of site intervention).

Realistically, 75 feet of clear and fairly (or at least preferably) flat area is necessary in front of the boat bay doors to comfortably get the boats in and out. This staging area (or "plaza," as we call it on our projects) needs to be reasonably flat to allow the boats to sit in slings for de-rigging, wash down, or other adjustments.

Several rowing programs have dealt with site constraints inventively. The Crumpacker Boathouse at St. Paul's School in New Hampshire is a new addition between two existing boat sheds. The addition includes a ground level pass-through that provides for the easy movement of the shells of visiting crews from the parking area to the water. At Clemson University, the steep ramp from the staging area is paved with textured concrete, even though the staging area outside the building is gravel. Clemson also has to deal with dramatically varying water levels.

Site considerations also include factors unrelated to rowing. The need to bring utilities a long distance into a site can contribute substantially to the cost of a boathouse project. At Episcopal High School in Jacksonville, electric, phone, water, and sewer services were more than 1,000 feet away from their new boathouse. The costs to bring the utilities to the building were substantial, amounting to a big part of the construction cost. The soil conditions where the building is located can also trigger unusual costs. The floodplain locations often appropriate for boathouses are formed by alluvial deposits, or silt, which do a poor job supporting structures. This is also true for land created by importing fill from another site. These conditions often require deep foundation systems consisting of piles or pressure injected footings, as well as grade beams and thickened slabs. This means more money and more time are necessary just to get the building out of the ground

Given the rarity of waterfront sites, creativity is often required to put your program in the position of building on one. Given the difficulty of building on the waterfront, and given the scenic and recreational qualities of those sites, it is not unusual to find parks or other public lands on the water's edge. The public often sees rowing as a non-destructive—if not beneficial—activity that can only occur on the water. This sentiment suggests the possibilities of public/private partnerships or other arrangements that are beneficial both to the crew and to the public.

This scenario is playing out in several current boathouse projects. At Community Rowing, Inc. in Boston and at the University of Kansas in Lawrence, boathouses are being built on public land. In both cases, the projects are seen as serving the public good as well as the needs of the rowers. Serving the public can be done in many ways: providing public restrooms or drinking fountains, providing occasional public use of the building for non-rowing activities, or by running "public" rowing programs to serve those not a part of the core rowing program.

Long-term leases are often the means by which the crews gain a place on the land, avoiding the massive capital outlay necessary to purchase the property outright.

Lacking adequate facilities, many programs have to make do with what they have.

Princeton's Shea Rowing Center, home to the university's largest varsity sports program.

YOU FOUND THE PERFECT SITE. Now what? The question is "what do you build?" Or in architectural parlance, what is the building's program? To determine this, I ask a boathouse client what he or she would like in an ideal world. But it is rare for a project to have the budget necessary to build such a perfect boathouse so we need to make adjustments. This requires knowledge of the practical needs of the rowing program, costs, and funds available. It is almost always a delicate balancing act. Sometimes needs drive the building program; sometimes funds do. In any case, consider the ideal situation before reining in your aspirations with the realities of funding constraint. An architect with boathouse experience can help find the necessary balance. They know the specific sizes and relationships of boathouse spaces. They understand how a boathouse functions, and thus can make realistic suggestions for compromises that will allow your boathouse to meet your needs—and your budget.

The most basic purpose of the boathouse is to protect the rowing program's expensive assets: the shells. Additional spaces support the crew's other needs. Bathrooms provide necessary relief after a long row. For some programs, lockers or changing rooms are critical. For others, time constraints, usage patterns, or other factors make them unnecessary. Offices for coaches provide a place to organize workouts or store personal items.

Training spaces give athletes the opportunity to complement their on-the-water work, allowing for off-season training or accommodating rowers who cannot find a seat in a boat that day. "Club rooms" can host full-squad meetings, alumni gatherings, or catered events. These rooms are often well placed to take advantage of the water views that most boathouses provide as a matter of necessity. In many cases, these rooms can double as training rooms. In this scenario, it is important to consider where the ergs and other equipment go when the room is needed for other purposes.

Rowing tanks can provide unique opportunities to train and work on technique that are difficult to achieve off the water. The simplest of these are essentially pools with rowing stations affixed to them. These "dead-water" tanks provide an opportunity to approximate the rowing motion without leaving the building. More sophisticated tanks include propulsion systems that provide moving water to more accurately approximate the feel of a boat on the water. Tanks sometimes become part of boathouse plans, but they can add considerable cost and complexity to the projects. Floodplain restrictions typically do not allow them below the 100-year flood elevation, for example. No matter how it is done, putting a tank in your boathouse will add substantially to its cost.

Occasionally, other spaces make sense in boathouses. Their location on the waterfront makes them appealing for environmental classrooms, or for offices for environmental watchdog groups. The University of Washington boathouse includes dining and academic resource areas for all university athletes. At Princeton, the Shea Rowing Center includes apartments for novice rowing coaches.

THE ARCHETYPICAL IMAGE OF A BOATHOUSE is a vaguely Victorian structure with boat bays facing the water, such as the boathouses on the Charles River or on Boathouse Row. While these buildings were a response to their time and location, a different approach may make sense. While most architects will consider the building's context when confronting issues of style, aesthetic issues are subjective and the approach will obviously vary. Accordingly, boathouses of many styles have been built recently. Some are fairly traditional, such as those at Boston University and St. Paul's School. Others are sleek and modern: Tufts University, University of Washington, and University of Wisconsin. One even manages to be old and modern at the same time: West Side Rowing Club in Buffalo recently completed a boathouse originally designed by Frank Lloyd Wright for a site in Wisconsin.

Aesthetics aside, requirements for environmental sensitivity and circulation may suggest how the building needs to fit on the site. For example, shoreline life cannot thrive when structures are built over it. Thus the broad raised aprons like those in front of many older boathouses would now be considered environmentally destructive. Aligning the boatbays parallel to the water, or setting the building back from the water avoids the need for these structures. Location and orientation then affects the building's relationship to the sun and to other buildings, factors which impact what a building looks like.

Design matters extend beyond aesthetics and site planning. Rowers need to store 60-foot long rowing shells and 12-foot long oars; designers who work on boathouse projects without prior experience need to understand the dimensional requirements necessary to make a boathouse function well. Familiarity with practice routines helps drive decisions regarding room adjacencies, mechanical, and electrical needs. Appropriate finishes must be selected to weather the intense activity that occurs there.

But the biggest issue in boathouse design involves the balance between desire and cost. With information about the desired program elements, an architect can begin to determine basic size information about the future structure. He can combine that with knowledge of construction costs to provide you with ideas of possible project costs. A number of consultants may be necessary to assist in this process. For example, a civil engineer can work with the architect to evaluate site and perhaps permitting issues.

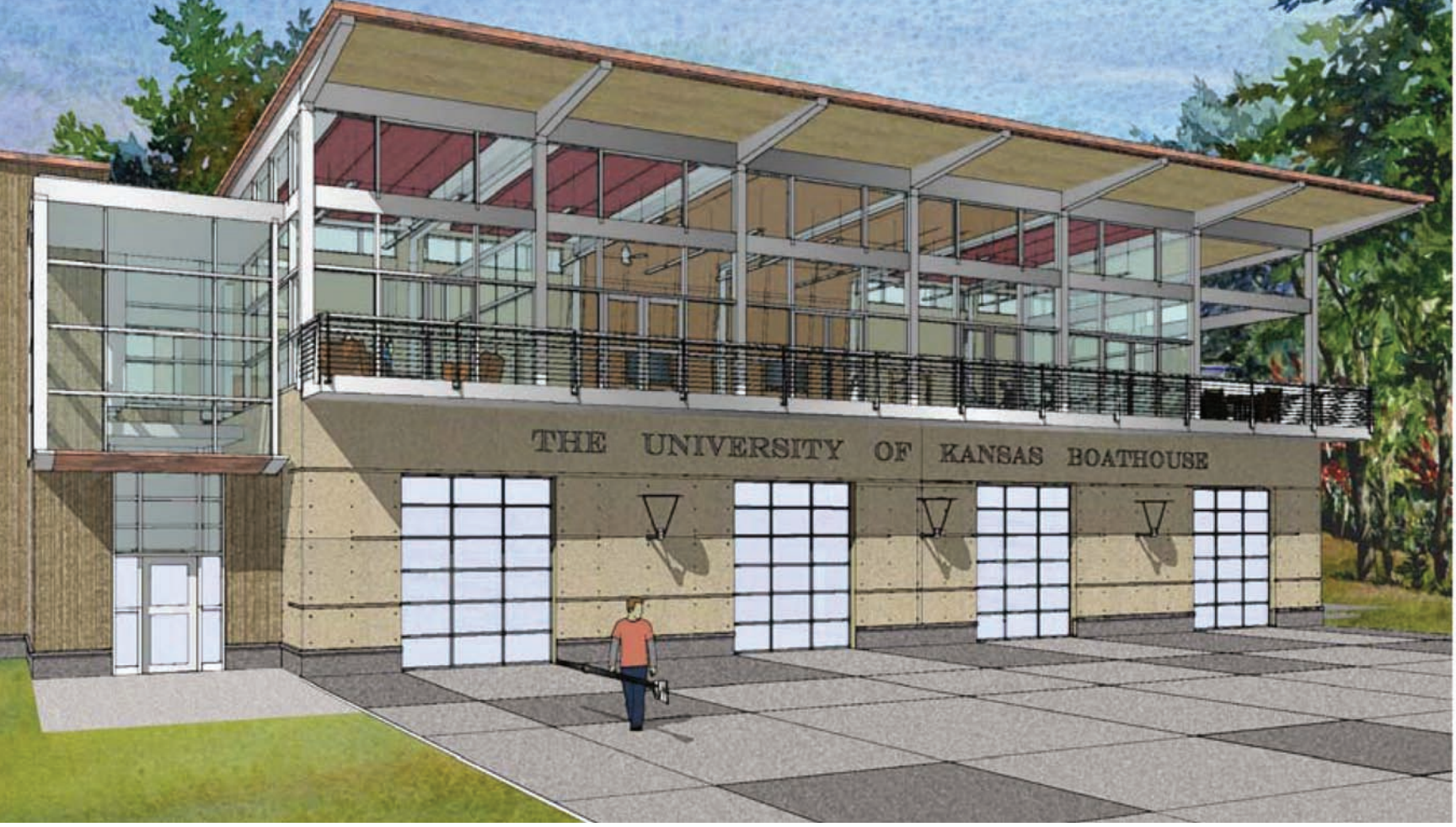
In the nearly certain event that your dreams exceed your financial capability, an experienced architect can help advise on relative costs of the program elements. He knows the specific sizes and relationships of boathouse spaces. He understands how a boathouse functions, and understands the cost issues that are unique to boathouses, including those attached to the more expensive foundations necessary for the poor soils often found on the water's edge. The architect can make realistic suggestions for compromises that will allow your boathouse to meet your needs, but also to meet your budget. These suggestions could include adjustments to the program or even the possibility of building the project in phases.

As costs are considered, bear in mind that construction costs do not constitute the full range of costs for a project. All construction projects require other expenses as well: "soft costs" such as architect's and other consultants' fees, permitting, and possible legal fees, as well as furnishings for the building. Thus the "project costs" equals the construction costs plus soft costs.

ALONG WITH THE INHERENT CHALLENGES of building on water, permitting and environmental issues are also complex challenges that need to be confronted. Every site is subject to different constraints because each is potentially subject to different controlling authorities. State building codes (often based on national or international "model codes") describe the basic requirements for all structures, including issues dealing with use, occupancy, construction materials, and fire resistance. States may also have environmental requirements, including setbacks from bodies of water or other wetland regulations. Further, environmental impact studies can be required to assess how the construction might affect endangered species on the site or in the water.

Town and local authorities will be responsible for dealing with a number of local issues. Zoning regulations describe site-specific limitations of building size, location, and use. Local conservation commissions deal with environmental issues of each site differently according to its particular ecological conditions or importance. Their requirements can vary widely, from replacement of plants or trees affected by the construction to site remediation to wetland re-creation. Finally, town fire marshals will need to ensure they are satisfied with access to the building. They may even ask for safety measures in excess of those required by the state building code.

Most federal requirements, including floodplain issues and handicap accessibility are enforced by agencies at the state or local



The proposed University of Kansas structure shows that boathouses don't have to look like they're from the 19th century.

level, but some require federal approval. For example, putting a dock (even a seasonal float) into a navigable waterway will often require review by the Army Corps of Engineers. Some sites trigger other federal reviews. For the proposed boathouse at Mount Holyoke College, a federal review was necessary simply because high voltage power lines run through the site. This tacked on nine months to the project timeline.

After the project goes out to bid, and through construction, there are three main parties involved in a construction process: the owner, the design team (the architect and the other consultants), and the contractor. When construction bids come in, there are often negotiations (called "value engineering") with contractors to make adjustments to reduce the construction cost. Once resolved and with a building permit in hand, you will now start seeing tangible results from your hard work.

So how long will it take to build your new home? Lots of factors contribute to the timeline, from foundations to structure to size and complexity. A simple pre-engineered structure with basic spread footings can be erected over the summer, while a multistory boathouse with lockers, showers, and training spaces could take a year or more, particularly if complicated foundations are necessary. An experienced architect or contractor can help evaluate the variables of a specific project.

Many programs build their new facilities on the site of their existing building. Doing so requires thought as to how to keep the program going during construction. While some programs are able to temporarily share space with other programs, others build temporary racks to get by. During the reconstruction of the Shea Rowing Center, Princeton was able to function out of its parking lot. At the same time, during their construction, Yale moved to a park across the river. The University of Wisconsin used a parking lot 500 meters west of their boathouse while their new digs were being built.

The process of building a boathouse requires hard work, flexibility, and a great deal of patience from all involved. As an owner, you should not expect perfection, but believe that if the team does its diligent best, with a reasonable balance of program, cost, quality expectations and time, you can produce something beautiful.

The new boathouse won't necessarily make your crews faster, but remember that you are providing a long-term home for the program. As such, the building itself can help ensure its own long and successful future. For example, consider how to include memorabilia displaying the history and accomplishments of the program and recognizing the generosity of those who made it possible. These gestures encourage a culture of giving back to sustain the program in the future.

Most importantly, make the boathouse design process a thoughtful one. Bear in mind that these waterfront sites deserve beautiful buildings. Create a building equal to the effort and intensity of those who row. Create a building that future generations of rowers will continue to take pride in as the center of their rowing world.

Contributors

Jeff Peterson

Award-winning architect Jeff Peterson rowed at Simsbury High School, Princeton University, and on the U.S. lightweight team and coached at both Princeton and the University of Virginia. Peterson is also one of the most accomplished architects and planners of rowing facilities in the world. His Cambridge, Mass.-based firm, Peterson Architects, has designed boathouses and rowing tanks from Florida to Washington State and around the world. Peterson's feature, "To Build a Boathouse," appears on page 54.