# Side Yard Pergola and Gate

## A hybrid structure turns an eyesore into an eye catcher

by Mark and Theresa Clement

Our house has a side yard whose main feature used to be that it didn't have any nice features (**Figure 1, next page**). This tiny, unattractive bit of lawn tended to collect stuff, including, among other items, an HVAC unit, a radon fan, trash cans, and bikes. Tempting as it was to just fence in the debris and hide it from view, doing so risked accumulating even more junk. A better idea was to make the area attractive enough that we'd want to keep it neat.

We're deck and fence builders, and we decided to apply our skills to our own yard. Our goal was to create a structure that lifts the gaze away from the ground (and the stuff stored there) and frames the space, while blending with the house. What we ended up building was inspired by a Japanese garden entrance and is a combination of a pergola — with rafter tails supported by a girder that spans two posts — and a gate. It runs from our house to a new section of fence separating our yard from the neighbor's.

### Design

A successful design balances elegance, proportion, and function. To achieve that, we needed to consider the posts, the gate, and the fence, and how the pieces worked together. The posts had to be tall enough to accommodate a person passing underneath, without being awkwardly towering. The gate needed to be wide enough

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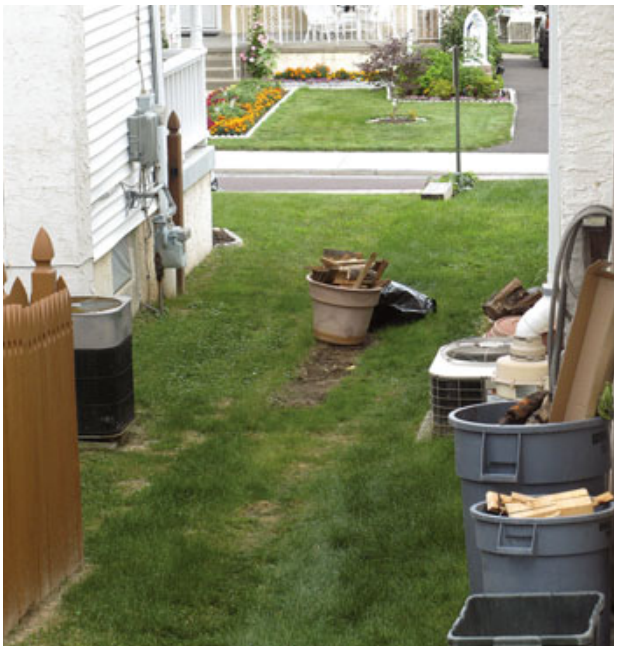

**Figure 1. Concealing outdoor items such as garden tools, sporting goods, and AC condensers can be a challenge at many urban homes.**

to get a lawnmower through, but not be unwieldy to operate. And the fence had to mask what would be behind it without choking the view through to the backyard. It also had to have enough meat to complement the girder details on top of the posts; too short and the fence would look like a ribbon, too tall and it would look like a bucket. Finally, all the lines had to work with the linear elements of the house that's one inch away.

That's a lot to cram into an 80-inch-wide side yard.

We came up with a drawing expressing our overall vision, then moved on to what we call "full-size templating" (**Figure 2**) to match reality with imagination.

The starting point in the design was the gate. Its function determined its width. Here, that meant a 4-foot-wide gate consisting of two 2-foot panels; with both open, the mower and snowblower can be accommodated, but if

**Figure 2. Full-size mockups of the girder and other parts were used to verify that the proportions looked right.**

someone is just walking through, he or she has to move only 24 inches of gate rather than arcing a 4-foot panel through space. And it's a lot easier to build two 2-foot-wide gates that won't sag than one 4-foot-wide gate that won't sag.

We determined the height of the gate later, after installing the gate posts, by bridging a 2-by across the opening and checking from various angles to see how it looked. We settled on 4 feet; at that height it would block the junkyard and deliver substance to the rafters while letting the eye pass to the backyard.

The gate width determined the spacing of the 6x6 gate posts, which also support the girder for the pergola. The property line and the house determined the locations of the 4x4 end posts. And the neighbor's HVAC unit determined fence post spacing: As a courtesy to whoever might service it — and to protect the fence and the homeowner from future inconvenience — we centered the fence panel layout on the HVAC so it could be accessed by unscrewing one of our panels.

**Figure 4. The author lays out the post locations on a 2-by that will also be used to align and brace the tops of the posts.**

**Figure 3. The bottoms of the posts rest on gravel for drainage and are topped with a bag of quick-setting concrete to keep them steady. Tamping the soil adds more stability and minimizes settling.**

## Laying Out and Setting Posts

The first step was to set the posts. As is often the case in cramped spaces and old houses, measuring and layout required forethought and triple-checking — the only straight lines were the ones we made. The first of those was a string line, 1½ inches in from the property line, where the fence would go. We then used a giant site-made square to square the posts and gate off the house to the corner post location. That done, we dug and set the end posts next to the house and at the property line, followed by the intermediate fence posts.

The posts are western red cedar. The Western Red Cedar Lumber Association (wrcla.org) recommends staining the material with oil-based stain to extend its service life, so we applied a coat before installation and one after to catch cut ends and screw holes. Wood in ground contact got two coats prior to installation (Benjamin Moore; benjaminmoore.com).

Each post was set a minimum of 40 inches below grade in 80 pounds of quick-setting concrete, with 4 inches of pea gravel in the bottom of each hole to facilitate drainage around the posts. We backfilled atop the concrete and tamped the earth tight (**Figure 3**).

With the four smaller fence posts set, we dug and set the 6x6 gate posts. We knew we needed a height of about 8 feet under the girder, so we used 14-foot 6x6 posts. We installed the posts full-length, leaving about 11 feet above grade. We cut them off level later on.

To keep the front faces of the gate posts flush with the corner posts' front faces, we bridged between the corner posts with a 2-by. This 2-by was also laid out as a story pole to show the post locations (**Figure 4**), and it helped to brace the 6x6 gate posts while the concrete in which they were set hardened.

In addition to using the story pole to keep the posts straight while the concrete set and we got the girders and fences in place, we ran diagonal bracing between the gate posts and the corners and to temporary rails

Figure 5. Temporary bracing holds the posts in place until the framing is complete.

Figure 6. Rafters were toe-screwed to the girder with deck screws.

we'd screwed to the fence posts (**Figure 5**). The western red cedar was incredibly stable and stayed stock still during several rain delays and a hiatus from the project.

## Superstructure Proportions

Rafter tails provide almost limitless opportunities for detail, but in this case we felt simple was better. Since there was a pre-existing pergola in the backyard with a basic circle detail on its rafter tails, we reflected that in the new structure.

To get the assembly to "blossom" like the roof of a pagoda does, we made the girder extend as far as possible beyond the gate posts, stopping it 1½ inches short of the property line. To make things easier — and so we could see any mistakes — we cut a test girder from 2x8 SPF. We put it in place, registered it ½ inch off the house, and double-checked its location 1½ inches back from the fence edge using a 6-foot level. Sure that it fit left and right, we stepped back and inspected it to determine the best clearance height. That turned out to be 96 inches to the bottom of the girder — fully 16 inches taller than an interior door, which had been our original plan. While the test piece was in place, we marked its height on the posts.

We also tested different length rafters, purlins, and stays. We decided that 30-inch-long 2x6 rafters crossing the girder looked best (**Figure 6**). We made three test rafters, and based on how they looked spaced evenly across the girder, decided on five rafters for the finished project. Atop the rafters, we ran 2x4 purlins that start ½ inch off the house and project plumb with the exterior edge of the fence. This is just 1½ inches farther than the girder projects — not much, but it looks right. Forty-inch-long, 1¾-inch-wide stays cross the purlins and carry the design skyward.

Once we knew which size test pieces worked, we marked one item from each assembly and set it aside. With all the height and sizing (or "massing") determined, we marked the posts and cut them to height — 2 inches lower than the top of the girder (more on this later) — using an 8¼-inch worm-drive saw (see *Tool Kit,* November 2010; deckmagazine.com).

## Rafters, Purlins, and Stays

The beauty of using test pieces and marking them in place on the posts is we could then use the test pieces as patterns — no measuring. We lined up the first side of the girder on the pencil marks we'd made on the post and secured it with two deck screws, fastening them top left and bottom right (more on this later).

Figure 7. Six-inch-long "construction lags" fix the girders to the gate posts.

Figure 8. Cap blocks protect the posts' end grain from water.

Figure 9. A cane bolt engages a pipe driven into the ground to secure the fixed half of the gate.

Figure 10. A standard gate latch holds the active side of the gate closed.

We then clamped the second girder to the back of the gate posts and checked the tops of the girders for level in both directions before fastening, again with two deck screws, top left and bottom right.

Each element builds on the next. We placed the two outside rafters based on what looked right to us. That turned out to be above the outside faces of the gate posts. Next we measured the centerline between them and placed a rafter there. Left and right of the center rafter, we split each space and placed rafters on those centerlines, for a total of five rafters.

We projected the purlins just past the girder, as described above, then positioned them on the rafters based on what looked proportional — in this case, 3½ inches in from the outside edge of the rafters. Stays were centered between the rafters, atop the purlins. This didn't work out perfectly. You can't tell from the ground, but there are up to ½-inch variances in the spacing because wood's not perfect and working off ladders doesn't make for the greatest accuracy. If you want furniture-grade work, build it on the ground and install it in one piece.

We fastened all the pieces in place with deck screws, except for the girder-to-post connection, for which deck screws served only as temporary fasteners. Through bolts would have made a solid connection between the posts and the girder, but through bolts presented aesthetic issues — you have to counterbore for the bolt heads for a plush look and cut the ends of the bolts off flush with their nuts using an angle grinder, exposing ungalvanized steel. Instead, we used 6-inch ceramic-coated washer-head "construction lags" we got at Lowe's (**Figure 7**). They cost about a buck apiece, and they locked the assembly together tight — there's 4½ inches of steel buried in a 6x6, four times per post. Instead of drilling pilot holes for the construction lags, we simply removed the deck screws used to temporarily set the girders. Because they were set top-left, bottom-right from opposing sides, there was an offset that kept the lags on opposite sides from hitting each other.

To protect the posts' end grain, we installed 2-inch-thick cap-blocks on top of the posts, between the tops of the girders (**Figure 8**). Four deck screws lock the caps in place.

## Fence and Gate Detail

We face-mounted rails and a top cap to the corner and gate posts, then hung the gate directly on the gate posts, insetting it slightly. A cane bolt holds one gate fixed (**Figure 9**). Twelve inches of ¾-inch iron pipe hammered into the ground receives the bolt and makes for a dependably stationary gate panel. A hardware-store gate latch enables the working side to move and latch freely while a 1-by stop (or astragal) enables the working gate to close over the fixed gate and hide the gap (**Figure 10**). ❖

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