Building a 'Removable' Deck

Working around a municipal sewer easement complicated the design

by Michael Walter

Last fall, my company was awarded the contract to upgrade the backyard of a Yorba Linda, Calif., home with a new multilevel 734-square-foot deck. Complicating matters, a portion of the new deck—basically an elevated walkway along the side of the house to the new backyard living area—would be located directly above a municipal sewer pipe and within a 15-foot-wide sewer easement that ran between the house and the property line. For the project to be approved, the city required future access to the pipe in case of trouble and a 5-foot minimum clearance between the pipe and any new deck footings.

To meet these requirements, project engineer Allstar Design & Engineering Group of Orange, Calif., initially designed a cantilevered framing plan for this portion of the deck, with the cantilevered beams partially supported by 4x4 posts bearing on floating 8-inch-thick by 24-inch-square concrete pads. If future access to the pipe became necessary, the engineer designed the pads and posts so that they could be removed without disturbing the deck framing. In the case of a major problem, that entire area of the deck would have to be removed.

While the building and zoning departments approved our plan, the water department nixed the idea of floating pad footings. I wasn't surprised; actually, I was shocked when the city signed off on the initial plan in the first place, so we went back to the engineer to beef up the cantilever design and eliminate the floating footings. Due to the pandemic, we couldn't get any major plan changes through the city in an acceptable amount of time, so we just went with the original drawing but with beefier cantilevers and without the removable pad footings.

Site Work

The existing site plan included a large elevated concrete slab patio off the back of the house, a smaller concrete patio, concrete pathways leading between the front and back of the house, a pair of concrete steps, and a series of CMU planters faced with stone veneer. In some cases, the new deck would incorporate aspects of the original hardscaping; in others, we needed to cut openings in the concrete flatwork to install the formwork for the new piers to support the deck framing. Fortunately, my excavation subcontractor was able to squeeze a small skid steer into the

PHOTOS BY MICHAEL WALTER; ILLUSTRATION BY TIM HEALEY

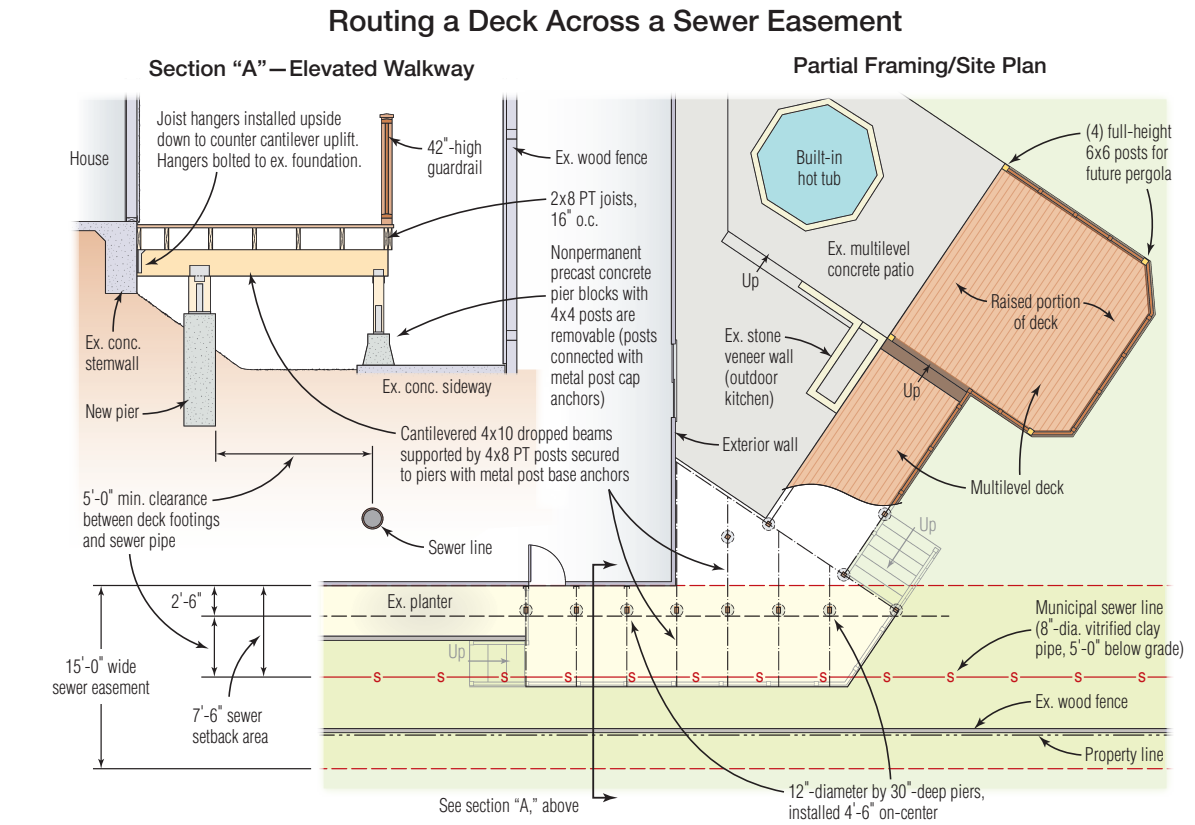

Figure 1. Because of an existing sewer easement (see illustration, above), footings for the elevated walkway along the side of the house could be placed no closer than 5 feet from the municipal sewer line (A, B). Thirty additional piers were also needed to support the main part of the deck, which was designed to extend an existing concrete patio (C).

backyard to do a lot of the grunt work.

To support the framing for the walkway within the sewer setback area, we formed seven 12-inch-diameter by 30-inch-deep piers 4 ½-feet on-center that were located 2 feet 6 inches away from the house wall (maintaining the 5-foot minimum clearance to the sewer pipe). We also formed 30 additional piers to support the 423-square-foot lower deck and the 283-square-foot upper deck in the backyard, ranging in size from 12 inches in diameter and 18 inches deep to 16 inches in diameter and 30 inches deep, depending on loads, soil conditions, and the slope where the footing was located.

We reinforced the deeper piers with tie-wired rebar cages, while the shallower piers were reinforced with rebar grids wired together and sitting on dobbies on the bottom of the form. Prior to pouring the concrete, we suspended Simpson Strong-Tie PBS-type post bases—sized for the post specced for that particular post location—above the form.

After waiting several days for it to stop raining, we finally had a clear weather

Figure 2. The elevated walkway joists are supported by dropped 4x10 cantilevered beams bearing on 4x8 posts (A). At the house, the beams are anchored to the foundation with upside-down joist hangers to counter uplift (B).

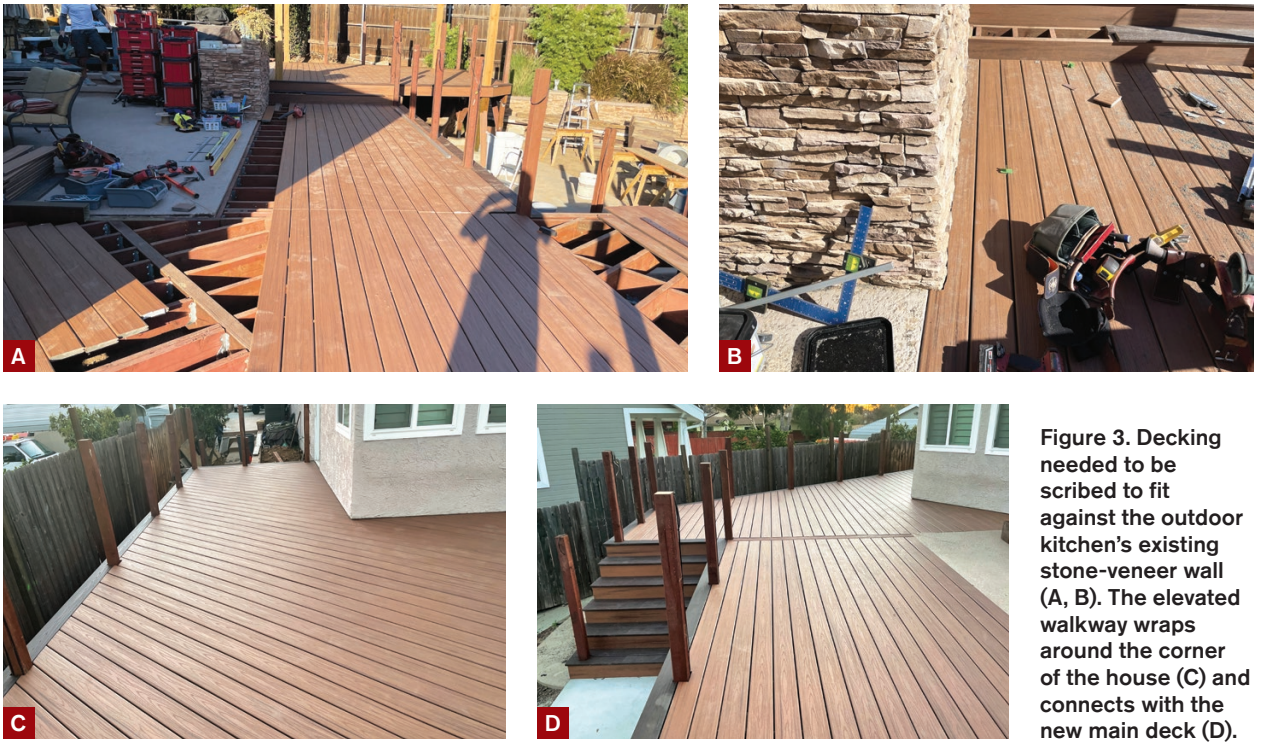

Figure 3. Decking needed to be scribed to fit against the outdoor kitchen's existing stone-veneer wall (A, B). The elevated walkway wraps around the corner of the house (C) and connects with the new main deck (D).

window to pour the footings. We ordered 10 yards of concrete and, since we needed to transport the concrete about 200 feet from the roadway to the backyard, a trailer-mounted line pump. To help prevent a hose blowout in our clients' driveway, I ordered 3,000-psi concrete rather than the 2,500 psi specced on the plans, because the higher-strength concrete here seems to have more "cream" to make it flow better in the hose. It finishes more smoothly and easily, too. The $40 additional fee for the 10 yards was well worth the money.

We were lucky: After we completed the pour, it then rained for the next two days.

Framing

In the walkway over the sewer easement, we installed 4x8 pressure treated posts on top of the piers to support each cantilevered 4x10 dropped beam. The beam ends are connected directly to the house's stem-wall foundation with Simpson Strong-Tie HUC410 joist hangers bolted to the concrete with ¼-inch-diameter by 2 ¾-inch SST Titen screws. To counter the uplift of the cantilever, we fastened the hangers to the foundation wall upside down, per the engineer's detail.

Though the original plans called for diagonal 4x4 braces (which we installed on posts that were more than 36 inches high), the posts in the walkway area were so short that diagonal bracing would have been virtually impossible. Even

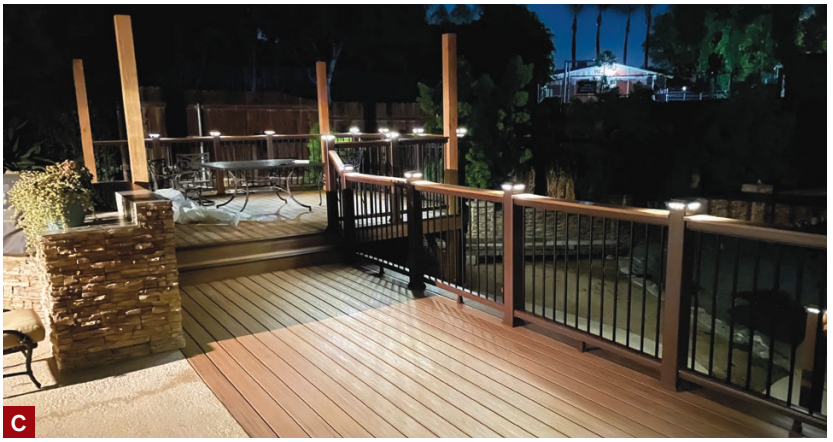

Figure 4. Accessed by a short flight of stairs, the walkway provides floor-level entry into the house and a straight path to the deck from the front of the house (A). As part of the project, the author installed 6x6 corner posts for a planned pergola over the raised portion of the deck (B). Integral post cap lighting helps illuminate the deck at night (C).

without the bracing, however, the cantilevered 4x10 beams were surprisingly stiff and had very little bounce.

For a little peace of mind, I decided to reinforce the cantilevered beams by placing precast concrete pier blocks with 4x4 posts under the end of each one. These supports—which were approved by the inspector—are easily removed if necessary, and the walkway would still be self-supporting without them.

Even though the rest of the deck angles away from the house to fit around the essentially triangular shape of the existing patio, it is conventionally framed with PT 4x8 dropped headers as needed and 2x8 joists to support 60-pound-per-square-foot live loads. In the raised portion of the deck designated for a future pergola, we installed four full-height 6x6 posts on top of the 16-inch-diameter, 30-inch-deep piers; the owners didn't plan to include the pergola in this project, but it made sense to have the footing approval and inspection in hand.

Finishes

Though the original design called for TimberTech decking, our clients preferred the color palette of the Trex Transcend line, and we installed its "tiki torch" composite decking with a "lava rock" border using Camo Edge Clip hidden fasteners and Camo's stand-up Clip Drive driver. This was one of the only changes that we made through the city planner's office, as Trex has downloadable ICC-ESR reports that were satisfactory to the city engineer.

While we were installing the decking, there were some areas where it had to be scribed to fit snugly against a stone-veneer wall. We always spend enough time on scribes to get as close to perfect a fit as possible—we call these scribed sections of decking the money pieces, because they are often the first thing a client will notice.

To finish up, we installed over $30,000 worth of Trex composite railing with aluminum balusters and integral cap lighting. To get the right color match, I like to source the railing components from the same manufacturer as the decking; to meet California code, all guardrails must be 42 inches high.

Now that we've wrapped up the deck, the client has invited me back to provide an estimate for the pergola. He wants an open-beam gable-end look—we call it a ski lodge design—which is a lot of fun to frame and a much-needed break from deck work. ❖

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