



# Stone Paver Deck

**Manufactured stone pavers are a durable, cost-effective alternative to wood and composite decking**

by Mark Parlee

When my clients first approached me about replacing their old deck with a bigger one, they were pretty sure that they wanted to use a low-maintenance PVC or composite product in place of the original cedar decking. But a landscaping and deck-building contractor that I've done several projects with has been substituting manufactured stone pavers for traditional decking on decks in my area, and he suggested that they consider this option too. They were hesitant at first, since they had seen a tile deck—just across the street—that had

failed. But after I explained the innovative way these pavers would be installed and pointed out their advantages over plastic decking, my clients were eager to give them a try.

In addition to having us replace the old deck, the homeowners wanted us to remove a window in the kitchen area and replace it with a door leading out onto the deck. This would improve the traffic pattern inside the house, because they would no longer have to walk through the living room to access the deck. We would also remove a French

door in the living room and replace it with a window to match.

Complicating both the deck replacement and the door-and-window swap, the 20-year-old house had EIFS (exterior insulation and finishing system) cladding. Problems with older EIFS—in particular, moisture getting trapped between the foam and the wall sheathing—have been well documented; chances are, if you build or replace a deck on a house that has EIFS cladding, you will need to take the same steps we took on this project to find the rot and fix the problems.



## Demo

My company has worked on a lot of houses with EIFS cladding over the years, so we weren't surprised to find rotted OSB sheathing when we removed the millwork and original deck. The deck ledger in particular was poorly flashed, a detail that is often executed incorrectly with EIFS and only makes the problem of moisture trapped behind the cladding worse.

We used a moisture meter to analyze potential problem areas, such as at the ledger and underneath window openings. Normal readings are 9% to 15% moisture content; higher readings indicate trouble. In some locations on this house, we found readings of 29% and higher.

To minimize the amount of patching that would need to be done later, we snapped chalk lines and cut away the EIFS cladding above and below the ledger. Most of the cutting in EIFS can be done using a wormdrive saw equipped with a carbide blade, but we also used a Fein MultiMaster to finish up the cuts in the corners and tricky areas (**Figure 1**). Eventually, enough moisture damage was uncovered that our clients decided to remove all the EIFS from the wall between the ledger and the middle of the half-round windows.

## Deck Ledger

Once we had repaired the band joist and patched in new plywood sheathing to



**Figure 1.** After removing the original cedar decking and framing (two photos, above), workers discovered moisture damage behind the home's EIFS cladding (right). The cladding had to be cut away to determine the extent of the damage to the sheathing and framing, and to make repairs.





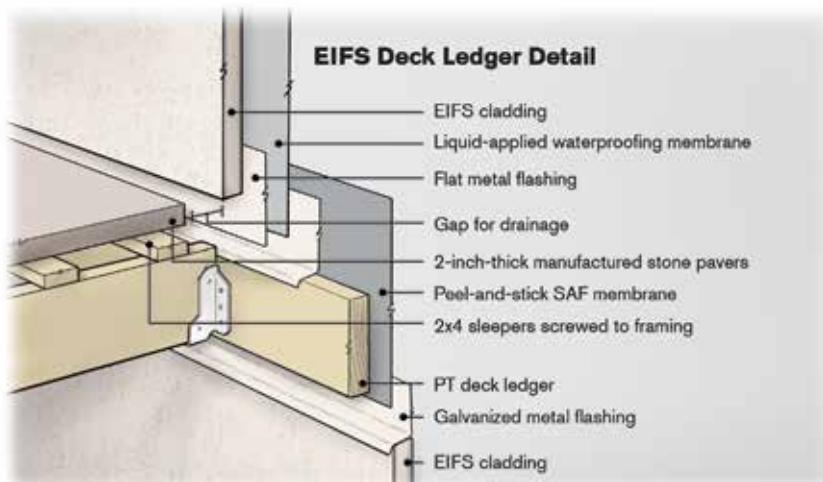
**Figure 2.** Before installing the new ledger, workers installed new metal flashing over the EIFS, and an SAF membrane over the sheathing.

replace the original OSB, we installed metal flashing and lapped it over the EIFS. Then we covered the wall sheathing with Grace Ice & Water Shield self-adhering membrane—lapping that over the metal flashing—before installing the new deck ledger (**Figure 2**).

Because it's critical that the deck ledger flashing is properly integrated with the drainage plane behind the EIFS, we design our own flashing and have it custom-fabricated from Kynar-coated 24-gauge galvanized steel (Exterior Sheet Metal, [exterior-sheet-metal.com](http://exterior-sheet-metal.com)). When we install the flashing, we overlap joints 3 to 5 inches and seal them with OSI quad sealant (**Figure 3**).

We used LedgerLok structural screws to fasten the ledger through the sheathing and into the framing. Because of the flanking turret-like structures on either side of the deck, we felt that additional lateral reinforcement for the deck framing was unnecessary. Our inspector agreed and didn't require the installation of lateral load anchors.

Once the ledger was installed, we fastened another metal flashing over it. Later, when the EIFS crew trowel-applied the Dryvit Backstop waterproofing membrane to the wall sheathing, they lapped the membrane down over the metal flashing.



**Figure 3.** Proper flashing is important with any deck ledger, but it's critical with an EIFS-clad house, where leaks in the cladding can allow water to become trapped between the foam and the sheathing and quickly lead to rot.

**Figure 4.** The new deck was framed with joists 12 inches on-center. To support the pavers, workers then screwed 2x4 sleepers to the tops of the joists, also 12 inches on-center.



Finally, we installed a flat piece of metal counterflashing to give the exposed wall sheathing above the ledger a finished look.

### Deck Framing

Following the paver installer's recommendations, we framed the deck with 2x8 joists 12 inches on-center. Then we screwed down rows of 2x4 sleep-

ers on top of and perpendicular to the joists (**Figure 4**). These are also spaced 12 inches on-center to accommodate the patio stones, which are sized 1 foot square, 1 foot by 2 feet, and 2 feet square. Later, we would adhere the 2-inch-thick pavers to the 2x4s, leaving about a 1/4-inch gap between the stones to allow for good drainage.

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The stone pavers add about 20 pounds of dead load per square foot to the deck, compared with a more typical 10 pounds per square foot for wood or plastic decking. While 2x8 framing may seem undersized even at 12 inches on-center, the joists span only 6 feet or so, thanks to a large bearing beam located in the middle of the span. This triple beam is in the same location as the original deck's rim joist had been, and we were able to re-use the footings for the columns that support our beam.

Because the special-order fiberglass columns that would support the deck weren't yet on site, we used temporary supports to move the project along. When the columns finally arrived, we jacked up the framing slightly to slip them into place.

Once the deck was framed, we laid sheets of plywood across the joists temporarily so that we could work on the door and window replacement and install the columns.

### Columns

The fiberglass Turncraft columns we used on this project are structural. To support them, we poured new piers for the front columns, and reused the existing piers for the rear columns. To elevate the columns to keep them out of the dirt, we placed concrete pads on top of the piers. The pads are bedded in non-shrinking grout and shimmed level with the help of non-compressible shims—normally used for leveling pre-stressed concrete panels—which I got from my local building supplier.

Once the grout set, we drilled into the blocks and attached the L-clips that fasten the columns to the piers. The tops of the lower columns attach to the support beams, also with L-clips. PVC caps on the tops of the hollow columns keep water and debris out (**Figure 5**).

To support the pergola structure, we fitted the upper columns with 4-inch-diameter posts welded to 16-inch by



**Figure 5.** The lower columns were installed after the deck was framed (top). Workers added additional steel to the upper columns (middle) to provide a solid attachment point for the pergola and to resist both uplift and lateral movement (bottom). Each steel column has a steel plate welded to its base, which allows it to be bolted to the deck framing.





**Figure 6.** Paver installation goes quickly. Working from a CAD-generated pattern, workers apply landscaping stone adhesive to the sleepers (left), then fit the pavers into place (above). A 1/4-inch gap between the ungrouted pavers is critical for drainage.

16-inch base-plates. The posts extend up through the top of the columns and provide an attachment point for the double beam carrying the pergola rafters.

### Paver Decking

The pavers were specced and installed by Matt Buman of Biondi Pro-Landscaping, who also provided the framing detail. I've worked with Matt on several projects, and he was the one who introduced me to the idea of finishing a deck with pavers instead of decking. He installed his first paver deck in 2007 and has put in about 15 more since then. For this project, Matt recommended Unilock Stonemark pavers ([unilock.com](http://unilock.com)), which he installed in an ashlar pattern on top

of the 2x4 sleepers. Matt laid out the pattern in a CAD drawing, and the crew glued the pavers down with Super-Stik ([super-stik.com](http://super-stik.com)), a high-performance exterior-grade adhesive that is also used for segmental retaining walls.

A selling point for Matt's paver deck system is the relatively low materials cost—about \$6 per square foot. But I was also surprised by how much faster installing the pavers was compared with installing standard decking. Of course, framing costs are a bit more, so the installed cost for these high-end pavers is roughly the same as that for basic composite decking (**Figure 6**).

One of the keys to a successful installation when using pavers this way is

plenty of drainage. In addition to the 1/4-inch gap between the ungrouted pavers, there is a 2-inch gap at the house between the pavers and the metal-clad sheathing. Matt also likes to seal the pavers after installation; on this project, he used DryTreat Stain-Proof impregnating sealer ([drytreat.com](http://drytreat.com)).

### Pergola and Railing

My clients ordered the aluminum-reinforced-vinyl pergola package and railings from Perfection Fence Corp. ([perfectionfence.com](http://perfectionfence.com)), but my crew installed them. The railings come pre-assembled and sized to fit the project, but because they were mounted to round columns instead of to a flat surface, we

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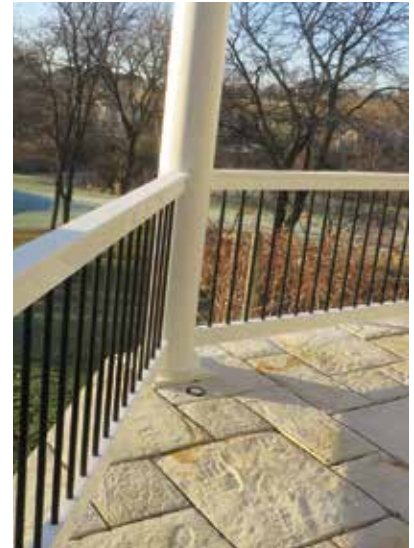
**Figure 7.** The pergola's double support beam is through-bolted to the steel columns (top). The vinyl pergola and rails were supplied by the same manufacturer; workers profiled the ends of the rail for a tight fit to the columns (middle left). Stone pavers are a surprising finish (middle right) on an elevated deck (bottom).



radiused the ends of the top and bottom rails with a belt sander for a tight and clean fit. The rails attach with a simple clip that's screwed to the column (**Figure 7**).

Since the pergola was prefabricated, installation was straightforward. The double beam carrying the outboard end of the rafters was attached with a pair of through-bolts to the steel posts running up through the columns. Because the beam is supported by four columns, the structure is quite stiff and didn't require any additional lateral reinforcement.

A single beam fastened primarily through the window trim and into the framing supports the inboard end of the pergola rafters. This beam stands proud of the EIFS wall cladding. We finished off the deck by covering the rim joists with a PVC fascia.



### Costs

We subbed out about \$2,000 worth of work for the footings on this project. Our labor cost to remove the old deck and install the new framing was about \$13,000, including the installation of the pergola. That was purchased directly by our client, who says that it cost about \$12,000. We also subbed out the paver installation, which cost about \$10,200 for labor and materials. ❖



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