Photos: Kyle Diamond

A Room for All Seasons

Enclosing an old porch gains much-needed floor space

BY KYLE DIAMOND

Last November, my company began remodeling a French cottage-style home in the Hudson River Valley region of New York. Built in the late 1960s, the existing wood-framed structure was set on a slab-on-grade foundation. It had half-round transoms above the doors and windows, a cementitious exterior veneer, and a hip roof with steep, unequal pitches and a curved "flare" at the eaves—all in keeping with its architectural style.

Currently, the owners use the cottage as a weekend get-away from the city, and to accommodate their growing family, they decided to make much-needed improvements to the home's size and comfort. Working with architect Jonathan Lanman, they created a scope of work that included tearing down the existing 13-by-18-foot screened porch on the south end of the house **(1)** and replacing it with a larger, 15-by-22-foot sunroom; providing a new bedroom and sitting area above the new sunroom; remodeling part of the existing second floor adjacent to the new living space; adding new dormers to both the existing and new roofs; and reroofing and re-stuccoing the entire home. In this article, we'll focus on the work relevant to the four-season room.

We decided to break up the job into two phases because of the late-November start date. For the first phase, our plan was to complete the demo work and foundations, then button up the place before

the snow started. Once spring rolled around, we would begin work on the framing. All in all, we planned for the whole project to take four months, with approximately three idle months during winter.

FIRST PHASE

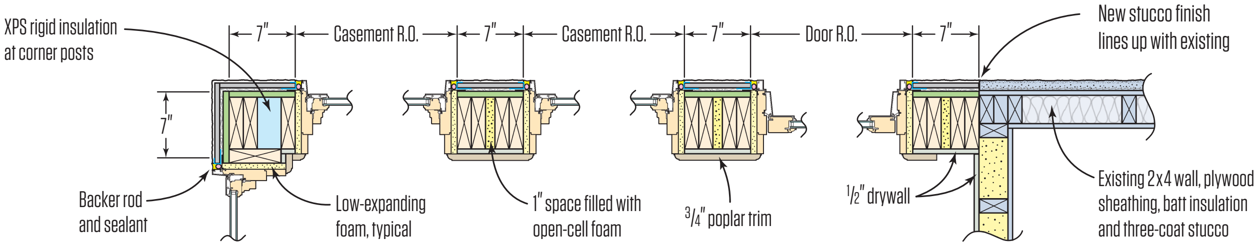
We began by removing the existing porch roof. It was a trapezoidal shape and had a flat top covered with single-ply EPDM. We stripped off the shingles, cut up the sheathing, and carefully removed the rafters by hand so as not to damage the main house. Then we turned to the porch walls, which were stucco-clad. The posts and top portion around the existing half-round windows were wood-framed, with short block "knee walls" at the base. We pulled them down with the help of a skid-steer **(2)**, which we also used to remove the top courses of the existing block frost wall and slab, and to help clean up the debris.

New foundation. To gain an additional 100 square feet or so for the sunroom, the new frost walls were aligned with the foundation walls of the main building. We left the bottom block courses of the existing frost wall and poured footing in place, using them to hold back the soil on one side of the trench. After excavating to about 4 feet, we formed 10x16-inch (HxW) footings, ran two #4 rebar, and poured 4,000-psi concrete **(3)**. We waited a day, then formed the 8-inch-thick stem walls **(4)**, which included a 3-inch-wide shelf to catch the edge of the slab. The tops of the walls were set at a height that would allow the new slab to match the finish floor level in the main house as well as maintain proper clearance above grade (see illustration, facing page). We padded out the forms with 2x10s to create the shelf, ran #4 rebar top and bottom, then poured the walls with 3,500-psi to 4,000-psi concrete and wet-set anchor bolts every 4 feet.

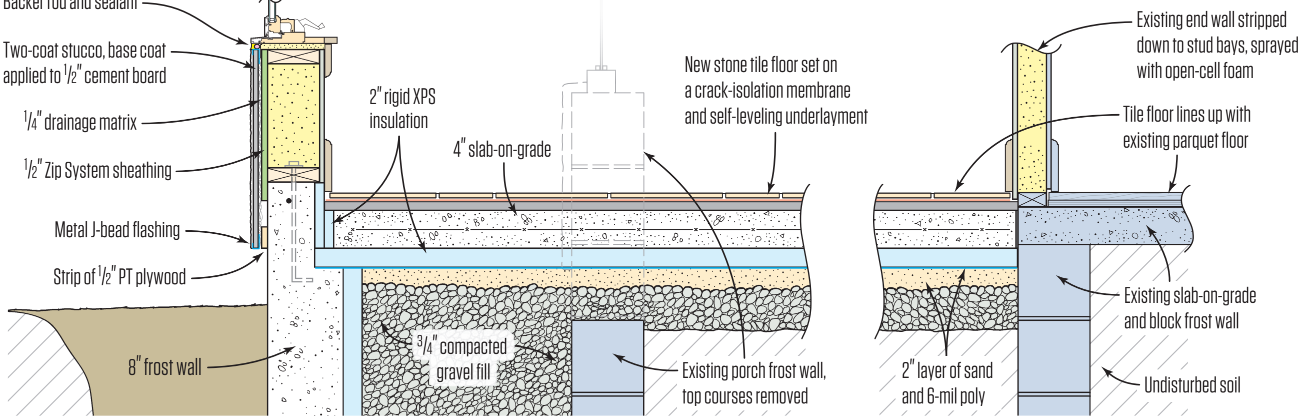
After stripping the forms, we installed 2-inch-thick XPS insulation on the interior side of the frost wall, then backfilled with $\frac{3}{4}$-inch compacted crushed stone to the interior side and with site soil to the exterior. We didn't install perimeter drainage because the house sits on a slight hill and, other than some ledge on the east side, the existing soils are "bony" and drain well.

Buttoning up. While removing the roof, we had left the EPDM membrane hanging in place. We now refastened it, along with a piece of Tyvek, to provide protection to the exposed gable-end hip roof of the main house. To protect the two exterior doors, we covered them with plexiglass panels left over from the screened porch. At grade, we

Post Layout—Plan View



Slab-On-Grade—Section View



spread a 2-inch layer of sand over the crushed stone to improve site walkability and to create a smooth, level surface for the future sub-slab insulation. Finally, we covered the exposed top of the frost walls and future slab area with insulated concrete blankets. Although the owners now had use of their home for the winter, they occupied it intermittently, so I made periodic inspections to make sure things were OK. It took about two weeks to complete the first phase.

FRAMING THE SHELL

Back on the jobsite in the beginning of March, we uncovered the foundation and started framing. The owners wanted to take full advantage of the home's great views of the valley below and of adjacent landscaping, as well as introduce as much natural lighting into the sunroom as possible. This meant maximizing the amount of glazing and minimizing the amount of wall area. The architect chose large French casement and fixed-transom windows by Marvin (along with its Clad Ultimate in-swing French doors) in lieu of matching the half-rounds of the existing windows and doors. This break in style helped differentiate the new sunroom from the main house, giving it the feel of a glass room.

With the windows selected, I used Marvin's rough-opening dimensions and the architect's plan for 11 posts to hold up the new hip and second floor to determine that we'd need 7-inch-wide posts. I decided to make each one from two sets of double 2x6s with a 1-inch space in the center—later on, the space would serve as a channel for wiring for sconces mounted on the posts. For the two corner posts, though, the four 2x6s were configured a bit differently: A single 2x6 was spaced 2½ inches from a doubled 2x6, and a fourth 2x6 was set at a right angle to close up one side, yielding 7 inches in both dimensions (see illustrations, above).

Wall framing. The plan called for a sunroom ceiling height of 10 feet above the finished floor. Factoring in the 2x6 PT mudsill, the curb created by the foundation, and a double top plate, the posts were about 9 feet 6 inches long. We framed the posts like stud walls—on the ground between top and bottom plates—then stood them up. We installed only one doubled 2x6 at each post location—except at the two outside corners—adding the second doubled 2x6 in place later. This reduced the weight of the walls, making them easier to stand up. We then framed the second floor using 2x12s at 16 inches on-center, running perpendicular to the house. We

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used LVL for end joists and doubled it up to serve as a header on the long wall of the sunroom. For bridging at midspan, we used solid 2x12 blocks.

Roof framing. We framed the roof using Douglas fir 2x10 rafters, which were doubled up at the hips **(5)**. We cut the seats so the top of the rafters ran flush into the rim joists; we would add the overhangs later to match the flare of the existing roof. The steep pitches—13:12 at the main roof and 20:12 on the end—required rafter bevel cuts well beyond the 50 degrees our saws would cut. Instead, we cut the inverse bevel on one end of a block that ran between the king common rafter and the hip, then cut the longest jack square to butt up against it. We repeated this with each jack, running a block from the longer adjacent jack to the hip, square-cutting the next jack and installing it against the block. It required a little more material, but saved a lot of time.

We sheathed the new roof with Zip System panels taped at the seams **(6)**, which we like because they dry in quickly and are easy to walk on. Where the new sheathing met the existing roof plywood, we fastened a layer of Grace Tri-Flex synthetic underlayment, the same material we would eventually use under the new shingles on the main house **(7)**. We prefer this material to felt paper because it's lighter and stronger, it comes in wider rolls, and—especially important in this case—it can be left exposed for up to 6 months without bubbling, curling, or degrading. Since we needed to open the roof in a couple of places while we built dormers, we needed durable weather protection for several weeks.

When it came time for roofing, we ran a 36-inch-wide band of Grace Ice-and-Water shield at the eaves. At the new roof, we left most of the release paper in place until the applied eaves were installed, then peeled it off and adhered the membrane to the flared sheathing.

Applied eaves. We used salvaged eaves material to make a template for the applied eaves that would not only match the soffit, fascia, and crown molding on the existing house, but would also match the concave flare in the roof plane. Working on site, we used the template and a jigsaw to cut profiles from 2x12s. We laid out the applied eaves at 16 inches on-center—using a 2x4 ledger to keep everything in line **(8)**—and fastened them off with 10d commons, eight per tail.

We used a double layer of ¼-inch AC plywood to sheathe the flare, running it about 3 inches past the end of the applied eaves so it would

catch the crown molding. After laying down a bead of glue, we bent the first piece in place—orienting the grain side to side between the eaves blocks—and fastened it with 8d ring-shank nails **(9)**. At the corners, we let the plywood run long, fastened it, and cut the miter in place **(10)**. After the first layer was installed, we added the second layer, staggering the seams and fastening with nails only. At the corner, we again ran the plywood long and trimmed it in place **(11)**. Once the eaves were fully sheathed, we snapped a line along the edge of the doubled-up plywood and cut a clean edge **(12)**. Then we pulled the release paper off the Grace membrane and adhered it to the surface of the flare.

Because the roof pitches were unequal but the soffit depth remained constant, the flare appeared to be more pronounced at the steeper roof (see photo, page 57). This matched the existing roof detail at the other end of the house, and it inspired a little head-scratching when we were trying to get the sheathing miters right at the corners. But having a consistent soffit profile made the fascia and crown molding work go a lot faster **(13)**. We installed Lifespan solid select for the fascia and the same type of clear pine for the crown.

With the trim in place and the dormers framed up, we reroofed the whole building. That involved stripping the rest of the existing roofing from the main house, applying white, factory-painted drip edge at the perimeter, and covering any remaining exposed areas of sheathing with Tri-Flex underlayment. We used Owens Corning Duration architectural shingles, and because the site is fairly windy and the roof pitches are steep, we used the double-nailing pattern recommended for high-wind areas (see "Roofing With Asphalt Shingles," May/14).

NEW SLAB

Moving inside, we turned our attention to the gable-end wall of the main house. At the bottom, the cladding extended down into the space that would be occupied by the slab, so we decided to complete all of the demo first. After laying tarps on the slab fill to catch the debris, we stripped the wall down to the studs, removing the three-coat stucco, metal lath, building paper, plywood sheathing, and fiberglass batt insulation.

To prepare for the slab, we laid a 6-mil poly vapor barrier over the compacted sand fill, taping the seams. Then, we ran 2-inch-thick XPS insulation over the poly, extending onto the frost wall's 3-inch-

wide shelf. To create a thermal break where the slab met the stem wall at the perimeter, we ran two strips of 1-inch-thick XPS insulation vertically along the edge (see illustration, page 59). For the slab, we used 4,000-psi concrete with welded wire mat reinforcing. After it was poured, it needed to cure for 28 days before we could begin installing the radiant tile floor (see the upcoming December 2014 issue of *JLC* for details of the tile installation). We used that time to install the windows and apply the interior and exterior finish materials.

WINDOW INSTALLATION

To complete the window openings, we built short 17-inch-high walls between posts, then sheathed them and the posts with Zip System panels. The architect didn't require us to install any special wall bracing, noting that the new roof tied to the existing house acts as a shear wall. Next, we waterproofed the walls by taping both the sheathing seams and the rough sills with Zip tape **(14)**. (For more on Zip System window flashing, see "Using R-Sheathing," Oct/13).

We mulled the French casements and fixed transoms on site using Marvin's mull kit. We had never used this mull kit before, but it was surprisingly easy to figure out. After removing the top nailing fin from the casement window, we ran a couple of beads of construction adhesive on both sides of the accessory groove along the window's head. We then attached Marvin's steel mull reinforcement strip, fastening it to the frame with #7 x ⅝-inch self-tapping wood screws. We followed the same steps for the transom's sill as well. Next, we joined the two frames by hooking the two "complementary" mull reinforcement strips together, making sure the windows were properly aligned and the reinforcement strips were fully engaged. Finishing up, we installed foam backer rod in the "joined" gap, then the mull cap (on the interior we planned to cover the gap with poplar trim).

Once mulled together, each window assembly weighed about 150 pounds, and we needed two men to lift each one into position. After checking for plumb and level, we tacked the windows in place **(15)**. We wanted to be able to adjust them after they were all installed to ensure that they were properly aligned, which would make the interior trim work go smoothly. Once all of the windows were permanently fastened in position, we applied a strip of Zip tape at each jamb, running a few inches above and below

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the window frame, then ran a strip at the head flashing. After finishing each window, we rolled all of the tape with a J-roller to set the adhesive.

INTERIOR FINISH

After the rough wiring was completed in the sunroom, we insulated the knee walls, the open space in the posts, and the stud bays of the gable-end wall of the existing house with "Thermoseal" open-cell spray foam (hitting the gaps at the windows with low-expanding foam). We sprayed the whole roof assembly as well, leaving the sunroom's ceiling uninsulated. After hanging ½-inch drywall on the posts and all of the walls, we converted the two exterior doors in the existing gable-end wall into interior doors. This involved removing existing weatherstripping and the exterior sills. We planned to forgo having thresholds, instead running the tile to meet the existing oak parquet under the doors when closed. This meant we needed to extend the existing jamb trim to make up for the removal of the two thresholds. Last, we sanded and filled holes and installed ball catches and handles to close the door from inside the sunroom.

We installed 1x6 finger-jointed pine bead board on the sunroom ceiling, and used poplar for window and door trim. To match the profile of the windows, we milled a decorative bead on the casings. This complicated the window trim at the intersection of the mulled jambs with the trim at the post **(16)**, so we miter-cut the mull jambs—chiseling out the extra material—to receive the 1½-inch-wide horizontal mull trim **(17)**. We took great care with the joints, even though all surfaces in the room, including the wood trim and ceiling, would be painted white **(18)**.

EXTERIOR FINISH

The existing house was clad with traditional three-coat stucco. We were tasked with trying to match its finish not only on the new sunroom, but on all of the dormers as well (this included the three new ones we built and the four existing dormers that had water damage and needed new flashing and cladding). Also, because three-coat stucco is a time-consuming process and is dependent on good weather to dry properly, I discussed alternatives with our stucco subcontractor, John Mortillo, during preconstruction meetings. Initially, we were going to go with EIFS,


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but we were concerned about having to deal with a thicker wall assembly. The EIFS would have helped with any thermal conductivity issues related to the wall assembly, but because there was such a small amount of wall area (compared with the glazing), we decided to go with a modified system of two-coat synthetic stucco (made by Total Wall) with fiberglass mesh embedded in the base coat. It would be applied over ½-inch Durock cement board, which would be installed over ¼-inch Keene DriWall drainage matrix membrane; the WRB in this case would be the Zip System sheathing. As for the existing three-coat stucco, the plan was to clean the surface, roll on a bonding agent, and apply just the finish coat of synthetic stucco.

John's crew fastened the Keene DriWall to the Zip wall with ⅜-inch staples and used 1 ½-inch-long Durock screws to fasten the cement board to the sheathing **(19)**. To protect the exposed ends of the Durock, they installed metal J-flashing along the bottom edge of the walls, as well as around all window and door perimeters. They "taped" the Durock seams with fiberglass mesh, then power-washed the existing stucco on the entire house with a bleach solution to remove any mold and mildew.

Starting with the dormers, they applied a 1/16-inch-thick butter coat of Total Wall T-2000 Base Coat over the Durock **(20)**, then quickly embedded pre-cut lengths of Total Wall reinforcing mesh **(21)**. They worked the mesh into the butter coat starting at the center and troweling toward the edges, overlapping runs of mesh by a minimum of 2 ½ inches. Then they applied additional T-2000 Base Coat mix, thick enough to embed the mesh so that its pattern wasn't easily visible. After a day or so, the crew installed backer rod and sealant around the dormer windows and applied the finish coat. Using a plastic float, John troweled on a thin coat of Total Wall's Total Premium Elastomeric Finish over the surface **(22)**, providing a medium sand-blast texture. The finish coat was tinted, so no further finishing was required.

Where the new sunroom abutted the existing wall, they rolled Total Wall's Stucco Bond liquid bonding agent onto the existing three-coat, then covered the seam with fiberglass mesh. Next, they applied the T-2000 Base Coat mix, feathering it onto the existing stucco surface **(23)**. With the base coat on and the sunroom's windows and doors caulked, they applied the finish coat **(24)**.

FINISHING UP

The final touch on the exterior was replacement of the gutter and downspouts. This work was subcontracted to Ken and Ryan Parsons of The Brothers That Just Do Gutters, in LaGrangeville, N.Y., who installed 5-inch K-style custom copper gutters and 4x5-inch leaders around the addition and approximately half the main house **(25)**. Inside, we installed a wall-mounted Fujitsu mini-split prior to the final coat of paint **(26)**. The mini-split would perform the bulk of the heating (and cooling) duties, while the radiant mat in the tile floor was chosen for added comfort. See the upcoming December 2014 issue of *JLC* for details of the tile installation.

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