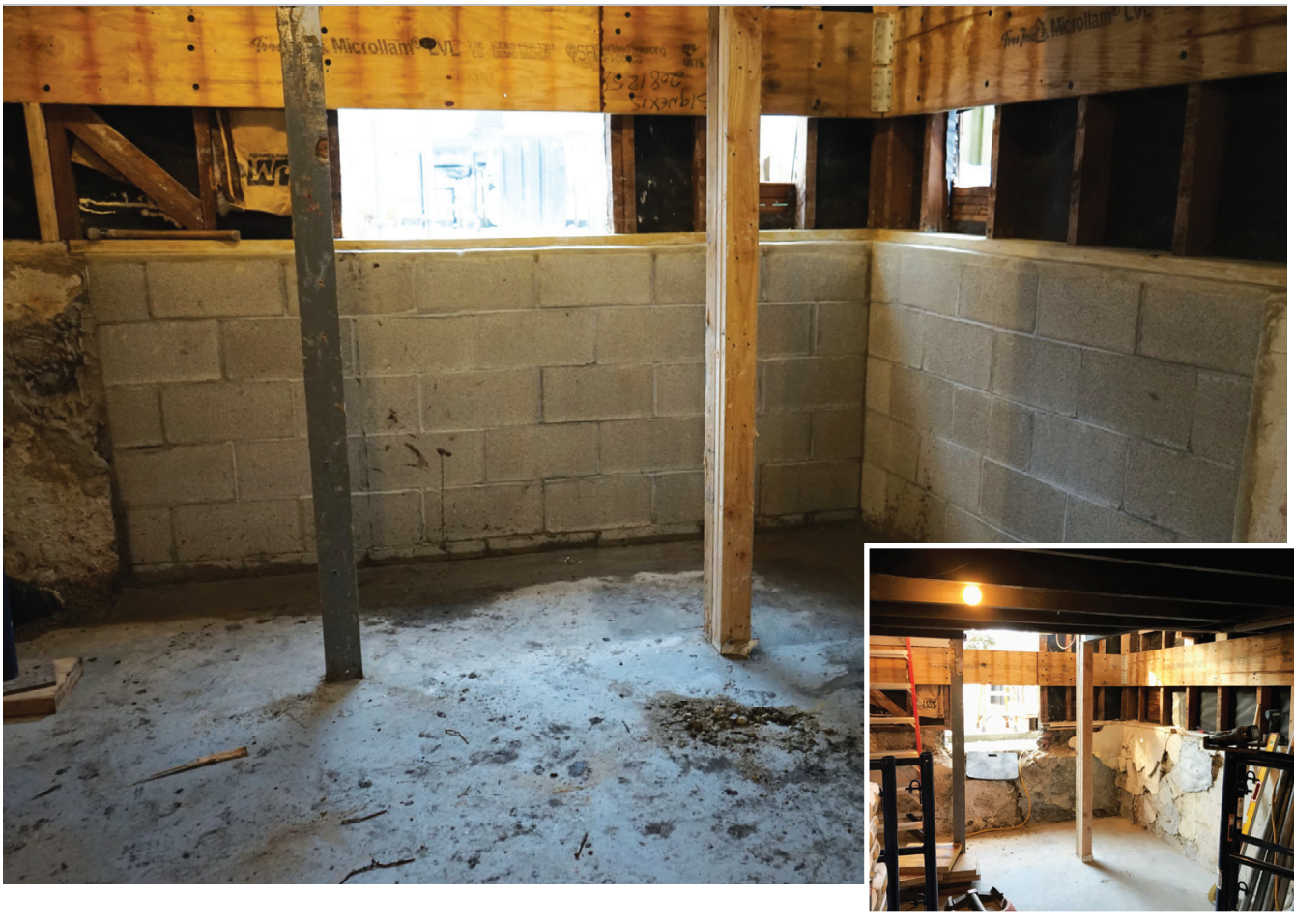


A Partial Foundation Retrofit

Save what's solid and replace what's not

BY JAKE LEWANDOWSKI

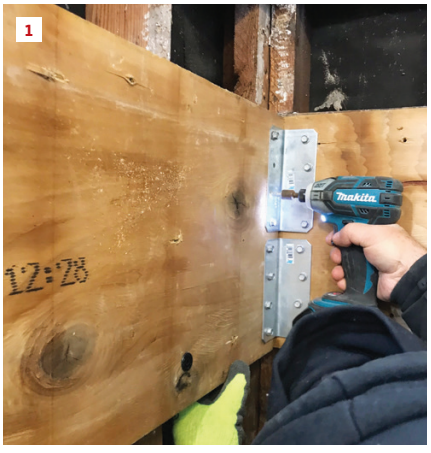
This project started for the clients with a burst pipe in the middle of winter. When they opened up the exterior basement walls—which had been framed and drywalled—to find the leak, they also found a crumbling foundation. Continued investigation revealed that the foundation was failing in two locations. A structural engineer devised repair strategies, and our company, Great Lakes Builders, was hired to do the repair work.

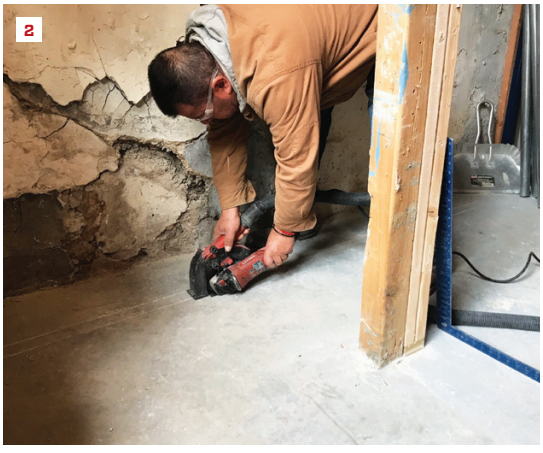
The most deteriorated section of the foundation demanded a remove-and-replace approach. When the original foundation had begun to fail, layers of parging had been applied. Those layers had since separated and the entire foundation on one corner of the house was in imminent danger of collapse.

Our plan was to replace the crumbling foundation, but first we had to stabilize the building above. To do this, we attached horizontal LVLs to the exterior wall framing, basically creating temporary headers on adjacent sides of the corner. After installing the LVLs, we made holes in the sheathing for needle beams. Outside, we supported the beams with cribbing, while interior beam support consisted of four screw jacks linked together. Once the structure was reinforced and supported, we could tackle the foundation.

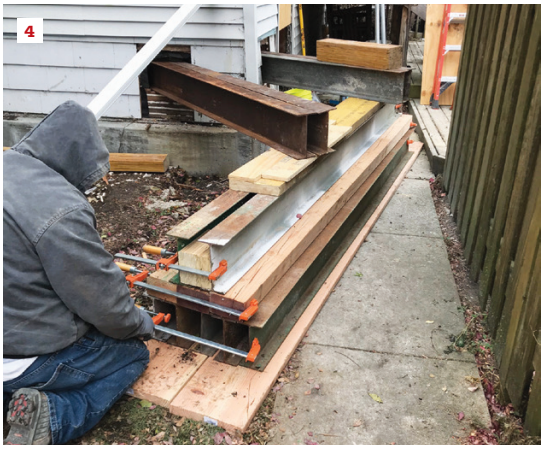
Jake Lewandowski is a construction manager with his family's business, Great Lakes Builders (greatlakesbuildersinc.com), specializing in structural repairs, in Elk Grove Village, Ill.

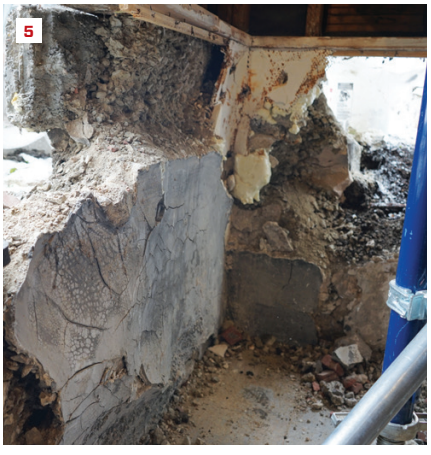
Photos by Jake Lewandowski

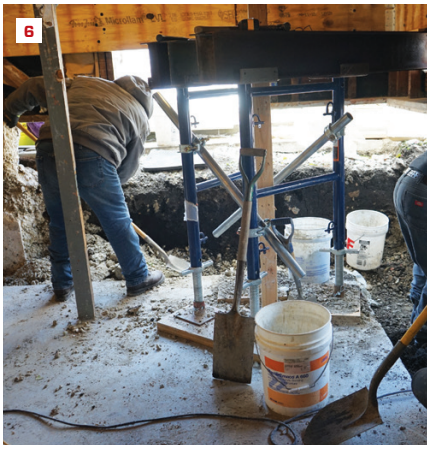


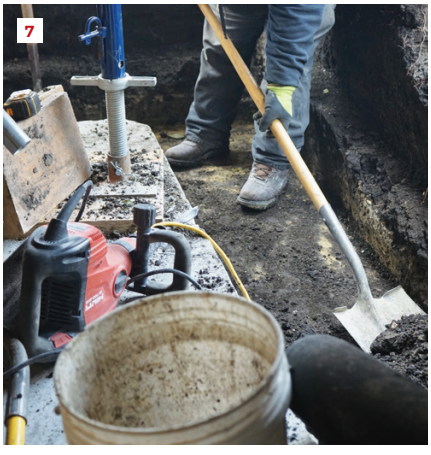


To help support the house walls at the corner, the crew bolted LVLs to the studs **(1)**. A crew member scored the concrete with a saw for the new footing **(2)**. After making holes in the sheathing, the crew inserted needle beams and supported them inside with double screw jacks **(3)** and on the exterior with solid cribbing **(4)**. The beams supported the exterior walls via the LVLs.

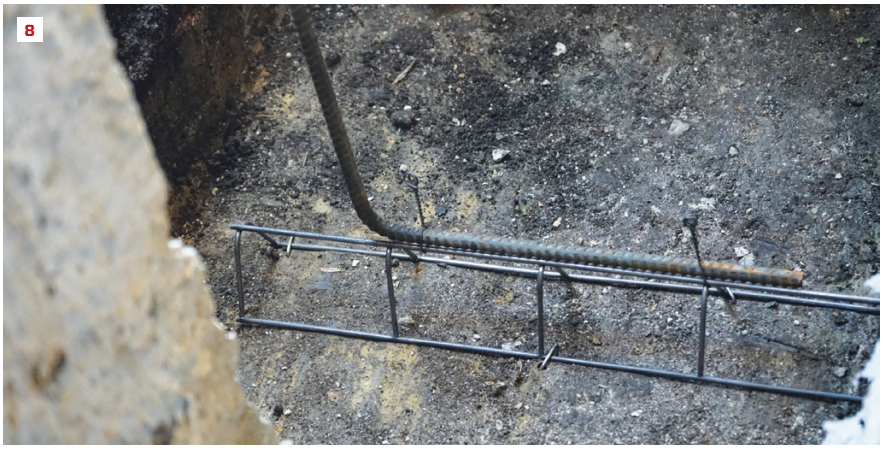


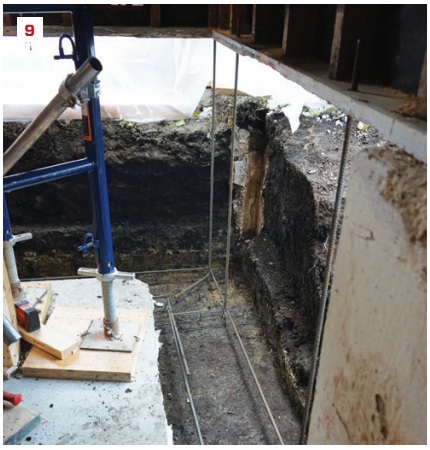




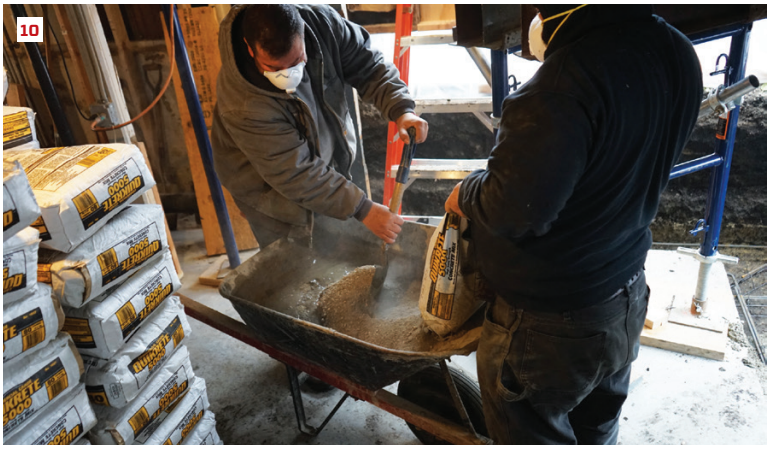


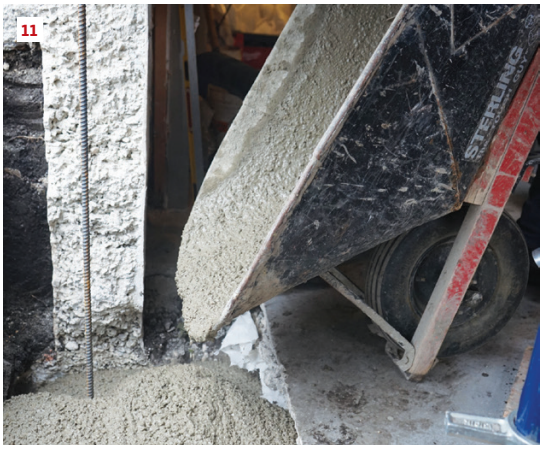
The foundation walls in this corner were in bad shape and fell apart easily with an impact hammer **(5)**. Once the walls were removed back to solid concrete, excavation for the footings could begin **(6)**. The crew dug trenches 12 inches deep and 24 inches wide for the footings, removing all the excess soil and debris in five-gallon buckets **(7)**.

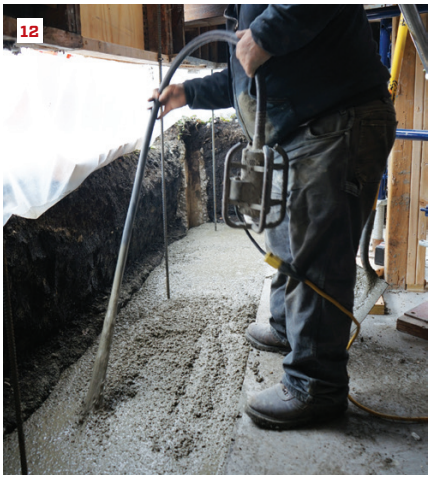




The new footing was reinforced with 1/2-inch rebar, which was tied to chairs pinned to the base of the footing trenches **(8)**. The rebar in the footing was wired together with vertical rebar that extended up through holes in the existing sill plates (which would later be replaced), tying the footing to the concrete-block replacement foundation **(9)**.







With limited space and limited exterior access, the crew had to mix all the concrete by hand **(10)**. Each batch was dumped into the trench until the footing was level with the basement floor **(11)**. To remove air bubbles and create the densest concrete for the footing, the crew vibrated the wet concrete **(12)**. Vibration not only consolidated the concrete but also made the mix more liquid, which made it easier for the crew to smooth the wet concrete surface of the footing with a float **(13)**.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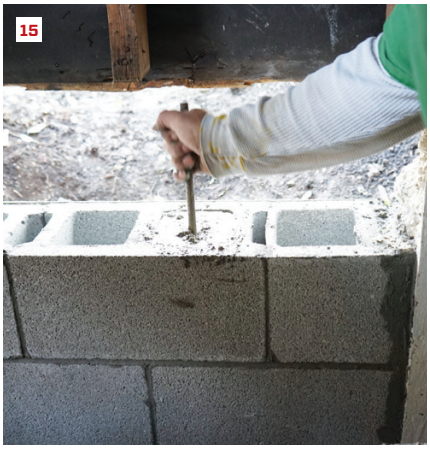
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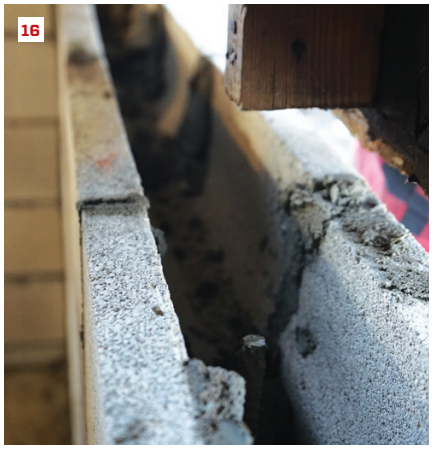
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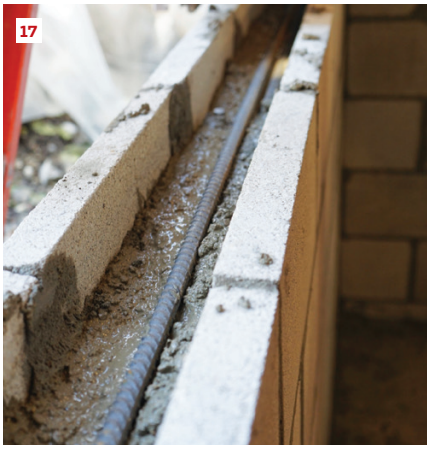
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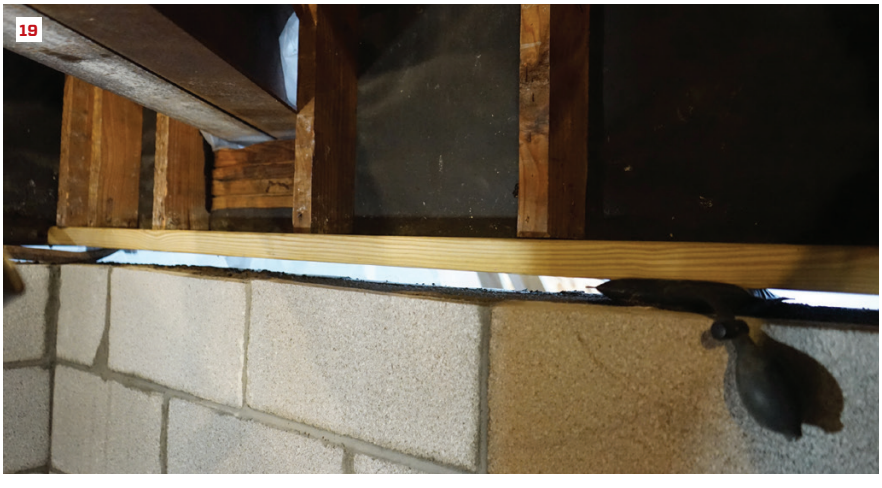
Masons built the foundation walls with Dry Block CMUs (which are made from water-repellent concrete) **(14)**, packing the cores with grout where vertical rebar extended up from the footing **(15)**. The walls were capped with a course of bond beam blocks, which were tied to the lower block courses with short lengths of rebar **(16)**. After filling the bond beam blocks partway with concrete, the crew installed horizontal rebar **(17)**, then continued placing concrete until the blocks were completely filled **(18)**.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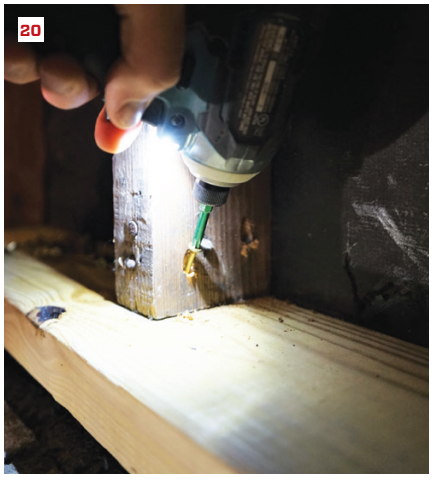
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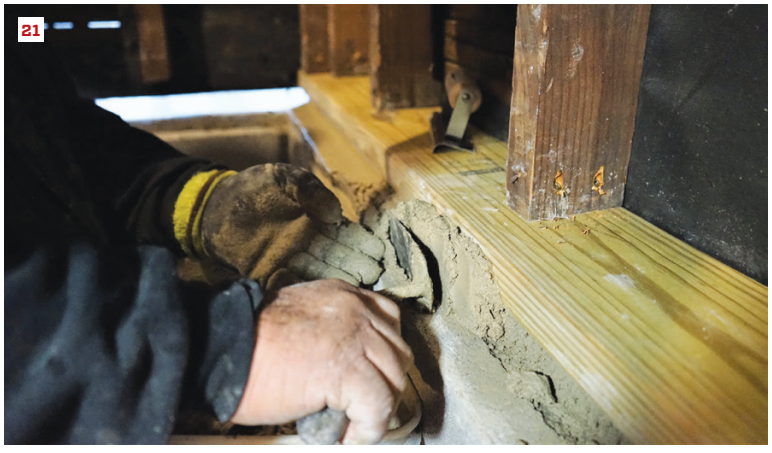
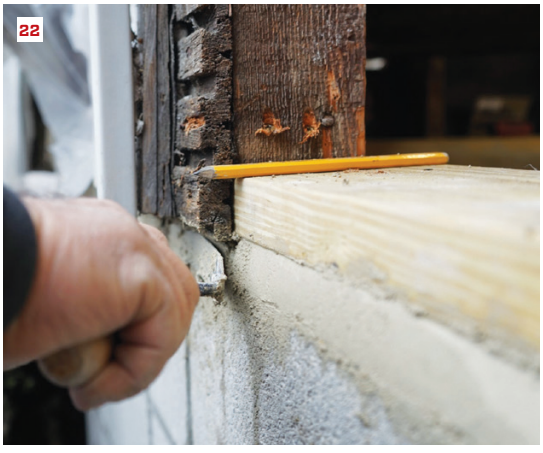
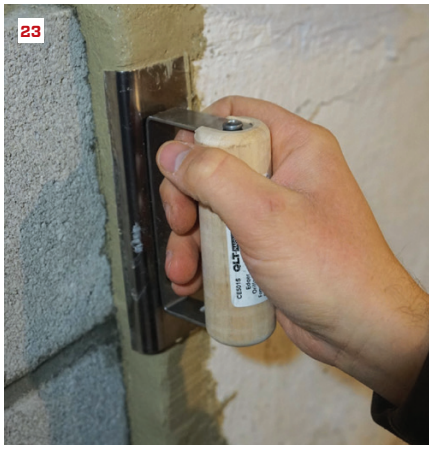
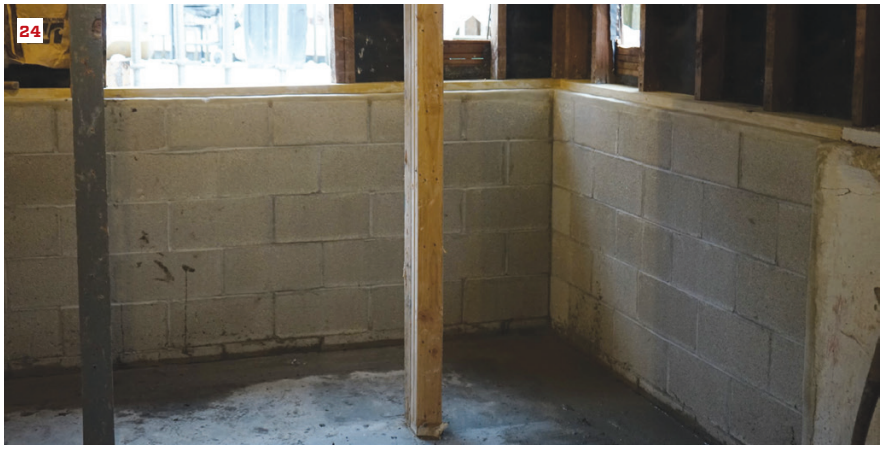
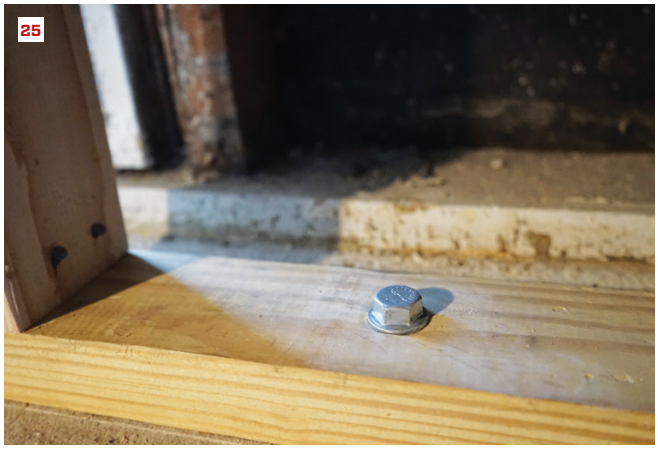
With the block wall finished, the crew replaced the old sills with new treated sill stock **(19)**. Using inflatable shims and heavy-duty pry bars to hold the new plates tight against the bottoms of the existing studs for fastening, the crew then drove galvanized toe screws through each stud and into the sills to secure the sills to the studs **(20)**.

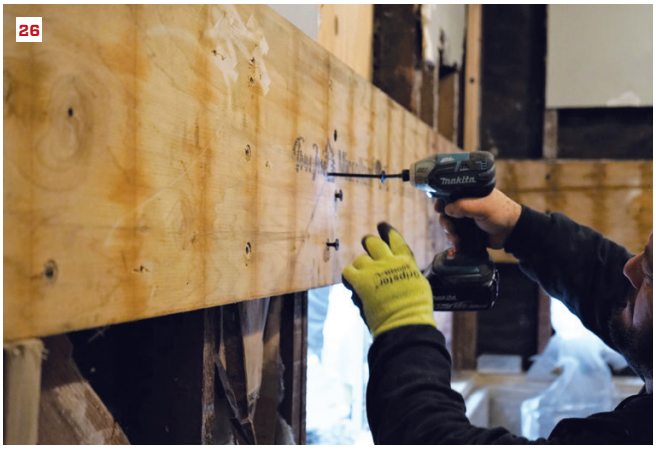




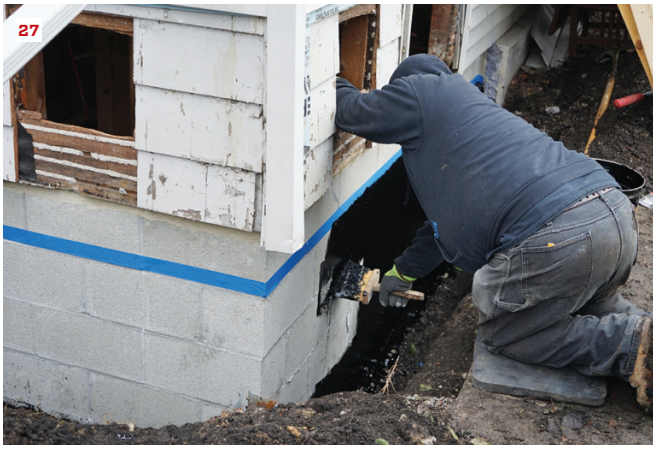


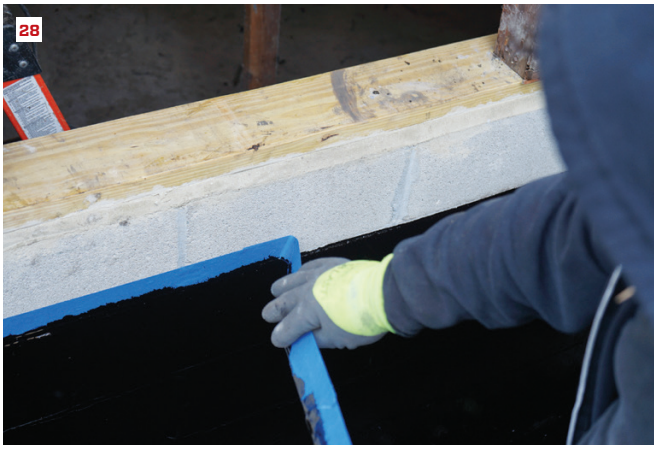


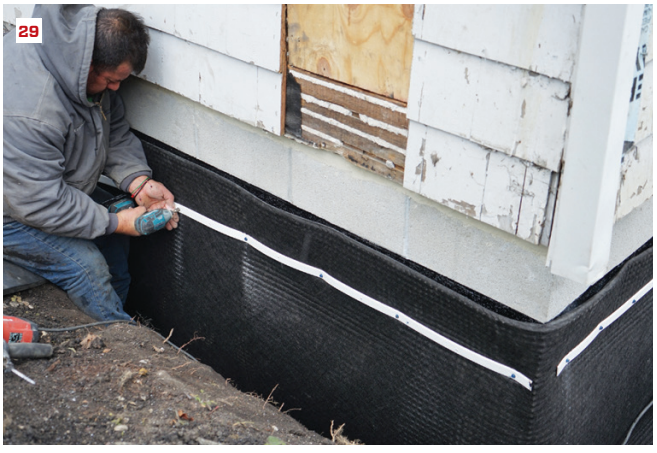


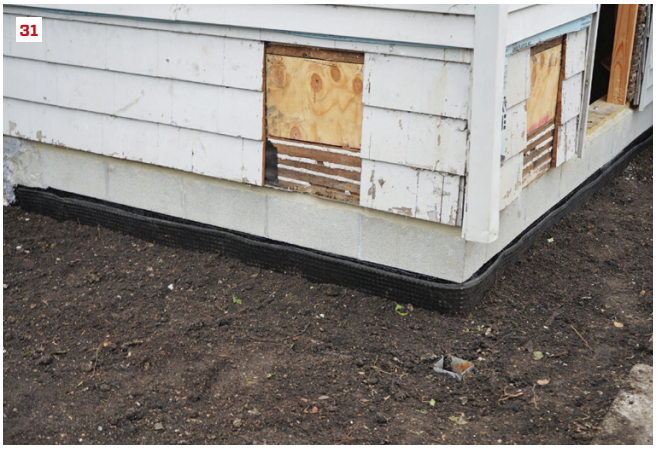


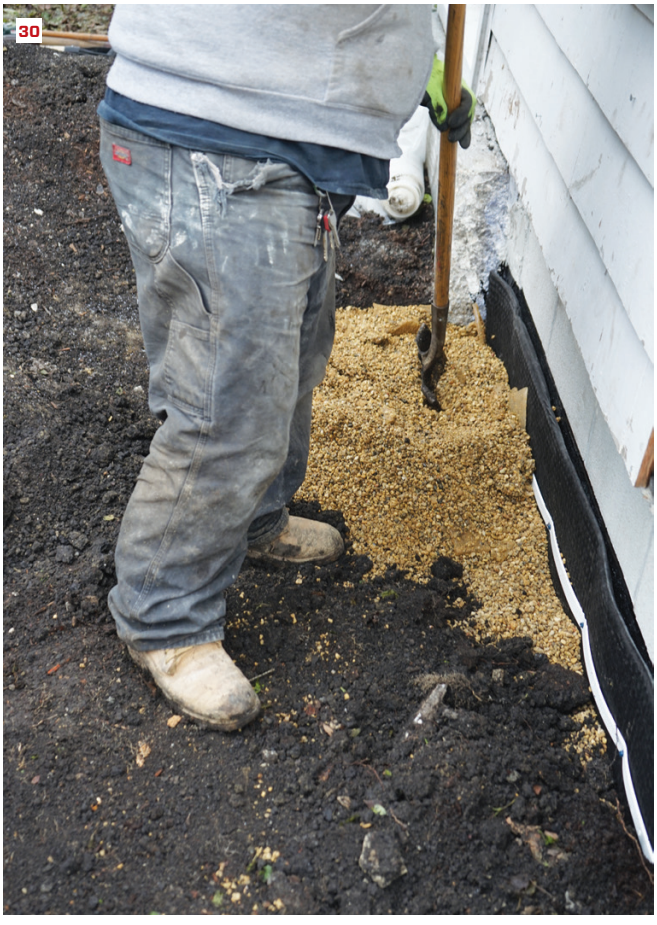
The crew filled the gap between the block foundation and the sills with high-strength non-shrink grout, forcing it under the sill from the inside **(21)** and outside **(22)** with a margin trowel. They used an edging trowel to smooth the grout along the top of the foundation and to smooth the seam between the existing foundation and the new block foundation **(23)**. After allowing the grout to cure, the crew removed the needle beams, leaving the corner of the house fully supported by the new foundation **(24)**. The crew anchored the sill to the new foundation with Simpson Titen bolts **(25)**, then removed the temporary LVL supports **(26)**.











To finish the exterior of the new foundation, the crew applied waterproofing to the block, after first masking off the part of the block wall that would extend above grade **(27)**. Removing the tape left a clean line on the block **(28)**. Then they secured drainage mat to the block with concrete fasteners **(29)** and backfilled with pea gravel to provide additional drainage next to the mat **(30)**. Once the topsoil was in place, the only remaining task was repairing the beam holes in the siding **(31)**.