

Providing natural light, fresh air, and a code-compliant exit can be the most important aspect of any basement remodel

Transforming a cold concrete basement into finished living space is one of the projects that I built my remodeling business around. Homeowners just love the idea of expanding their houses to include pool tables, wet bars, entertainment centers, and often, guest bedrooms. What they don't typically consider is that these belowground living spaces need to have at least one means of exterior escape in case of a fire.

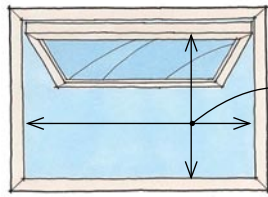
As a former volunteer firefighter, I know that installing an egress window as a secondary escape route makes sense. But as a current remodeling contractor, I know that egress windows can present a few installation challenges, especially in older homes. Also, the thought of a utilitarian escape hatch right next to a basement wet bar usually makes my customers cringe. Trust me, though; egress windows don't have to be eyesores. They can blend with your interior decor and exterior landscaping yet still meet building codes and keep you safe.

To qualify as an egress window, the location, the size of the opening, and the window-well dimensions must meet some specific requirements (sidebars facing page) that follow the International Residential Code (IRC). This code might have some local modifications, so it's a good idea to check with your local building department

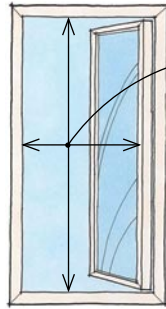


To provide a safe means of escape in case of fire, building codes require every sleeping room on every level of a house to have an egress window big enough for occupants to get out and for firefighters to get in. Until recently, this code didn't include occasional-use rooms like a basement office or den. But the latest codes (2006 IRC) require all basements, not just those with sleeping rooms, to have a means of egress as well. In many cases, a single egress window or door won't pass muster, either. As shown above, this basement bedroom required an additional egress window because the bulkhead door was not located in the sleeping area.

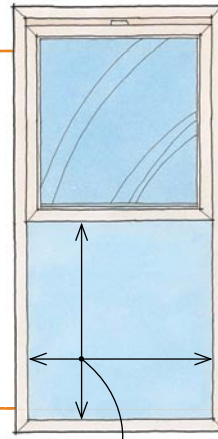
What size and what kind of window?



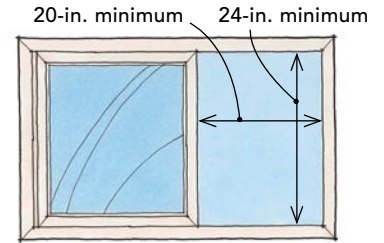
A 24-in.-tall awning needs to be 35 in. wide, but its upward swing is problematic in below-grade installations.



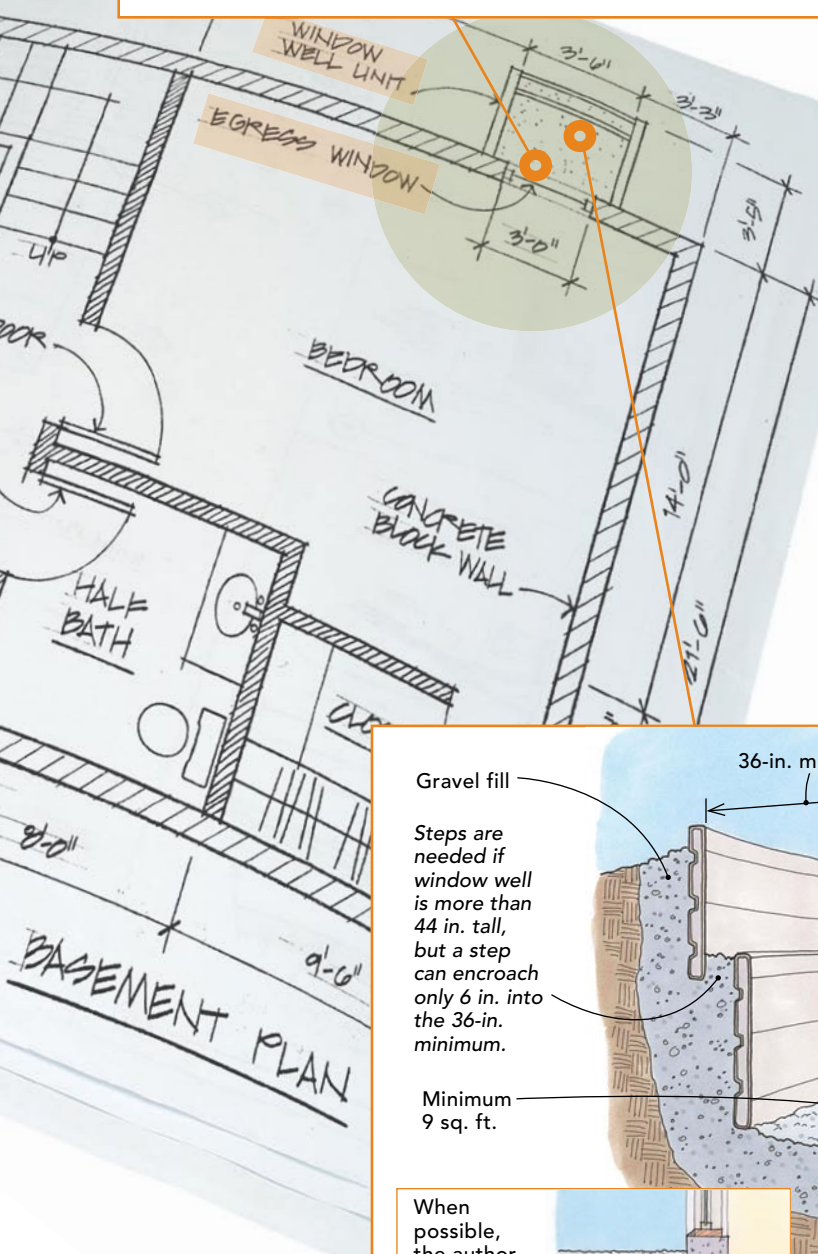
A 20-in.-wide casement needs to be 42 in. tall.



A 28-in. by 30-in. opening in a double-hung provides an acceptable 5.8 sq. ft. of net-clear opening.



A 20-in. by 24-in. opening in a slider meets minimum-dimension requirements but provides only 3.3 sq. ft. of net-clear opening.



WINDOWS NEED TO BE LARGE ENOUGH FOR ENTRY AND EGRESS

Egress windows aren't sized just to allow escape; they also must be big enough to allow a firefighter with an oxygen tank to enter, and must be operable without the use of tools.

An awning, casement, double-hung, or slider window qualifies, but the window opening (free of muntins, sashes, and window frames) must be at least 24 in. tall and 20 in. wide, and have a height, width, and cross-sectional area (known as net-clear opening) of at least 5.7 sq. ft. For example, the slider shown in the drawing above (far right) meets minimum-height and -width requirements, but doesn't provide enough net-clear opening. A slider that wide (51 in.) would need to be 42 in. tall.

Some windows also work better than others when installed in a belowground window well. An awning window might meet code requirements, but because it opens upward, it could potentially block the path of escape up the ladder of the window well.

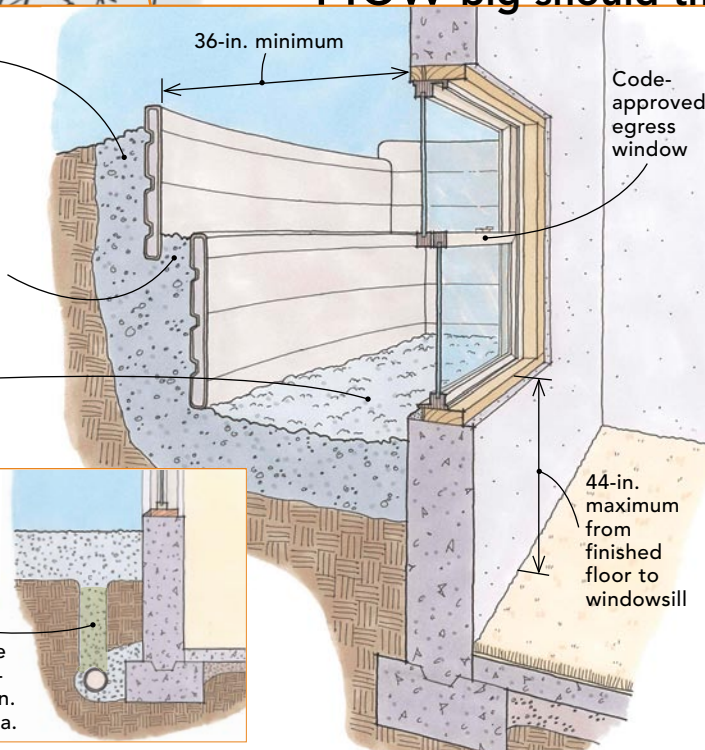
How big should the well be?

Gravel fill

Steps are needed if window well is more than 44 in. tall, but a step can encroach only 6 in. into the 36-in. minimum.

Minimum 9 sq. ft.

When possible, the author connects the window well to the underlying drainage pipe with a gravel-filled hole 8 in. to 10 in. in dia.



THE WINDOW WELL ITSELF ALSO MUST MEET RESIDENTIAL CODES

If you buy a window well from a reputable manufacturer, you can trust that its dimensions will pass code requirements. If you build the well yourself, though, make sure that it meets each requirement shown at left. If a cover is used to protect the window well, it must be nonlocking and operable without any tools. Also, whichever type of well you choose, remember to slope the surrounding grade to provide proper drainage.

Cost breakdown

The cost of installing an egress window well in a basement varies depending on what part of the country you live in and how much of the work you do yourself. I saved myself some money by using my pickup truck to haul away the dirt from digging the hole and to deliver the gravel for backfilling (savings: \$150). I also elected to rent a masonry saw to cut the block foundation rather than hiring a company with water-cooled saws (savings: about \$400). You could also cut costs by installing a less-expensive window well and eliminating the cover (savings: \$550).

- Permit: \$40
- One-day mini-excavator rental: \$220
- ScapeWEL #4048 window well and cover: \$750
- Gravel for backfill (6500 lb.): \$130
- One-day 12-in. concrete-saw rental: \$50
- Pressure-treated 2x8 for window bucks (12 ft.): \$11
- Double-hung window: \$230
- * At the time of this installation, my chief building inspector allowed me to install a window that required the removal of the window sash to meet the size requirements. This window probably wouldn't have passed muster in most parts of the country, and if I were to do the same installation now, a larger window most likely would be required.
- PVC window trim (8 ft.): \$19
- Miscellaneous (caulk, fasteners, ready-mix concrete, and lumber for bracing): \$35
- **Total: \$1485**



before you begin doing any amount of work on an egress-window project.

You also need to check lot lines and zoning setbacks. A code-compliant egress-window well projects at least 3 ft. from the foundation, and in some neighborhoods, that distance might be too close to a lot line. You'll save time if you identify these problems up front and show all this information on the drawing you take to the building department when obtaining the permit.

Rent a Dumpster and a mini-excavator

The ScapeWEL unit (The Bilco Company; see "Sources," p. 90) I used here requires a 1-ft. overdig on all sides, which leaves room for a layer of river rock or pea gravel to provide adequate drainage. This means you're going to be digging an oversize hole and removing a lot of dirt.

On one of the first egress windows that I installed, I thought I would save some money by digging with a shovel and hauling away the dirt myself. That was a bad idea. The window well might have been small, but my first load of dirt weighed in at 3000 lb.; the second hit 3500 lb. Any money I saved in excavator and Dumpster rentals surely was spent on back massages.

Nowadays, I contract with a refuse company to place a Dumpster near the hole, rent a mini-excavator for the day, and take it easy on myself. Even with an excavator, I still need to do some of the fine digging and leveling by hand, but I save myself no small amount of strenuous labor.

Leave room to cut the foundation

Once the hole is dug, I typically cut an opening in the basement wall, install the window, and finish by installing the window well. The water-cooled saws used to cut concrete are pretty big, and leaving the window well until last means more room to maneuver the cutting equipment.

This job proved an exception to that rule because I had some bad weather coming in and the window was back-ordered. I needed to move the job ahead, so I dug the hole and installed the window well, leaving the foundation work and window installation for another day. I also knew that in a pinch, I could cut an opening in the block foundation with a smaller hand-held masonry saw fitted with a diamond blade. It's not my favorite option, but these smaller saws are more maneuverable in tight quarters.

Anchor the window with wedge bolts

I've seen some contractors install window wells using masonry screws or powder-actuated nails, but these fasteners don't have the pullout or shear-load strength that I prefer, or that is required by the manufacturer of the well I used here.

I prefer to attach window wells with 3/8-in.-thick, 2-in.-long wedge bolts (sometimes called expansion-sleeve anchors) because I really like the way they suck in tight when I torque them with an impact driver. The flange holes on the ScapeWEL are made for 1/4-in.-thick fasteners, but I prefer to use a larger 3/8-in. fastener for a stronger



TAKE CARE WHEN DIGGING

Always phone the national **Call Before You Dig** hotline (811), and ask them to check the area for buried utilities. It's a free service and will save you headaches down the road (see "Cross Section," p. 20, for more information on the new 811). On the job shown here, I had to deal with only an underground sprinkler system and a bit of low-voltage wiring, but you never know what might be lurking.

Also, be careful when digging near the foundation, especially if it's old, is built of block, or has some obvious cracks. Excavators are heavy machines, and you don't want to end up in the basement prematurely.

1. Prepare the hole



1. A small window well requires a pretty big hole. Digging the hole for an egress window might not look like a big job, but you probably will have to remove roughly 6000 lb. of soil. A mini-excavator helps to make short work of the digging and is well worth the daily rental fee, especially if you need to remove large rocks or buried concrete wells (photo far left). With the hole dug roughly to size, I do fine digging and leveling by hand. Once the foundation wall is exposed, I clean out cracks or defects that won't be cut out to make way for the new window and seal them with urethane caulk.

2. Measure and mark



2. Measure and mark for the new opening. After transferring the dimensions of the window well to the foundation wall, I use a level to scribe a plumb line so that I can accurately position the pilot holes needed to attach the L-shaped metal flanges that hold the window well to the foundation wall.

3. Secure the sides



3. Drill pilot holes for the mounting flanges. Holding the side of the window well in place, I drill pilot holes for the fasteners with a masonry bit before installing $\frac{3}{8}$ -in. wedge bolts. In this case, I also had to chip away some of the split-faced block near the top of the foundation so that the metal flanges would sit flat against the wall. This house had 12-in. heavy-block foundation walls, so I hit solid block for most of the wedge bolts. For those that hit a void, I used a fast-curing acrylic adhesive injected into wire sleeves to hold the fasteners securely (www.itwconstruction.ca).



4. Assemble and backfill



4. Two-tiered back panels double as steps. With the two sides anchored to the foundation wall, I attach the two-tiered back panels, which double as steps for climbing out of the hole in case of an emergency. After bracing the window well so that it stays square, I evenly backfill the hole with gravel to provide adequate support and drainage.



Egress options: basic and beyond

Safe, code-compliant egress will always be the primary consideration when installing a window well. But finished appearance is also important. Fortunately, prefab units are

available in lots of styles, made from metal, plastic, or even masonry. If you prefer to make the well yourself, consider poured concrete, interlocking landscape stones, or even railroad ties; just be sure to follow code

requirements. Although it's possible to buy the window well and the window separately (as I did for this project), there are definite advantages to buying all your components from one manufacturer. For one thing, you can be sure the dimensions of the window and well comply with building-code requirements.



Sources

The Bilco Company
www.bilco.com

Boman Kemp
www.bomankemp.com

Egress Window Systems
www.egresswindowsystems.com

Mar-flex
www.mar-flex.com

Monarch Manufacturing
www.monarchmanufacturing.com

RockWell Inc.
www.rockwellinc.com

Wellcraft
www.wellcraftwells.com

attachment. To accommodate the larger wedge bolts, I enlarge the flange holes a bit with a drill.

In this case, the foundation walls were 12-in.-thick, heavy concrete block. I was able to hit solid material for most of the fasteners, but in a couple of places, I hit a void and had to insert a wire sleeve and adhesive to hold the wedge bolt (photo p. 89).

Two ways to mount the window

Once the hole is cut and prepped, there are two ways to attach the window in the masonry opening, and each has a benefit. The first method is to attach the window directly to the concrete with masonry screws driven through the side jambs. The second option is to frame the masonry opening with pressure-treated wooden bucks, and then fasten the window to the wooden bucks.

The advantage of the direct-mount method is that you don't need exterior trim. You can just caulk the outside seam between the window and the concrete, and you're done. In this case, I wasn't sure how the blocks would look once I cut and knocked them out, so I chose to install bucks, then trim the outside.

When I trim the exterior of a window, I like to build up a sloped-concrete sill on the bottom because this is where water tends to accumulate. Then I cut the side and top trim to fit the space between the window and the block and lintel. I then caulk where the trim meets the window and the block and lintel.

Ordinarily, this step would finish the installation, but *ordinarily* is a dangerous word in the remodeling business. This foundation had some cracking issues, and although it wasn't badly bowed, cutting deeply into a block wall had me concerned about its long-term structural integrity. I elected to install a 4-in. steel I-beam on each side of the opening. In fact, it's a good idea to consult with an engineer anytime you're concerned with the structural integrity of foundation walls, and it's definitely best practice to do so if the hole you're cutting will be more than 4 ft. tall with full-height grade on the outside.

Make provisions for proper drainage

The one issue I didn't cover in this installation that deserves comment is water in the window well. Anytime a home has a sump pump and drain tile, I tie into the system with a gravel-filled hole under the well. At minimum, if there is no drain tile, it's important to buy a cover for the window well. This isn't the best option, but it does keep water outside the well. Either way, make sure you have a positive slope away from the well in all directions.

On particularly problematic sites, I have gone as far as installing a sump pit in the window well itself, or knocking out additional concrete to run drain tile to a basement sump pit and pump. These options are more expensive, but are better than having a wet basement. □

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CUT AND PREP THE OPENING

I usually spend from \$400 to \$600 to hire a company with water-cooled concrete saws to cut foundation openings. Their saws are large enough to cut all the way through most block or concrete walls from one side, saving me from having to cut from both sides.

In this case, I cut the wall myself to save money. Concrete saws make a lot of debris, so I wear gloves and a long-sleeve shirt to protect myself. Ear and eye protection go without saying, but you can also expect to be surrounded by a large cloud of concrete dust, which is hazardous to your health, so make sure to wear a properly rated respirator.

Photos this page, from top: Courtesy of RockWell Inc., Wellcraft, and Mar-flex.

1. Break on through to the other side



A small saw makes cuts from both sides of the wall. Even after cutting from both sides of the wall, I still can't slice deep enough to remove the 12-in. blocks cleanly. So working from inside the basement, I use a sledge to break the concrete blocks loose, then use a rotary hammer to clean up the rough edges around the sides of the opening.

Fill the voids and frame the opening. With the sides of the opening smoothed out, I use bag-mix concrete to fill the cores in the exposed block at the bottom of the opening and to level any inconsistencies in the block. Then I frame the opening with pressure-treated bucks and seal the exterior joint between the new wood and the existing concrete with urethane caulk.

2. Below-grade windows need special detailing



Corrosion-resistant nails are a must. This is a below-grade installation, so I fasten the window to the pressure-treated bucks with stainless-steel nails.



Slope the sill to help shed water. With the window in place, I mix a small amount of concrete and apply it under the lower nailing flange. Slope the concrete just enough to ensure that any water running down the window drains away from the opening.



PVC trim is best for below-grade uses. I prefer to trim basement egress windows with PVC trim because they likely will see lots of water, and I don't want to worry about rot. Finish the job by applying a bead of caulk where the window meets the trim and another where the trim meets the foundation.

