Building and Design - "How To" Details

SAFERhome Standards - STRUCTURAL & DESIGN

	STRUCTURAL & DESIGN	8 Standards	
Criteria	SAFERhome Standard	Description	
1	Exterior Thresholds	All exterior thresholds are flush.	
2	Interior Thresholds	All interior thresholds meet minimal code constraints (eg. shower entrance).	
3	Doors (pinch points)	All doors and pinch points are a minimum of 34" but ideally 36" wide.	
4	Hallways	All hallways are a minimum of 40" but ideally 42" wide.	
5	Washroom Wall Reinforcements	Reinforced with 2x12" solid lumber in all washroom tub, shower, and toilet locations.	
6	Wall Reinforcements (Top of the Stairs)	At the top of all stairs, walls are reinforced with 2x12" solid lumber at 36" to centre.	
7	Multistory Connection Provision	Either an allowance for an elevator options in stacked closets or build all staircase(s) with a minimum width of 42".	
8	Sink Cabinets	Cabinets underneath each sink are easily removed.	

	STRUCTURAL & DESIGN	Criteria 1 Exterior Thresholds	Building and Design "How To" Details

Criteria 1 - Exterior Thresholds: All exterior thresholds are flush

Exterior thresholds are the entry points to the building. The four most commonly used methods are:

- slab on grade based entry thresholds,
- frame based entry thresholds,
- optional framing techniques for skim coat, and
- sliding patio doors.

Foundation Slab on Grade Based Entry

The key to a SAFERhome slab on grade foundation based threshold is to create an indentation in the foundation which reserves space for the shim, weatherproofing, and threshold material. In the past, these materials were simply attached on top of the finished foundation wall, creating a tripping hazard. But if you create a space so they can be recessed into the foundation, your threshold will be flush with the flooring — safer for everyone from toddlers to seniors. In a SAFERhome, you're going to modify the foundation form so a space will be reserved right when you pour the concrete.

To begin, grab your blueprints, a measuring tape, and a thick, black carpenter's pencil, then mark where each exterior entrance will be located directly onto your foundation forms. Allow an extra inch on either side of each opening to give adequate clearance for installing your doorframe and bulkhead — in other words, if your door is 36 inches wide, your measurement will be 38 inches.

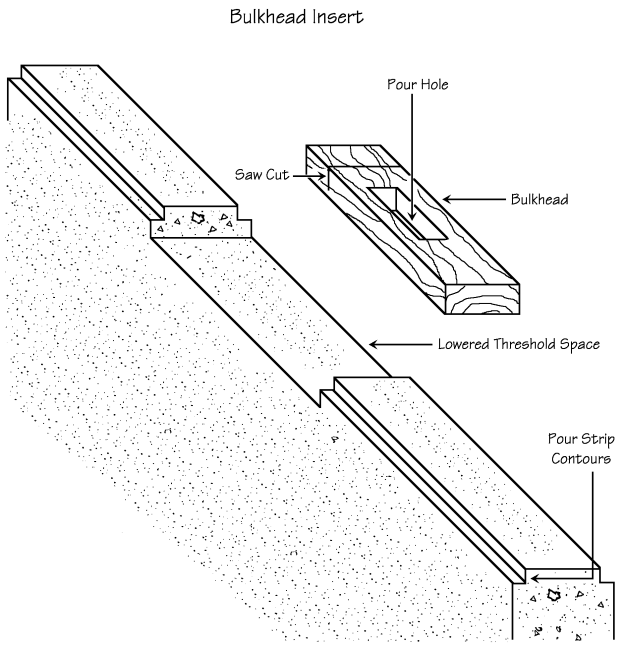
Once you've marked where the doors will be located, remove the pour strips directly below each entrance because we're going to replace them with a bulkhead that fits inside the frame itself. Pour strips are simply pieces of 1x1 inch material you'll find nailed on the form frame's interior walls to mark how high the concrete will be poured.

Removing them is simple — just four quick saw cuts and the pour strip sections below the doorway should pop right out.

The next step is inserting a bulkhead to create the all-important recess for the threshold material which will form the door's bottom plate. A bulkhead is nothing more complicated than

a piece of 2x4, 2x6, or 2x8 lumber. The width of the bulkhead should match the inside width of your form framework, so the size you use in order to get a snug fit is entirely dependent upon the thickness of your foundation wall.

Just remember, once installed, the top of the bulkhead must be the same height as the top of the pour strip — it's only purpose is to reserve space for the threshold, shims, and weatherproofing material. The best way to attach the bulkhead is still the old, tried and true method — using common or, even better, double headed nails nailed through the outside of the form walls and into the bulkhead.



One word of caution: when you attach the bulkhead, be sure to leave enough of the nail above the form surface so you can remove the nails easily once the concrete has set and you're ready to dismantle the form framing.

Another important detail is to incorporate a crosscut into the bulkhead material. This cut should be about three quarters of the way through the material and creates a relief point so when it's time to pop out the bulkhead; you'll be able to pry it out of the form with minimal chance of doing any damage to the concrete or yourself. There's only one crosscut required.

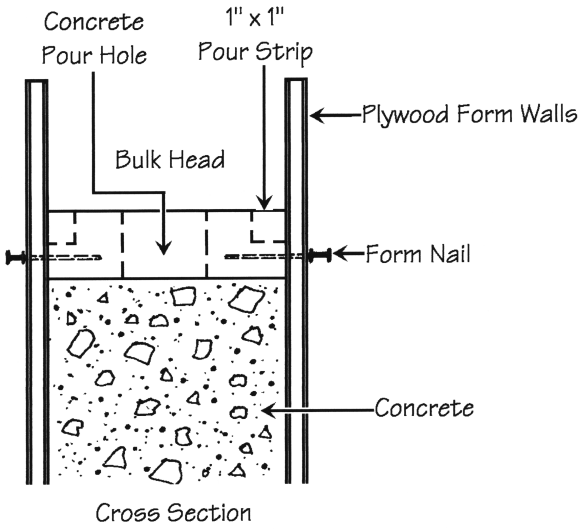
Caution - Honeycombs, well that's exactly what can happen to your concrete foundation if air bubbles form under the bulkhead. Unfortunately, in a house foundation, this means loss of strength and rigidity. Translation: your wall isn't living up to its purpose which is to support your home.

Two traditional ways of eliminating those unwanted Honeycomb-style air pockets under the bulkhead are:

- pound the sides of the forms with sledgehammers while the concrete is being poured, or
- use a compacting machine and vibrate the concrete into place.

Cut an opening or pour hole in the centre of the bulkhead before you install it. If you're putting in a double door or an opening greater than 48 inches in width, you'll need an additional pour hole in the bulkhead to ensure even and complete distribution of the concrete mix. See diagram.

If your exterior doors open inward, it's important they are high enough to swing without chaffing, roughing, scuffing, tearing, or otherwise marring the surface of your interior floors.



Cross Section

Shims are used for height adjustment and are usually made out of some type of treated wood. Since this is an area where water could potentially enter your home, use a proper sealant on both the top and the bottom surface of the shim material. This provides a significantly better seal against water penetration than older building techniques and standards.

An acceptable alignment positions the interior finished floor surface no more than half an inch below the top of the threshold. The door can swing freely and the extra space will permit tile to carpet or carpet to hardwood without adding significantly to the tripping statistics. Of course, you could always take out some of the shim, but if you've already left enough room, you won't have to bother.

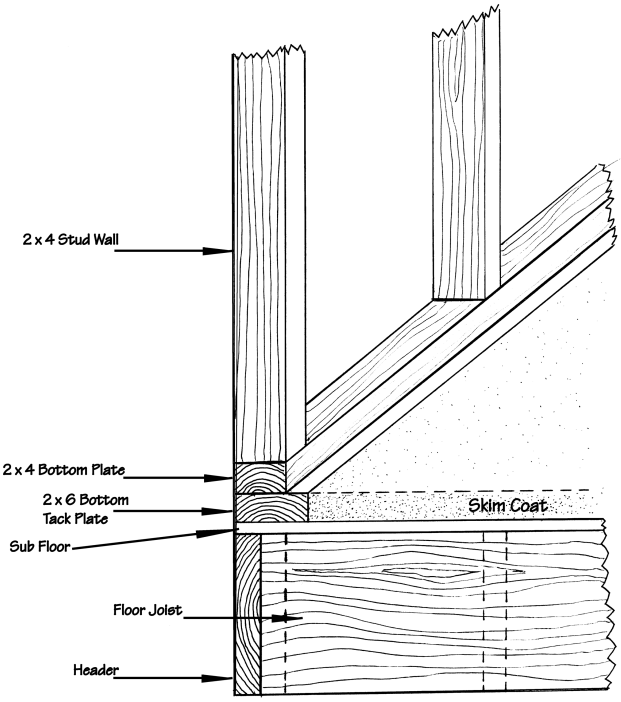
Planning an outside slope away from the threshold/door sill is also crucial and applies to outside decks, patios, porches, verandas, and sidewalks. Check your local building codes for regulations governing the amount of slope required on outside decks and patios. Usually 2 percent of slope is ample to ensure water sheds away from the house. Or, when in doubt, a simple 1:50 will allow the rain to run off. There is also the option of putting a strip or trench drain at the outside threshold of the door and that will remove all water build up issues and allow for a flatter entrance surface.

Frame Based Entry Threshold Techniques

The following is a method of removing thresholds with the frame based construction method.

Simply remove the wall's bottom plate(s) and possibly the plywood sub-flooring below the door. This will create a recess for your threshold and allow a better than even chance it won't get in the way during the comings and goings of daily life.

In most standard construction, a rim joist — usually built from doubled 2x10s — runs around the perimeter of the platform framing. Some plans call this rim joist a header. We will use both terms interchangeably.



First, establish the height of the interior floor finish to figure out if you need to cut out the sub flooring at the door locations where the threshold will sit. In most cases, you won't need to because the inside floor finish will be thick enough to remove the tripping hazard.

But remember, soft squishy carpet compresses, so if your 3-inch plush gets squeezed down to 1-inch, you've just created a 2-inch tripping hazard. And you've still got to think about that allowance of 2 inch more width than the size of the door being installed.

In most new homes being built, all you need to do is cut away the bottom sill plate of the wall framing in the doorway and install the doorframe on the plywood flooring. If you need to go lower, then attach wooden blocking onto the rim joist between the floor joists anywhere an exterior door will be located to give the threshold something to rest on. The top of this reinforcement blocking should be flush with the top of your floor joists. Once again, make sure there's enough clearance for your door to swing without scuffing.

Optional Skim Coat

A skim coat is simply a thin covering of lightweight concrete poured on a sub floor. It's usually used for soundproofing or to give the floor a more solid, substantial feel.

The most noticeable characteristic of skim coat construction is the use of a double bottom plate on the framed walls. The lower 2x4 or 2x6 is your shoe plate and has three purposes: it's a marker for how thick to pour the concrete; it acts as a dam so the concrete doesn't flow over and out of the walls; and it maintains the standard 8-foot ceiling height.

Only cut out the upper part of the bottom plate when you install your doors except in very, very unusual situations. Depending on your interior floor finish, you may decide to remove the entire double plate and then shim the door to the desired height as this sometimes gives you more

adjustment options later on.

If you use skim coat construction and your interior walls are framed with 2x6s, then use a 2x8 for your bottom plate. When you're ready to lay carpet, you'll have solid wood to attach your tack strip to.

In some cases, when incorporating a concrete skim coat into the home design it may also be an opportunity to slightly slope or bevel the concrete skim upward as it flows toward various thresholds. This will give you an invisible and zero transition at the doors.

Sliding Glass Doors

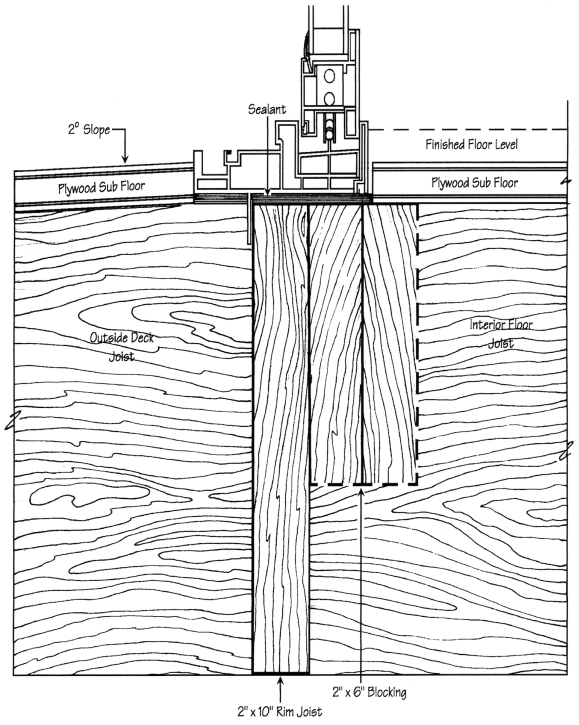
To start, remove the entire bottom plate and sub floor at the door opening and build in blocking between the joists. If you're using a skim coat, you may decide not to cut the sub floor when you install a sliding glass door. In this case, just put the threshold on top of the plywood sub-flooring and slope the concrete up to the frame so the tripping hazard is removed.

Once you know the height of your interior floor finishing, you'll be able to use shims to adjust the door up or down. Then simply use the standard best practices and locally approved sealing techniques.

Thresholds Revisited

- Slope the outside area 2 degrees away from the door to ensure proper run off,
- Use proper sealing techniques for the door itself, and
- Pay attention to the leveling and height of your finished floor so the door doesn't scuff and scrape the finished surface.

If the door being installed is susceptible to weather influences and water penetration may be a problem, then install a strip or trench drain on the outside of the threshold so that water cannot build up or penetrate the doors weather stops.



Criteria 2 - Interior Thresholds: All interior thresholds meet minimal code constraints

The tripping hazard threshold to the shower should be removed or lowered.

Let's start by eliminating the threshold in the shower area. It's been our experience that by taking the threshold out, you've just made your shower stall safer and more toe-friendly because you've eliminated another major tripping hazard.

This threshold removal is a simple idea which makes sense for everyone, but — and this is a big one — many threshold bylaw requirements are, sadly, out of date. Especially if you are currently able bodied and just want to design options for your future independence, safety, bylaws and building codes at all levels of government sometimes make it difficult to resolve this problem.

Typically, these codes look for a drop of approximately 3 inches for drainage in your shower area. We believe 2 inches is more than adequate, because the last thing we want to do is create another hazard by having a shower with a sever slope. Better yet, put in a trench drain and reduce the slope to 1 percent. If you install a trench or strip drain at the shower threshold and still have a main drain in the standard location, then the threshold drain becomes an overflow drain just like the other CSA approved drains that are used for all sinks and tubs in the bathroom environment.

Here's what you'll need to do to create a SAFERhome shower:

- Drop frame the designated area of the shower stall base,
- Install trench and main drains,
- Lay in your first coat of mortar or concrete to create the base and drainage slope for the waterproof membrane,
- Install the liner/waterproof membrane,
- Lay in your top coat of mortar/concrete over the liner and produce the shape for the speed bump and proper slope to the drain, and
- Install tile and grouting, and then complete your enclosure.

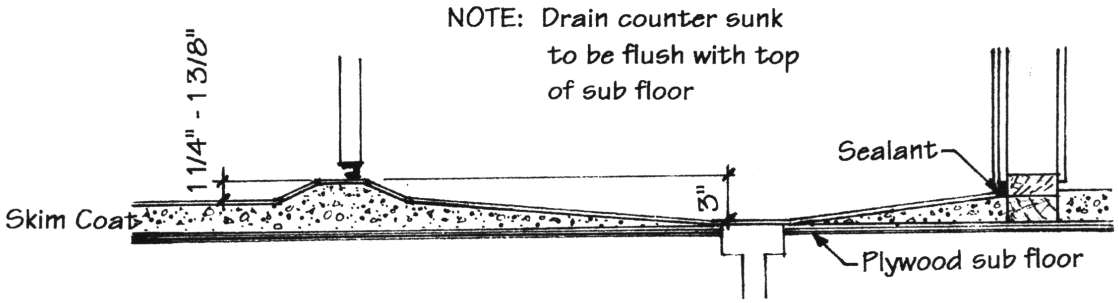
Step 1:

If your floor joists are 2x12, all you have to do is box frame the area to be dropped, and then

finish framing in that floor space with 2x10 lumber. This is a great place to use those floor joist hangers. Just be sure you keep in mind the load characteristics of your floor as you're designing: if in doubt, call your engineer.

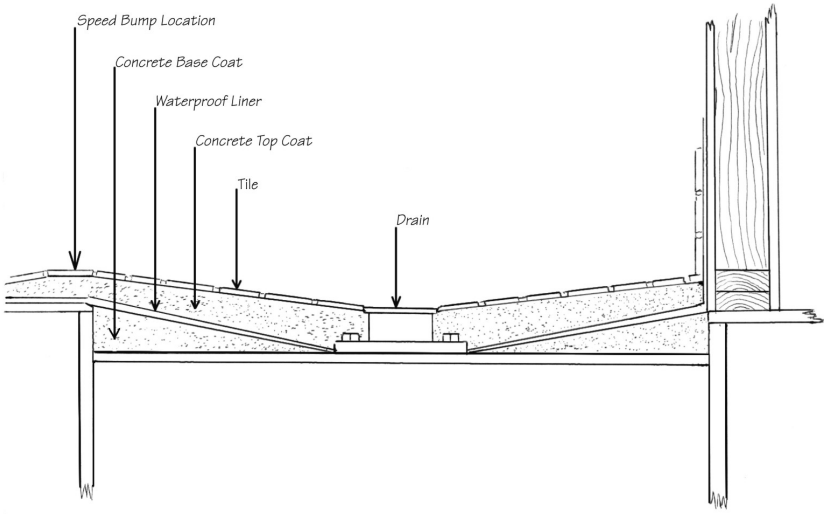
Step 2:

Using a router or even just a file, smooth, or round over the top edge of the sub-floor on the inside top edge of the shower entranceway. This is to ensure when you install the liner there are no sharp edges to potentially rip the waterproof material. This also helps to prevent your mortar from cracking at this floor transition area in the future.



Step 3:

Lay in your first coat of mortar or concrete to create the base and drainage slope for the waterproof membrane. It is important to get this first slope in place properly, because what we are doing is ensuring the slope and base are going to seal against water penetration into any inside corners or edges of the drop framed area. This is just the first of two coats, but it's important to establish where the door to the shower and the speed bump are going to be located. This ensures the door and the speed bump are correctly aligned and can work together to create a proper seal and slope which will keep the water inside the shower area.



Step 4:

Install the liner/waterproof membrane. The only difference you'll encounter from standard liner installation is that

the liner needs to extend further out onto the bathroom floor area. This should satisfy your local inspection authority's requirements.

Step 5:

Lay in your top coat of mortar/concrete over the liner and produce the shape for the speed bump and proper slope to the drain. Keep in mind that you still need to allow for the depth of the tiles in this design so the tiles will meet up with the top of the drain properly. You should also look carefully at the way your speed bump transitions into the shower drop area.

What you need to watch out for is that the mortar/concrete has sufficient depth or thickness to it at the point where your standard height sub-floor meets up with the mortar/concrete shower base. If it is too thin at this location, you may develop cracking problem later on.

The two main functions of this speed bump are to achieve a closer to code drainage drop in the shower and to provide a plateau for the swinging door to seal against. Just as in our other threshold sections, we don't want the shower door to scrape, drag, or mar the tile surface by being mounted flush to the floor. The flat top of the speed bump works well.

Step 6:

Install your tile and grouting, and then complete the enclosure.

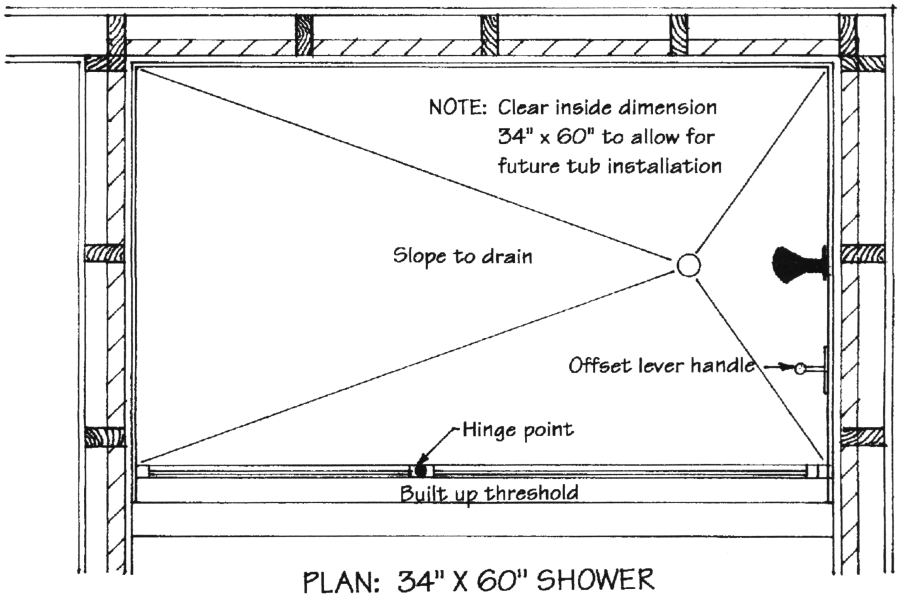
As you'll find throughout this manual, we have strong rationale for reducing the threshold while keeping in mind its original purpose of keeping something, in this case water, where it ought to be.

One last consideration relates to the size of the shower facility and just how many expect to occupy it at any one time. With a little ingenuity, you can create a comfortable party-sized shower without making significant changes to the overall size of your bathroom.

Below is a plan of a generous shower occupying the footprint of a standard 5-foot bathtub. The floor slopes to the drain, the control lever is offset from centre, and the hinge point protects the user from becoming soaked or scalded while they adjust the shower flow.

This shower/tub option also allows for a conversion to a tub without changing the framing of the bathroom walls. Everything we've talked about here applies equally to a shower space which could be converted to a tub at a later date — the whole idea is to avoid making things so rigid they may affect your ability to sell or get the price you wish to get in the future.

Showers are one of the few spaces in any SAFERhome where you should be prepared to spend a little extra.



PLAN: 34" X 60" SHOWER

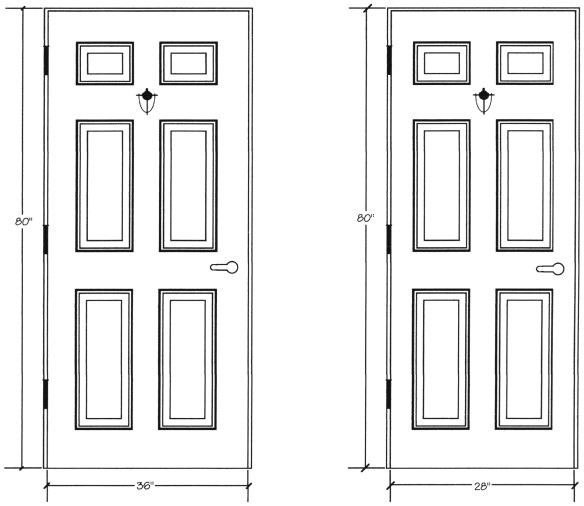
There is also another “great threshold option” and that is to install a strip or trench drain at the threshold location. This is our favorite solution due to the common-sense application of a second drain in the shower. Your bathroom sink and tub both have secondary drains to reduce the chances of water escaping the wet environment. It makes sense to have that same double drain standard applied to the shower.

This universal idea also totally eliminates any tripping hazards at the threshold of the shower and is so universal that it can also easily be used at any outside doors which are susceptible to the outside weather conditions. This type of drain will also give you the option of having less of a slope on the finished floors top layer that controls the water flow to the drain. The less the floor slopes means less chance of a slipping or falling accident.

Criteria 3 - Doors (pinch points): All doors and pinch points are a minimum of 34” but ideally 36” wide. (pinch points like doors are a minimum of 36”)

Most of us live in standard homes, built to satisfy our basic needs. The builder probably had no incentive to spend a penny more than he must on doors because no one asked for or recognized the benefit of larger doors.

So the builder priced out the cost of 8, 10, or 12 pre-hung, framed doors per home. Noting very early in his career that door prices increase with their width, he opted to save the $10 to $15 per door, possibly generate a saving of a $100 to $150 per home simply by using 2-foot 8-inch doors.



The SAFERhome Standards deliver the clarity of why you should build to a higher than national minimum building standards when it comes to doors! The door on the left is larger, and looks far more elegant.

Good news: the amount of labour and materiels needed to install a 3-foot door and frame is no different than installing a standard, 2-foot 8-inch door. Typically, you’ll find there’s no more than a $10 to $15-dollar variation between the two standard sizes. This is the only additional cost of upgrading your inner doors and doorways to be SAFERhome compliant.

More good news: when you choose this option, there are some areas where you’ll actually enjoy some cost savings. While not every wider door eliminates a stud, certainly the majority of wider openings do, so you’ve immediately saved not only the cost of the stud but the time to install it during framing as well. Typically, the framing cost savings per doorway is about five dollars for every two wider opening. This will partially offset the additional price of the door itself.

Doors also establish the baseline for “pinch points” - pinch points are anywhere which restricts people moving, like kitchen counters and their relationship to the walls. 34 inches is the minimum pinch point, allowance between the wall and counter.

Criteria 4 - Hallways: All hallways are a minimum of 40” but ideally 42” wide.

Hallways

Halls are described as long, narrow paths leading from one lovely, useful area of your home to another lovely, useful area. These paths usually have sharp corners, bad lighting, and small doors which interfere with art placement at regular intervals.

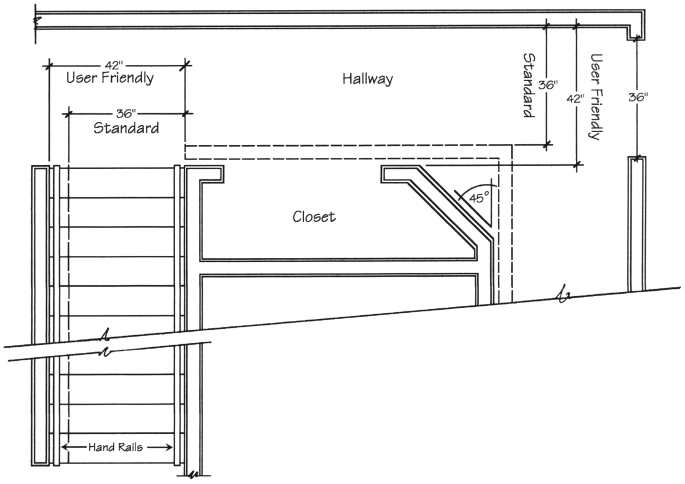
Badly designed hallways affect the look, feel, and value of the home. Even enhanced with light tubes or fancy fixtures, in the end a couple of inches more width in the hallway is the better real estate investment and lifestyle.

SAFERhome has always recommended 42” wide hallways. Innovative? Not really, just another practicality. A 42” hallway makes it easy to install 3-foot doors and the proper door moldings too. To do this, we use the Six-Inch Rule.

The Six-Inch Rule is a simple, easy to live with compromise. You trade six inches from somewhere else for a wider hallway. A wider hallway will look better and be more useful on a daily basis than a slightly larger third bedroom.

The above drawing illustrates one of the most talked about features in our show homes. A 45-degree angle opens up the hall corner, prevents damage, and allows for easier passage. Cost: $25.

Best bet? Do away with as many hallways as possible by working with open floor plans. Where you can’t, try to build in beveled corners.



Stairs and Staircases

Stairs are where many household accidents happen. Often we’re in a hurry when using the stairs and, like hallways, they’re usually far too

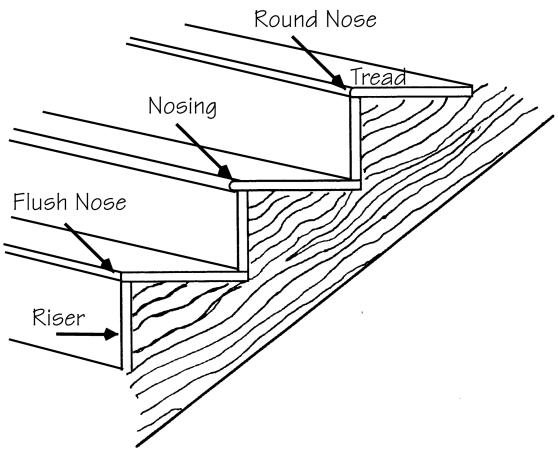
narrow. For example, a queen-sized bed is being hoisted up the stairs by two strong relatives. They reach a turn in the staircase and stop dead. There's no way your bed is going around that corner. Let's make sure this isn't going to happen in this home.

Like hallways, all your staircases should be a minimum of 42" wide. You'll have greater flexibility later on, and you can easily install handrails or banisters on both sides now. If you always carry your toddler with your right arm, it sure would be easier if there were handrails on both sides so you don't have to come down backwards just to feel safe!

Having the nose of the stair tread overhang the riser portion of the stair below can become a tripping hazard.

Note, this does not mean you shouldn't have nosing on your stairs, it just means if you are putting nosing in, try to reduce the size so it's less of a tripping hazard.

Always close in the riser portion of your stairs. More than toys can accidentally slip through this gap and cause you to become a statistic.



Use substantial handrails and allow exactly 1" of free space between the railing and the wall. Such a space is too large for toddlers' arms and legs to get stuck in but too small to put a head through. Most jurisdictions in the United States have already legislated this 1" spacing, and you can expect Canada to follow soon! The additional cost involved in widening a standard staircase is minimal. By adding 6" of extra width to an 8-foot long staircase, you add or reorganize only four square feet of your overall building.

With 50 % of all accidents in the home happening on the stairs it makes sense to build them safer.

The additional width on the stairs also allows for the installation of double handrails.

Ontario has just, September 2016, increased the code width of the stair tread by 2" for a plethora of safety reasons. We encourage this consideration before legislation for all uses now.

	STRUCTURAL & DESIGN	Criteria 5 Washroom Wall Reinforcements	Building and Design "How To" Details

Criteria 5 - Washroom Wall Reinforcements: Reinforced with 2x12” solid lumber in all washroom tub, shower, and toilet locations.

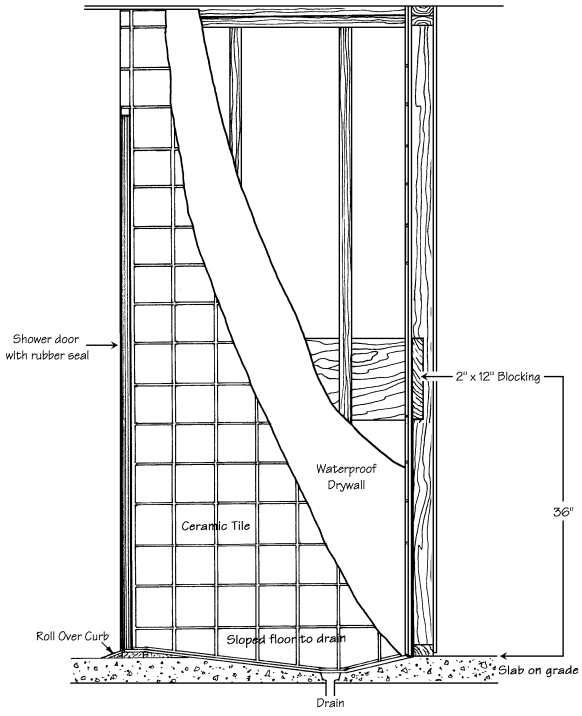
Most home owners consider their bathrooms second only to the kitchen in terms of importance to the overall value of their home, so we’ve made them an important portion of the SAFERhome program.

Let’s look into some ideas which, although barely visible, will improve the comfort and function of the home. One example is, reduction of potential slipping in the shower. The solution to this common occurrence is easy. All you have to do is install some form of wall hung supportive device.

But, if you don’t have reinforced walls and you want a supportive device, it’s almost always renovation time. This is a very time consuming, expensive and frustrating operation.

On the other hand, you can reduce costs, inconvenience, and frustration to almost nothing simply by having your builder do a couple of things for you while your new home is under construction.

The simplest insurance is to nail 2x12 inch solid lumber horizontally between the existing studs. The blocking pieces should be centered 36 inches from the top of the finished floor and will provide a strong backing to support future installation of safety bar features which can be attached anywhere from 30 to 40 inches above floor level. The cost is minimal.



We always recommend using 2x12 inch solid lumber for reinforcement because the extra thickness makes it much stronger than 1-inch plywood. It holds screws better, costs less than plywood and you can often find exactly what you

website version June 2020

need among scrap from the jobsite reducing your material cost to zero, and your recycling costs too.

The main reason for this reinforcement is to make installing grab bars and other SAFER accessories painless in the future. The soap dish is not designed to hold us upright.

Reinforcements for stabilization and other safety devices in the shower or bath is an invisible SAFERhome feature and can only add to your homes future value.

If your walls are reinforced this way, you'll also have a much wider range of choices when you look at stabilization devices. Wall studs on 24-inch instead of 18 inch centres? No problem, you can still have a grab bar any length you like because wherever you attach it you'll be screwing into solid wood. Towel racks will never come loose, and you'll easily be able to attach things like telescoping mirrors or future electric lifting devices anywhere they're needed.

Of course, if you're really planning for the future, do the whole bathroom — reinforcement in the shower area or behind the toilet for future armrest installation options and towel racks for example. Using this system, you can attach racks securely wherever you wish.

The 2x12s also add rigidity to the walls themselves and add strength at the pressure point where racks and devices are attached. This is important particularly if you've finished the tub or shower area in special tiles. A wall which moves in any way, shape, or form will lead to cracked and broken tile which will lead to water leaks. Don't even think of scrimping on the bathroom wall reinforcement!

	STRUCTURAL & DESIGN	Criteria 6 Wall Reinforcements	Building and Design "How To" Details

Criteria 6 - Wall Reinforcements: At the top of all stairs, walls are reinforced with 2x12" solid lumber at 36" to centre.

With the emerging seniors market and the staggering statistics about young children and seniors' accidents, it makes sense to reinforce the top of the stairs so that a strong gate can be installed at any time in the future.

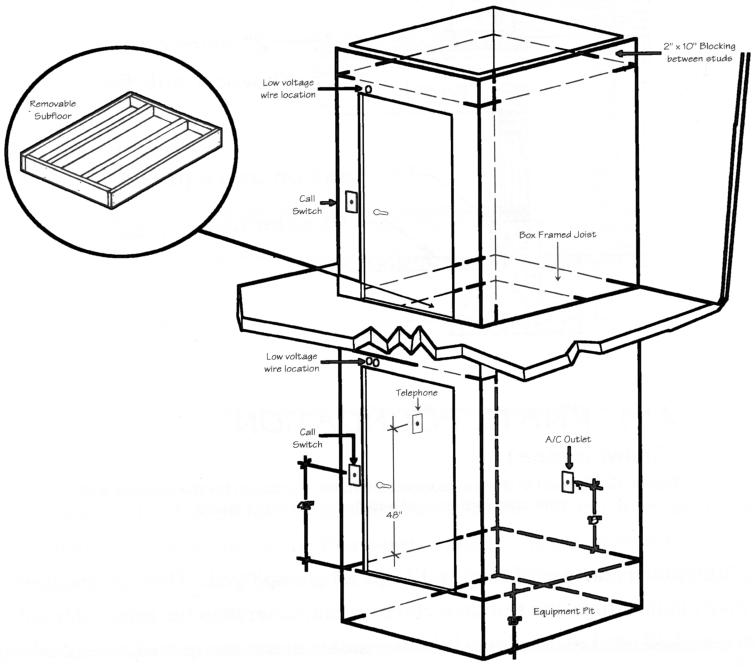
The reinforcing should be like the reinforcing for the safety bars in the bathroom locations. Simply install 2x12" solid lumber 36 inches to centre from the finished floor height at one or both sides on the top of all stairwells.

Criteria 7 - Multistory Connection Provision: Either an allowance for an elevator option in stacked closets or all staircase(s) with a minimum width of 42".

This gives the home the ability to easily accommodate technology that will get residents from floor to floor and keep them independent and in the home, longer. The cost of building in a future elevator shaft is only a few hundred dollars during new construction and about $80,000 on average to retrofit or renovate in afterwards if you don't have this feature.

The cost of making a staircase wider is only about $40 worth of materials and about four square feet of additional space to accommodate the design.

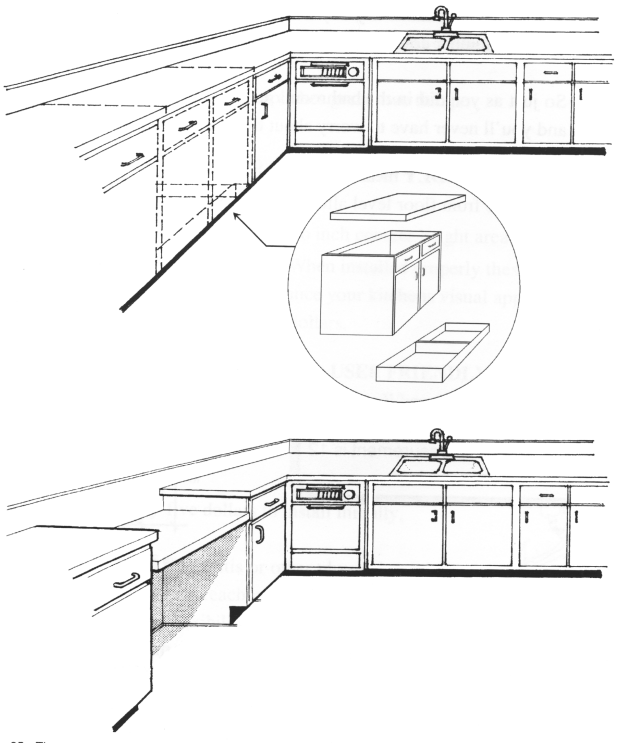
Keep in mind, this SAFERhome wider stair case design is now required by code to install handrails on both sides of the wall making the stairs safer. This space also allows for people to safely pass and reserves space for a future stair-glider installation if needed. Research your local market for the best sizes available.



	STRUCTURAL & DESIGN	Criteria 8 Sink Cabinets	Building and Design "How To" Details

Criteria 8 - Sink Cabinets: Cabinets underneath each sink are easily removed.

Most homes built today utilize modular kitchen and bathroom cabinetry. In general, products are good quality, durable, and aesthetically pleasing. But the largest benefit of the modular design craze is the fact that cabinets and counters come in pre-sized sections so, with just a tiny bit of pre-planning, kitchens and bathrooms designed with these units are easy to modify if you need to re-arrange your kitchen or bathroom in the future — a decidedly SAFERhome feature!



The SAFERhome program calls for the cabinets that contain sinks to be the last cabinets installed during the kitchen or bathroom install. This means that if you decide to make your sink in the kitchen or bathroom a sit-down design then, all you have to do is take out the last cabinet installed: (Last one in- First one out) a simple adaptation if the cabinets are installed correctly. The SAFERhome Certification Inspectors will look for access to the screws in the cabinets to establish if the cabinet under the sink was the last one installed.

Unfortunately, there is no such thing as the perfect kitchen counter height. Most counters are built 36 inches high. Good for some, a poor height for most.

If you have the space, have three different counter heights built in: 42 inches for taller people, 36 inches for standard areas of the kitchen, and 32 inches so you have a potential place where you can sit down in the kitchen.

Have your kitchen cabinet manufacturer install the counters so their height can be adjusted

easily should the need arise. It's simple to do during the initial building phase, but difficult in any retrofit phase of re-design.

The key to simplifying this is in the framing support your lower cabinets sit on. Usually this frame is a single, complete unit running the entire length of your kitchen or bathroom — not a pretty thought if you want to take out a section in the middle.

SAFERhome framing supports are easily removable in sections because they're a series of smaller box frames, screwed together into one piece. Just ensure your cabinet installer sets the screws so they're easily accessible and not buried somewhere you can't even see them. Remember, this is the wood which you will attach the kick plate to later on, so your frame must fit together well.

Like everything else SAFER, this adaptation makes future modifications significantly less expensive, less messy, and less time consuming. If you ever need to lower the counter, a cabinetry company will remove the cabinet, cut the counter where it needs to be lowered, re-set it to the new height, replace the unit, and finish the counter ends.

The surfaces will rarely require refinishing. You can adjust your counter simply by replacing the framing support. If not you, then the next owners.

The cost of this adaptation should be minimal and most manufacturers are always willing to find new ways of satisfying their customers.

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Building and Design - "How To" Details

SAFERhome Standards - ELECTRICAL & TELECOM

	ELECTRICAL & TELECOM	4 Standards	
Criteria	SAFERhome Standard	Description	
9	Light Switch Positioning	All switches positioned at 42" to the centre of the electrical box from the finished floor.	
10	Electrical Outlet Positioning	All outlets positioned at 18" to the centre of the electrical box from the finished floor.	
11	Electrical Outlet Placement Locations	Beside windows, especially where draperies or blinds may be installed. Bottom of staircases. Beside the toilet. Above external doors (inside). On front face of kitchen counter.	
12	Four-Plex Outlet Locations	Placed in master bedroom, home office, garage, utility room, and recreation room.	
	Supplemental Criteria (the following three criteria are optional) If you would like a hard-wired low voltage system in your home that provides a higher level of security and reliability. SAFERhome Standards offers the supplemental criteria that measures and recognizes the full access technologies ready home.		
Supple-mental	RG-6 Coaxial Cable Runs	All homeruns return to one central area. (Node Zero)	
Supple-mental	Telephone Pre-Wiring	CAT 5E (4 pair) homerun to all areas and return to one central area. (Node Zero)	
Supple-mental	Electrical Outlet Placement At Node Zero Location	At Node Zero Location (the communications control centre for smart home options) where all the house wiring meets in one place.	

	ELECTRICAL & TELECOM	Criteria 9 Light Switch Positioning	Building and Design "How To" Details

Criteria 9 - Light Switch Positioning: All switches positioned at 42” to the centre of the electrical box from the finished floor.

Normally light switches are located 48” from the finished floor height. There’s never been a practical or ergonomic reason why. The only reason switches ever got that high was to place them above the traditional 3-foot high wainscoting, a decorating standard which fell out of favour more than half a century ago. Remember, back then switches were also push button.

However, by installing the switches 6” lower at 42” floor to centre you’ve achieved a great balance between small and tall family members plus you’ve made it easier to hit the light switch with your elbow when you have an armload of goods.

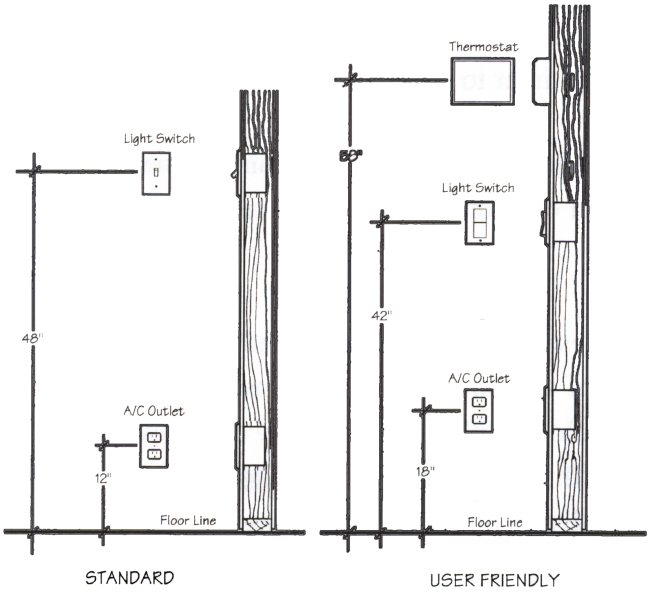
Combine this height change with an easy-to-operate switch instead of a traditional toggle, and you’ve created an inexpensive win-win situation that’s easy to use and looks great.

No extra cost for change of height, and the easy to operate switches are a minimal extra cost.

Criteria 10 - Electrical Outlet Positioning: All outlets positioned at 18” to the centre of the electrical box from the finished floor.

Like the light switches, there is a “reason” why electrical outlets are traditionally placed where they are. The rough-in electrician used his hammer as the measuring implement. After all, each house only required integral consistency with itself.

SAFERhome Standards raise all the receptacles, plug-ins, electrical outlets, phone/cable jacks, built-in vacuum, etc. from the typical 12” to 18”, to centre from the finished floor height.



This way someone doesn’t need to bend down quite as far to plug things in and unplug. This has major implications for people with reduced mobility.

This modification, like lowering the light switches, will cost nothing extra. The electrician only cares how many outlets there are, not where you put them. It will, however, be much more convenient.

	ELECTRICAL & TELECOM	Criteria 11 Electrical Outlet Placement Locations	Building and Design "How To" Details

Criteria 11 - Electrical Outlet Placement Locations:

Place electrical outlets in the following locations:

- Beside windows, especially where draperies may be installed.

Near all the windows. This gives the option of automated curtain and window control in the future. Start from the fixed outlets on the right side of the windows, and then follow the 12-foot rule by placing an electrical outlet every twelve lineal feet — and at least one outlet on every wall. If the window is wider than 6 feet, place an outlet on either side then follow the 12-foot rule.

- Beside the toilets.

This allows for all forms of technologies for independence. You should only use GFI outlets in this location. These outlets give the option of accessorizing toilets making them more user-friendly. This technology makes the toilet easier to use and is how seniors retain their freedom and dignity.

- Top and bottom on every staircase.

You'll easily be able to add a chair lift in the future, an especially attractive option if you're unable to design in a space for the storage closet lift/elevator option. Plus, in the meantime, you've got two great places for designer night-lights and convenient plugs for the vacuum.

- Above external doors (inside).

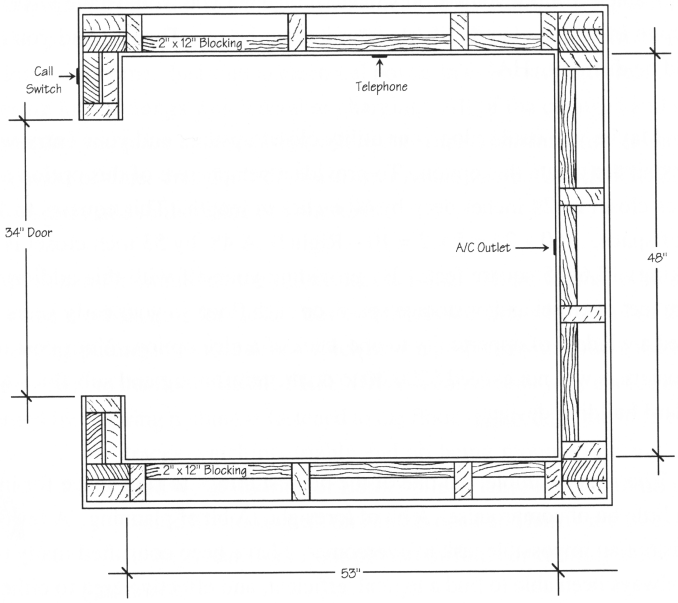
An outlet on the interior wall directly above the lintel and in line with the door handle allows the option of adding an automatic door opener and/or electric door strike. If you don't want this right now, just install a cover plate and either paint it or use wallpaper to conceal the outlet.

- On front face of kitchen counter.

This is for those people who cannot easily reach the back counter in the kitchen to plug in devices. This standard can also be met by positioning an electrical outlet on a side-wall beside a counter to achieve the same effect of easier reach.

Additional Electrical outlets should be roughed in at all the following locations:

- The lift/elevator shaft (stacked closets). What's important is that you'll need to rough in a standard single gang box on the inside of the lift/elevator wall 18 inches from the floor to centre at the rear of the closet area,



- Beside your electrical panel. Rough in 2 electrical boxes here so you can install a house spike/surge suppressor and phase coupler either now or in the future. This will protect the entire house from power fluctuations, and

- Beside Node Zero. Rough in 2 electrical outlets beside Node Zero so you have a way for your X-10 and other devices to interface with your wiring.

	ELECTRICAL & TELECOM	Criteria 12 Four-Plex Outlet Locations	Building and Design "How To" Details

Criteria 12 - Four-Plex Outlet Locations: Placed in master bedroom, home office, garage, utility room, and recreation room.

In most homes, you only have two outlets beside the bed. One is usually a switched outlet that lets you turn on a light beside the bed from a switch beside the door, and the other outlet is used for your clock radio. If you have electric blankets, cell phone chargers, electric beds, foot-warmers or other accessories where do you plug them in?

Bedrooms are where you commonly see a lot of accessories vying for too few plugs. Being SAFERhome requires a 4-plex outlet on either side of the Master bedroom bed location. That's right, 4-plexes on both sides for a total for 8 outlets within easy reach.

	ELECTRICAL & TELECOM	Supplemental Criteria (*optional*)	Building and Design "How To" Details

Supplemental Criteria (the following three criteria are optional)

If you would like a hard-wired low voltage system in your home that provides a higher level of security and reliability. SAFERhome Standards offers the two supplemental criteria that measures and recognizes the full access technologies ready home. When all the low-voltage (telephone, cable, security) home runs meet in one place they make the home smart ready. Putting all the wires on one wall or in one closet with an A/C receptacle gives you open wiring network design.

This gives the homeowner the ability to use electricity not only for energy savings but also for independent seniors aging-in-place lifestyle needs. The other benefit is that the house will have the ability to cross-communicate with any current/future or proprietary technology's. The SAFERhome Standards recommend and measure for at least one extra telephone line to the front door bell position from where all the other low voltage wires meet.

	ELECTRICAL & TELECOM	Supplemental Criteria RG-6 Coaxial Cable Runs	Building and Design "How To" Details

Supplemental Criteria - RG-6 Coaxial Cable Runs: All homeruns return to one central area. (Node Zero)

Whether you have a local cable company which insists on doing the pre-wiring for you or one that still trusts you to do your own, cable is an important aspect of the overall plan. Homes with cables tied to the outside of window sills, patched up, and painted over, etc. are downright inefficient. Cabling, like telephone wiring, should be on individual direct runs to Node Zero. For the extra $30 per run, it is much better than having shared lines. Line loss, cable technologies, and the distribution of Internet services via the cable require clean, undiluted runs.

We recommend you use RG-6 Quad shielded gold low-loss cable for all of these applications- because it's the current industry standard for all new technologies.

	ELECTRICAL & TELECOM	Supplemental Criteria Telephone Pre-wiring	Building and Design "How To" Details

Supplemental Criteria - Telephone Pre-wiring: Cat 5E (4 pair) homeruns to all areas and return to one central area. (Node Zero)

The following configurations are nothing more complicated than a re-organization of the wire which will normally be installed in your home. Virtually all homes in North America have telephone and cable wiring. Pre-wiring is pre-planning for the future.

SAFERhome always call for a telephone and coaxial cable run to the locking side of both front and rear doors plus any other significant entries to the home. This is for your doorbell or intercom, security, monitoring, etc.

The family room (and possibly the home office too) has telephone and cable outlets behind what you consider the optimal television location. This is a safety issue reducing wiring on the floor.

The home office or computer work station should have two telephone cable runs and two cable

outlets for phones, fax, internet, wireless activities, etc.

If the kitchen has a work area, telephone and cable should be installed there. Many homes have television and telephone connections in the kitchen area.

Whenever there is the consideration of a lift/elevator option, a telephone jack inside your downstairs storage closet is a must. This jack should be roughed-in 48 inches floor to centre on the side the handle is on (the side opposite to the hinge point). This is a common-sense safety feature.

Bedrooms also require telephone and cable pre-wiring, as well as a telephone jack in the garage.

All rooms should have a 4-pair low voltage run which returns directly to Node Zero for future needs.

SAFERhome requires the use of Cat-5E. This superior grade wire delivers an electronic information highway in your home — “a larger and better quality pipeline” is what the professionals call it.

	ELECTRICAL & TELECOM	Supplemental Criteria Electrical Outlet At Node Zero	Building and Design "How To" Details

Supplemental Criteria - Electrical Outlet Placement At Node Zero Location (Where all the house wiring meets in one place.)

Electrical Outlet Placement At Node Zero Location allows the low voltage to communicate across the high voltage lines. By bringing the wires all together into one location you enable all forms of enhanced energy and lifestyle controls to the occupants. And, for a Smart House the low voltage and the high voltage must communicate on one open standard level.

Building and Design - "How To" Details

SAFERhome Standards - PLUMBING

	PLUMBING	3 Standards	
Criteria	SAFERhome Standard	Description	
13	Bath and Shower Control Positioning	All controls are offset from centre, roughly 1/2 way between the historic centre location and the outside edge of the shower or tub enclosure.	
14	Waste Pipes	All pipes are brought in no higher than 14" to the centre of the pipe from floor level.	
15	Pressure/Temperature Control Valves	(Canada for renovations only) Control valves are installed on all shower faucets.	

	PLUMBING	Criteria 13 Bath and Shower Control Positioning	Building and Design "How To" Details

Criteria 13 - Bath and Shower Control Positioning: All controls are offset from centre, roughly 1/2 way between the historic centre location and the outside edge of the shower or tub enclosure.

Let's look at two important considerations in any home — plumbing and plumbing controls. Mass production homes often line up everything on one wall. Bathrooms and/or laundry rooms are back to back and all the plumbing for water either coming in or going out is on a single wall. While this saves drafting, production, and construction costs, it certainly isn't SAFERhome!

In a common bathroom, it's normal to see the shower/tub controls on the same end of the tub as the wall the toilet is on. This presents a number of problems, the biggest being the toilet bowl and reservoir; you often have to lean over and around to reach your shower/tub controls.

A simple solution -

Put the controls on the opposite end by flipping the tub around 180° when you install it or move the toilet across the room. Yes, you will have to move one water source, but this shouldn't take a plumber more than a few minutes and is not expensive to do during construction.

Offset those controls by six or seven inches so they're midway between the traditional centre line location and the outside edge of the tub instead of on the midpoint of the tub.

A professional plumber shouldn't charge for this slight adjustment in location of the controls, and now you have a customized tub you don't have to lean over to adjust. Not only is it friendlier to use, it presents itself well. You end up stepping into the wider and flatter area of the tub.

Control or tap handles are your choice. But if you are installing round handles, we recommend you choose a product which can easily and inexpensively be changed to a lever action handle in the future. You should also consider where you place the diverting lever — the knob you pull up and out of the tub faucet to allow the shower to engage. This lever doesn't have to be part of the faucet. Other design options can be mounted separately but at the same height as the flow controls that are easier to use and that don't cost a lot more to install.

Don't hesitate to plumb for more than one showerhead. Think about it: can one height really satisfy your 6-foot something adult and your 4-foot pre-teenager? Or what about putting the

second showerhead on a different wall altogether?

Consider using a flex hose on at least one head. If you have the room but not the funds while you're building, why not reserve room for a future hot tub by putting a standard five-foot tub into a larger area — don't forget an extra AC outlet too. You can use the additional space as ledges, bleachers, and toy storage etc. Then later, a hot tub can just slide right into the existing space.

Another detail you should address is the distance between the front of the toilet and the wall of the bathroom. In most homes, there is only 28 to 30 inches of space. If you want to make the bathroom meet SAFERhome Standards, this area is called a "pinch point" and the space you should have here is the minimum door size of 34 inches. Now Mum and her walker can get by the toilet on her way to the universal tub or shower.

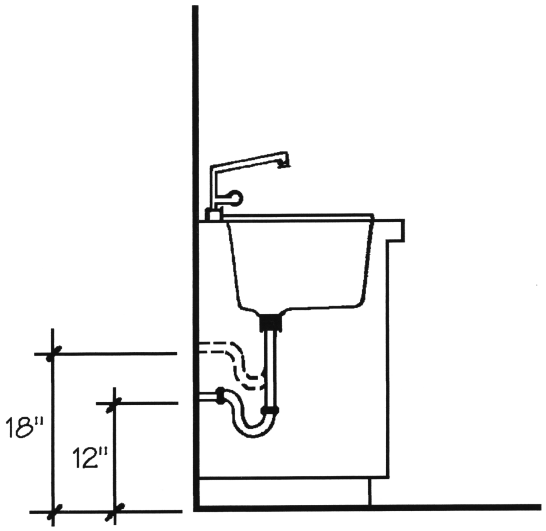
	PLUMBING	Criteria 14 Waste Pipes	Building and Design "How To" Details

Criteria 14 - Waste Pipes: All pipes are brought no higher than 14" to centre of the pipe from floor level.

Let's look at the waste pipe under your sink. It's normally black plastic and comes through the wall 18 inches above the floor. By simply bringing it no higher than 14 inches from the floor now, you'll have the ability to lower the sink and counter in the future without rebuilding the entire plumbing system.

The cost is literally nothing. The potential benefit to someone who needs or wants to sit in front of the bathroom sink is enormous.

Lowering the waste pipe to meet SAFERhome standards, and create space.



	PLUMBING	Criteria 15 Pressure/Temperature Control Valves	Building and Design "How To" Details

Criteria 15 - Pressure/Temperature Control Valves: Control valves are installed on all shower faucets.

Pressure control valves on a shower controls, already exist in most Canadian homes. This feature is a basic North American building code requirement. The SAFERhome guidelines are being used for renovations and new construction in areas outside Canada such as Barbados's where they do not have the same controls and building bylaws.

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