



PLANNING GUIDE

The Barndominium Process

Section 10:
Foundations +
Storm Shelters

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FOUNDATIONS + Storm Shelters

In this section we will cover:

Can a Barndominium Be Built Over a Basement?

Foundation Types

Questions to Ask Your County

Storm Shelter Types

Foundation questions are definitely some of the most asked when it comes to a barndominium. People often wonder what their options are, and like most everything else there will be some things based on build location.

Storm shelters are the HOT topic, especially for tornado alley USA builds. Barndominiums (wrongly) got a rep for automatically being unsafe during a tornado just because they aren't normally seen over a basement.

This section of the guide will walk you through all of your options so that you can make the best choice for your build.

CAN A BARNDOMINIUM

Be Built Over a Basement?

The simple answer is... yes!

While it wasn't commonplace for a lot of barndominiums initially because of the foundation types normally used in post and steel frame designs, that doesn't mean it hasn't always been an option.

There is a lot of debate on the "cheapest" way to build- ranch, two-story, basement, etc. The answer for your project depends on a variety of factors. What we see more often than not is that cost savings aren't significant enough to not do what will work best for your piece of property and peace of mind.

Foundations can be dependent on the soil type and topography of the property. This is why knowledgeable site prep contractors are so valuable. They can help you make the decisions that will work best.

QUESTIONS TO ASK:

Does my county have any foundation requirements? _____

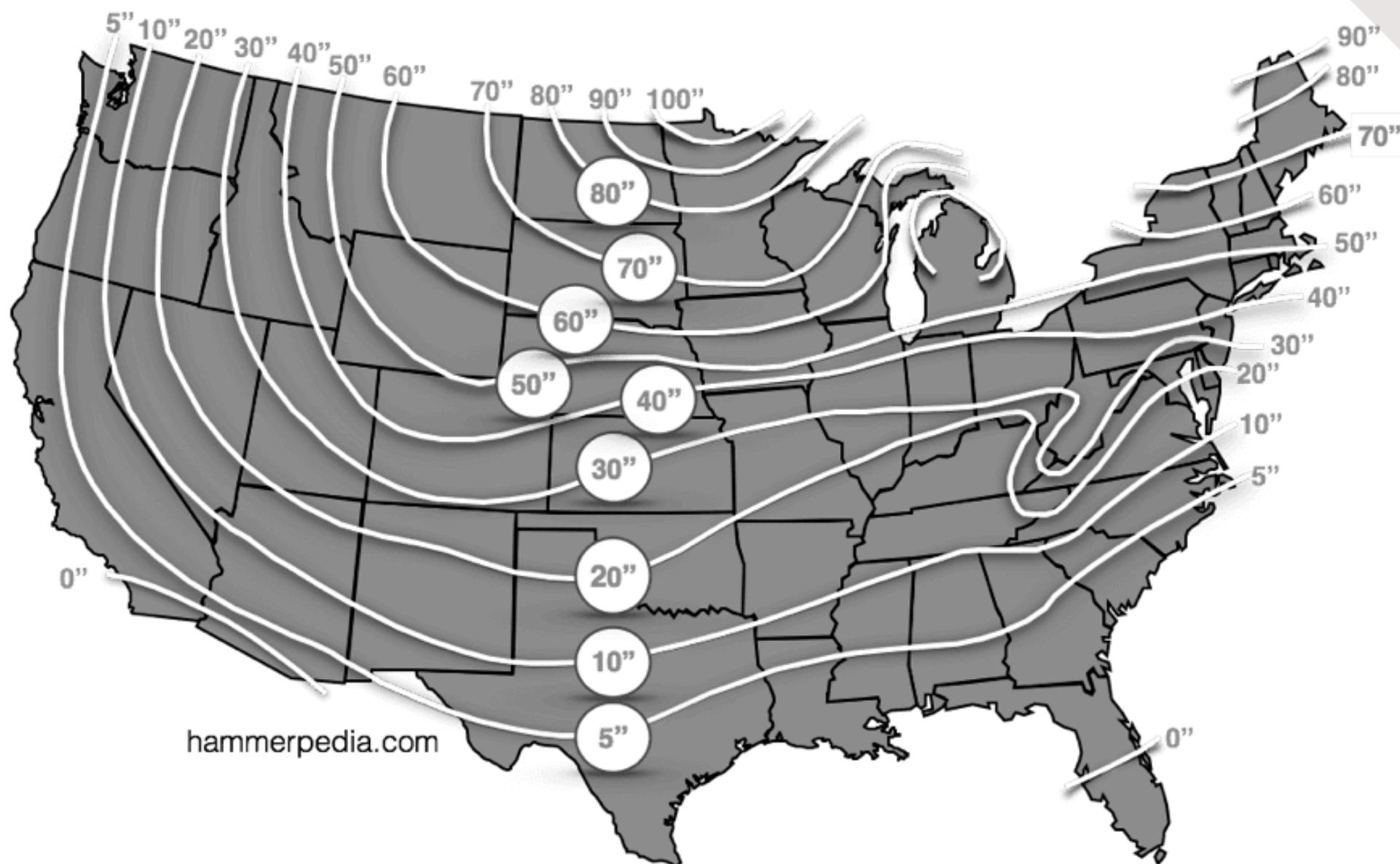
What is the frost depth of my location? _____

What type of soil does the property have? _____

Is it advised to obtain a soil test? _____

FROST LINE DEPTH

US Map



Understanding your frost depth will help you determine some of the minimum requirements for your foundation. The county you build in can provide the exact depth for your build address.

This is separate from depth requirements due to your structure loads.

Your foundation should always go below the frost line for your area.

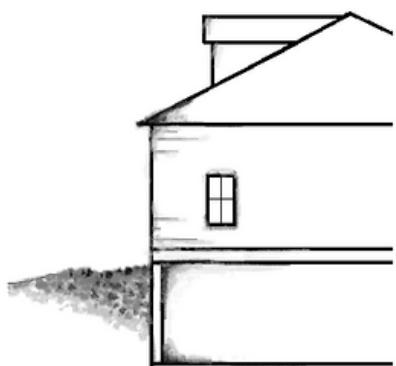
Frost protection should be used to protect interior slabs. The depth of the frost protection can be different from the depth of your foundation.

FOUNDATION TYPES

Full or Partial Formed Concrete

This is the typical basement with a staircase from the main floor of the house. It can run under the entire structure or just a portion of it. The intention behind a basement area is that you can use it for storage, additional living space, or sheltering from storms. In many areas it's considered a safe option during bad weather.

Things to consider:

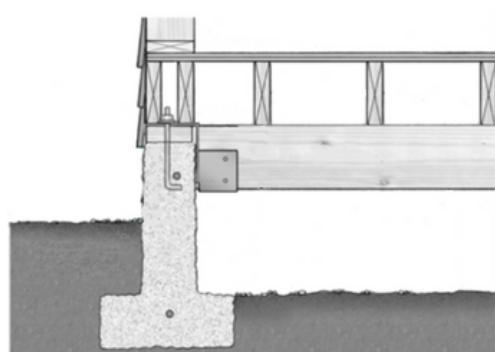


Excavation and poured concrete walls can become very costly during a build. The excavation and final grading need to be done precisely to avoid foundation and water issues.

Basement square footage can be left unfinished without impacting your ability to occupy your home or qualify for financing. This gives you future opportunities to add living space to your home as time and money allow.

Crawl Space

The crawl space foundation option is a pier or continuous foundation that is set up higher above grade, raising the main level of the home to create space below. This provides access to plumbing, electrical, and other things that are installed under the floor.

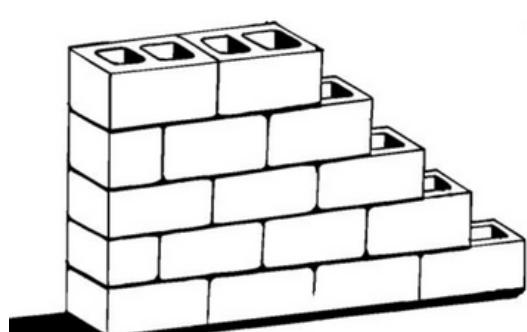


Things to consider:

While it is nice to have access to things under the floor, you must make sure that your foundation is properly frost protected. If not maintained properly there is also potential for rodents and other animals to make their way into this space.

ICF Options

Insulated Concrete Forms (ICF) can be used to create any type of continuous wall foundation. ICF is a series of blocks put together and filled with concrete and rebar to create the wall. Unlike traditional methods, the blocks are never removed and remain a part of the foundation system. The insulated sides offer frost protection on both sides of the wall.



Things to consider:

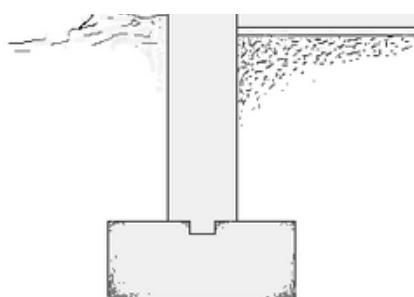
ICF foundations may have limitations in some areas on how wide the building can be. Your county contact should be able to provide that information.

FOUNDATION TYPES

Continuous Footing with Frost Wall

This is an option when you don't need space under your home but still need a continuous foundation. The footing width can be dependent on the structure, but is usually around 10-12" wide with the wall sitting on it at 8-10". The exterior walls of the home attach to the top of this wall.

The depth of the footing and height of the frost wall will be determined by the structure size and frost depth. Your county will be able to provide this information.



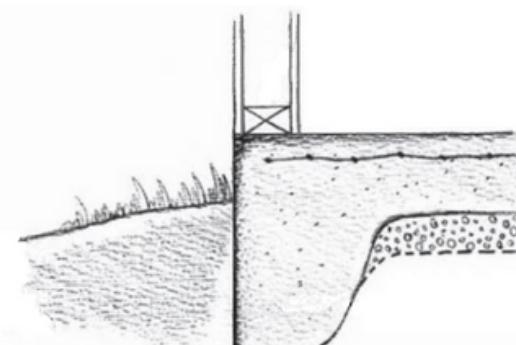
Things to consider:

This is a more costly option than a pier footing foundation and does not provide additional square footage potential like a basement. You can construct a frost wall using ICF blocks, traditional concrete forms, or cinder block (CMU).

Monolithic Slab

A monolithic slab is a single pour slab/foundation. The slab is thicker at the perimeter and along load bearing wall lines in the interior. Rigid insulation is used to protect the edge of the slab since its depth is usually above the frost line.

Things to consider:



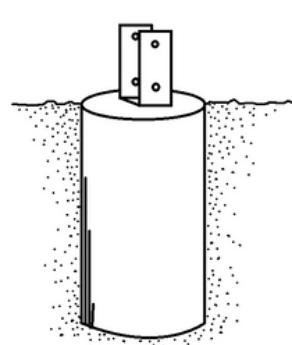
All below grade plumbing, electrical, and in floor heat must be completed prior to the pour. This is done first before any of the structure is put in place.

This can be limiting during the construction of the structure since you will have to watch out for protrusions in the slab when setting trusses, etc. and will not have any guidance from the structure when putting in plumbing, etc. since the structure hasn't been put up.

A monolithic slab foundation has limitations in some areas on how wide the building can be.

Concrete Pier System

Pier foundations are a popular option with post frame construction. Most of the projects you've seen from us have pier footings. The pier is drilled using an auger in the dimension/depth specified in the plans. The hole is filled with concrete to create the foundation, and each column is connected to the top of the pier using wet or dry set brackets.



Things to consider:

This is the most affordable of the foundation options because it uses less concrete. The space between the piers will still need to be insulated using a rigid insulation board

For an experienced DIYer the pier system can be something that you can do. Accuracy with layout and knowing the grade of your site is paramount to success.



STORM SHELTER OPTIONS



If you live in a part of the country that experiences severe weather you are likely interested in a place to take shelter during the storm. Your options range from various custom shelters to FEMA approved bunkers.

Underground Poured Cement

If you're not planning on a basement room, but want a space underground that has a hatch or ladder you can build a custom underground shelter.

Things to consider:

This option could be multi-purpose and used as a root cellar too. Anytime you choose an option that is underground you need to keep in mind how you'll be able to get out of it and make sure that there are no water issues.

Reinforced, Block or Concrete Poured Room

This option will be built on site and needs to be specified in the design plans. Your concrete contractor will likely be able to guide you on some of the requirements. To be considered a secure shelter this area will need to have a reinforced concrete ceiling and walls.

For areas that aren't prone to as many storms, sometimes reinforcing the walls and ceiling of an interior room with plywood is considered.

Things to consider:

You'll need to know the dimensions, wall thickness, and what material you want to use prior to finalizing your design plans.

This option is good for those wanting flexibility with room size. Some clients add a bathroom in it, but be sure to discuss plumbing/electrical with your contractor beforehand so they are aware of having to work around concrete.

STORM SHELTER OPTIONS

Above Ground Prefab Shelter

This is a bolt in place above ground shelter found in a garage or other interior room. It has the look of a safe, but it's intended to keep people and belongings safe. They are also FEMA approved and built to withstand the highest level of tornado.

Things to consider:

Prefab shelter options come in limited sizes. Depending on the size of your family you may not feel as comfortable in a premade option. This is something worth comparing the cost of these vs construction options especially if you are able to DIY the labor for your storm shelter.

Buried Prefab Shelter

There are companies that make FEMA approved shelters that can be placed below ground. They are normally accessible by a hatch in the yard away from the house.

Things to consider:

Because you often see them placed away from the structure you'll be going out into the weather to get in. You'll also need to make sure that you can keep bugs + rodents out especially if you're stocking the shelter with supplies.

Supporting Videos



Pier Cost



Storm Shelter Options



Basement Shelter Playlist



ICF Frost Wall

Keep following MR Post Frame on YouTube for updated videos on foundations, storm shelters, and everything else barndominium related!



NOTES SECTION

My Foundation Selection:

My Storm Shelter Selection:

