



Chapter 6

# Build Your Rural Home

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## **The philosophy of rural home design**

Your rural home should be thought of as simply a comfortable place to stay while you enjoy rural life. Our non-rural friends and relatives were worried that we would have nothing to do and be bored once our house was built. They didn't understand that building the house was not the focus of our move to rural life. Building a house is just something we had to do to have a place to live on our property.

Unlike suburban settings, homes in rural areas are usually not built to compete in style and opulence with those nearby. Practicality is often the style driver for rural construction. Form following function is the general rule. That does not, however, mean that a rural house is supposed to be ugly. It is just not necessary to allow style to compromise comfort and practicality.

## **New or existing house?**

Whether you should buy a property with an existing house or buy undeveloped land and build a new house is an arbitrary decision. There are good arguments for both choices.

Buying a property with an existing house of adequate size, quality, and layout simplifies your transition to rural life. Some repairs, upgrades, and remodeling may be necessary but you are starting out with a livable home. You can work on repairs and changes at your leisure. An existing inadequate house on a property, however, may be a liability. Its existence will likely increase your property taxes and insurance costs unless it is demolished.

Undeveloped property provides you with a blank slate upon which you may create your rural lifestyle. This, of course, is a lot of work.

## **Size – bigger is not always better**

Avoid buying or building too much house. Larger houses are more expensive to heat and maintain. Taxes and insurance costs are higher. It takes more work to clean a larger floor space. Most importantly, larger houses cost more to buy or build.

How much house is enough for you is an individual decision. Some couples are happy with as little as a few hundred square feet. A typical comfortable house size for retired couples in the early 21<sup>st</sup> century is about fifteen hundred square feet depending upon the floor plan. There are factors that make smaller house sizes OK in rural situations.

With acres of space around a rural house, adding outbuildings is common. Workshops, storage sheds, garages, and barns can provide extra room to spread out at about a tenth of the cost of the same floor space when built as part of the house.

Most rural activities involve being outdoors. Knowing that you have acres of private space around your house makes even smaller houses seem less confining. Sitting near a fire in your fireplace or woodstove feels cozy and comfortable when you are seeing snow falling outside your windows whether your house is big or small.

One of the tricks available to you to double your living space if needed after your house is built is to include an unfinished basement in your plans. Your local tax assessor will value your home lower if you have an unfinished basement as compared to the same floor space finished. Have your basement weatherproofed and insulated when the house is built. As time and money allow, you can partition and finish it as you desire.

## **Location on property**

If you are building a house on undeveloped land, consider carefully where you will be placing it. Too often we see people buy a forty acre plot of land fronting on a busy highway and then build their house right at the highway edge of the property. With forty acres available, the house could have been placed a full quarter of a mile away from the noisy road. Certainly, some money might be saved by not having to extend the utility lines and driveway back onto the property. Research the prices carefully before you conclude that expense would be too high. You will have to live with the road noise for a long time.

Sloping house sites are not necessarily a disadvantage. A basement is an easy way to gain floor space. A Sloping site is great for a walkout basement. The dirt removed to dig out the basement can be used to reshape the ground on the uphill side of the house to direct rainwater runoff around the house.

There are obviously considerations too for routing a driveway to your building site. Usually though, the house site is determined more by available view and slope for building than difficulty in putting in a driveway. Common ways of handling tough driveway situations are locating the parking area closer to the public road and walking the remaining distance or to loop the driveway around difficult areas.

## **Protecting trees**

A commonly overlooked problem is protecting trees near construction sites. As rugged and enduring as a large tree like a mature Oak appears, it is actually very easily damaged during construction. The problem is the tree's roots.

Trees breath with their roots. Without oxygen, they die. Anything that compresses the soil over a tree's roots can block that oxygen. Vehicles and construction equipment should not drive over those roots. Even storing construction lumber other materials over roots can damage a tree.

Tree roots spread out from the tree base to beyond its drip line. That is out as far as any of the trees branches reach. The mass of hair thin roots that collect water, minerals, and oxygen for the tree are within the top few inches of soil. It is those roots and soil that must be protected.

The first step in protecting trees is to figure out which of them you want to keep and which should be removed. Dead, damaged or diseased trees should be removed. Consider also removing trees that lean in the direction of future buildings or other structures. Trees have finite life spans. When a tree dies, it may be difficult to remove it if it does not lean away from structures.

While selecting trees to keep, consider sun angles. Trees that shade the house during the day will reduce your air conditioning load. Conversely, a thick stand of trees can block a cooling breeze. Trees that lose their leaves during the winter are ideal shade trees. They can keep the ground under them cool in the summer but only minimally block the sun's heat in the winter.

Once the trees that will be preserved are identified, the area under them should be temporarily fenced off during construction. Simply warning workers to not drive on tree roots is not sufficient to protect them.

Damage to tree roots usually does not show until months have passed. It may take up to four years before a tree dies from construction root damage. By the time the damage becomes obvious, construction crews are long gone. They generally do not know how much damage they are doing to trees.

Fencing should be installed out at the drip line of the trees to be protected. Construction net fence is probably the best choice for materials but anything that blocks access will do. String and plastic construction ribbon are not adequate as they are easily broken and bypassed.

For areas that cannot be fenced off, covering the ground with a foot deep layer of mulch will protect tree roots. Mulch is loose and porous enough that oxygen can reach the roots. It is also spongy enough to minimize soil compaction.

## **Orientation and sun angle**

When buying a house in a residential neighborhood, few of us are able to choose which way our house faces. Orientation is something you can choose when building a house on rural property. It is not necessary to make the 'front' of your house face the street. Instead, sun angles and view should determine how your house is oriented.

Sun angle is important for heat gain and loss. South facing windows allow sunlight to enter to warm the house during the winter. They also can produce extra air conditioning load in the summer if porch roofing or awnings are not used. Porches provide protection from weather but they can also be used to control how much sunlight comes through your windows. Proper porch roof width will shade windows in the summer when the sun is high in the sky but allow sunlight to enter during the winter when the sun is lower in the sky.

You can easily calculate the sun angles you will experience. Subtract the latitude of your house location from ninety degrees to determine the angle the sun will be above the horizon in the spring and fall. Add twenty-three degrees to that number to find the how high the sun rises in the sky in the middle of summer. In the dead of winter, the angle will be twenty-three degrees lower than the spring and fall angle.

For our Midwestern location, with an eight foot porch ceiling height, a porch width of six feet with eighteen inches of roof overhang is adequate. This width provides adequate shade for walls in the summer while allowing sunlight into windows in the winter. This width would provide more shade for walls in southern areas and more sunlight in northern areas.

Orient your house to take advantage of whatever scenic view is available at your building site. Adjust your floor plan if necessary to give your primary living space access to the view. Often houses designed for suburban neighborhoods have few windows on the front of the house to provide isolation from the street. The main living space and windows are placed on the back the back of the house, away from the street. If you are placing your house away from the public road, that front isolation is not necessary.



## **House shape for heating and cooling**

The best shape for a house in places with cold winters is probably a cube. A cube provides a minimum of exterior wall area for the volume it encloses. This minimizes heat loss and gain. Unfortunately, a cube is hard to make attractive architecturally. Ugly or not, it is good starting point for the design for your house.

Southwestern style rambling floor plans are not commonly used in Midwestern and northern states. Houses tend to be more rectangular and often have basements and/or multiple stories. Consider building a house with ‘walk out’ or ‘daylight’ basement.

A house with a walk out basement is built on sloping ground with most of the basement dug into the hillside. One of the basement walls is left exposed with windows and doors for light and access. The earth around the other three sides keeps the basement cool in the summer and warm in the winter. The basement becomes useable living space without losing the temperature moderation of earth contact.

## **Plan for elderly frailty**

When considering a home design for retirement, remember that you will eventually get older, losing strength, agility, and stamina. Even before that time, you may experience illnesses and injuries that limit your activity. Think about what that might mean for your house design.

Multi-level house designs can be interesting and fun when you are able to climb stairs easily. Even something as simple as a sprained ankle can limit your mobility. Stair climbing can be a challenge for elderly folks. That doesn't mean you can't build a multi-story house. Just make sure that there is a kitchen, bedroom, and bathroom located on the same level. Stair lifts are a possible alternative to single level living but is better to design from the beginning with limited mobility in mind.

Along with stair climbing, household maintenance activities can become difficult. Choose low maintenance materials, furniture, and appliances wherever practical. If you are planning to heat with wood also install an automatic furnace that can heat your house if you are not able to cut, split, and stack firewood.

There is an infinite number of ways to design a house and arrange its furnishings. All it takes is a little thought and perhaps a little research to figure out how to make choices that can be equally practical for both younger and older people.

An example of a choice that supports senior living is installing a conveniently located walk-in shower. Bathtubs are difficult and even sometimes dangerous for elderly people with poor coordination and strength to enter and exit. A walk-in shower provides much easier access for someone who must use a walker.

## **Design in lots of storage**

More so than urban or suburban homes, rural homes benefit from having lots of storage. Trips to stores to buy food and household supplies are more difficult and expensive because of the driving distance. The likelihood of being marooned on your property by weather events such as heavy snow or flooding is greater.

Rural folks keep a stock of common canned and dry food items as well as other supplies such as toilet paper and paper towels in their pantries. These items are typically bought in quantity as bargain prices are found. City folks often shake their heads at the idea of buying a package of forty-eight rolls of toilet paper or a dozen cans of tomato soup in one purchase. When you are sitting by your woodstove enjoying the fire while watching another foot of snow falling outside, having a well-stocked pantry is very comforting.

## **Exterior surface materials**

Exterior surface materials are a more important consideration for rural buildings than city buildings. House exteriors serve many functions beyond simply aesthetics. Weather, fire, and insect damage potential are greater in rural situations.

Roofs should always be covered with fire resistant materials. Avoid wood shake roofs. Fiberglass base shingles are a preferable choice. Modern steel roofs are attractive, maintenance free, and obviously completely fireproof but also a bit more expensive. Various kinds of beautiful tile and concrete roofing materials are available. They can, however, be difficult to repair if leaks develop.

The best material for the exterior wall surface of a house depends upon local weather conditions. Colored stucco is often the most practical surface for dryer western states. In that part of the country, stucco is essentially maintenance free. It does not weather well in the Midwest or other humid summer locales, deteriorating and discoloring quickly from soil acidity and mildew.

Midwestern homes are more likely to be covered with Vinyl siding or brick. Modern Vinyl siding is attractive, durable, and provides excellent weather protection at a reasonable cost.

People from western states are often surprised at the number of brick homes in the Midwest. Brick is a very expensive material on the west coast. It is seldom used for suburban homes there.

While the basic durability and stability of brick would probably override concern for much of its price premium if costs were comparable in the Midwest, fortunately they are not. The mere fact that brick is more commonly used makes obtaining it easier and cheaper. With more brick used, more experienced contractors are available for installing brick. Competition between suppliers and contractors keeps the overall price of brick low enough for it to be practical for use on medium cost homes.

On modern homes, brick is installed as a one brick thick veneer on the outside of a conventional Canadian wood frame construction home. The brick provides little or no structural support. It does, however, provide additional insulation, fire protection, and protection from damage from extreme weather events. It is, after all, a brick wall built around your house.

Another, less common choice is available. That is steel sheathing. Steel is very durable and is used with conventional wood frame construction or with all steel construction. An interesting and inexpensive method of house construction is to have

it built as if it were a commercial steel building. Steel building contractors often are quite amenable to building all steel houses. You may, however, need to hire carpenters to frame and finish the interior walls. The resultant structure, built using steel beam construction can be well insulated and provide a fireproof, maintenance free exterior at a cost significantly below conventional construction methods.

## **Permits and inspection**

Many rural areas require no building permits or inspections during construction. This reduces the cost of building a new house by as much as 10 or 15 percent. Of course, you may be stuck with obtaining a building permit. Check with the local county offices for procedures and costs. Often, this process is included in fees to a general contractor you hire for your construction job. As for construction without permits and inspections: there is a national Uniform Building Code that you can require your contractor to abide by.

## **Blueprints**

Architectural blueprints for a house are normally not cheap. A complete architectural blueprint set might run ten percent of the final construction cost. Blueprints may be necessary for obtaining permits and for reference during inspections. If you are in an area where permits and inspections are not needed, blueprints may be completely unnecessary. Check with your general contractor.

Often, houses are built from little more than a floor plan sketch and an elevation drawing. Blueprints, when they are available, are often kept in your general contractor's office or behind the seat in his pickup truck. Once the walls, doors, and windows are located and the rooflines are understood, little additional information is needed by the construction crews. Plumbing and electrical fixture locations are typically decided after the house is framed except where pipes and conduit must run in or under a concrete slab.

## **Choosing and working with a general contractor**

We strongly recommend you hire a general contractor for your house construction job. It is the general contractor's job to locate, hire, and supervise the various workers and subcontractors that do the actual work. He is also available for answering questions and solving problems you notice during construction.

A general contractor typically charges ten or fifteen percent of the total construction cost for his services. A good one will save you much more than his fee by knowing how and where to order materials and which subcontractors are best for the job. Further, if he is a successful businessman, his suppliers and subcontractors will often work hard to please him to assure his future business. That is not necessarily the case for homeowner jobs.

There are two main things you are looking for in a general contractor besides his competence at building houses. One is that he shows that he understands what you are planning and that he is easy to talk to and work with. The second is that he has a reputation for completing his construction projects without a lot of prompting from his clients. You want someone who will work to full completion on your job. Some contractors lose interest in a project once they start work on another project as crews free up from your job.

Our general contractor was very good. Before starting, he created large spreadsheet listing all the steps to build our house. He assigned estimated labor and materials costs for each and used their total as his bid price. As work progressed, he brought us updates to the spreadsheet showing actual costs so we knew how close our true costs were to estimates. He kept working on our project until all the steps were completed. The house was finished and we knew exactly where every dollar was spent. He also finished the job for a little less money than his initial estimate.

## **Buying lumber and materials**

It is probably best to rely on your general contractor for advice on buying construction materials. He has had experience with local lumberyards, stores, and vendors so will know where and what to buy.

Lumber is large part of the material costs of house construction. Be cautious though while shopping for low prices. Often the lowest initial price may not be the lowest final cost. Some percentage of the lumber delivered will be faulty and not suitable for structural use. We saw cases where this was nearly 50% of the delivered wood. What is done about the unusable material has a big impact on your final cost.

The best way to handle unusable and unused material is to send it back to the lumberyard for credit. Some yards do not accept returned material and you are stuck paying for waste lumber. Others accept it with a restocking fee. Some will come out you your construction site, pick up the unused material, and give you a full refund. As you might imagine, free pickup and full refund can offset a significantly higher initial price.

You will also have to check with your general contractor as to what the most economical way to purchase things such as electrical fixtures, plumbing fixtures, and finishing items such as carpeting. We found that we saved several thousand dollars buying electrical fixtures from the local Lowes store over using an electric supply store. On the other hand, we found no advantage buying from a big box store when selecting plumbing fixtures. For carpeting and tile, we were free to select materials from any of the local stores and were given a significant discount previously negotiated by our general contractor.

## **Appliance for rural homes**

There are several issues associated with kitchen and household appliances that should be considered. One is about gas appliances. In general, natural gas pipelines do not extend into rural areas. Rural gas appliances normally run on propane gas. A two hundred fifty to one thousand gallon tank is installed on your property. You order deliveries from local propane gas supply companies that then sends a truck out to refill your tank.

Propane gas is denser and heavier than natural gas. Any gas appliance you move from an area where you were using natural gas will have to be readjusted or re-jetted for propane. Pound for pound, propane and natural gas provide the same heat. Propane, though, having a larger molecule and thus being heavier requires less volume burned to obtain the same heating effect. If not readjusted, natural gas appliances will smoke and overheat if used with propane.

Another issue with propane versus natural gas has to do with propane being heavier than air. Natural gas is lighter than air so leaks tend to dissipate upwards. If a burner blows out on a natural gas cook top, the gas will normally float up and out through your stove vent. Leaking propane sinks downward and collects in low places in your house, producing an explosion hazard. A propane cook top burner blowing out will allow the propane to collect in the cook top assembly, producing some interesting pyrotechnic effects when you attempt to relight the burner. Automatic igniters are a good safety feature on propane cook tops.

Don't let the above discussion prevent you from using propane appliances. They are used extensively throughout rural areas. Once you are aware of the specific hazards associated with propane use, it is easy to avoid problems.

The alternative to propane is electric power. Many folks choose to have all electric homes. This obviously eliminates any propane hazard. It is not always the most economical choice in areas with high winter heating requirements. This will, of

course, depend upon the relative costs of propane and electric power in the area you will be living in.

Propane does have an advantage in that it is available during electric power outages. Household propane storage tanks are typically sized for a minimum of one month between fillings. Some rural areas suffer frequent and long power outages. That is not a problem in most areas but may be a consideration in some areas of the country.

Another point to consider about appliances is about rural isolation. You should plan to have a food freezer in addition to your normal kitchen refrigerator/freezer unit. You will be making fewer trips to the store but buying larger quantities of products that are best stored in a freezer. Having a large freezer unit and a large pantry can cut down significantly on the trips to the store.

Rural isolation also means there is an advantage to having a refrigerator/freezer unit with good icemaker. If you, like most of us, use lots of ice during the summer, having to drive to town for a bag of ice is a definite hassle.

Overall, rural isolation is not particularly burdensome, provided you think about what kinds of appliances and features best support your rural lifestyle.

## **Wiring your house**

There are many, many ways that people have found to do **unsafe** electrical installations. Electrical wiring is normally hidden in walls and attics so faulty work may not be noticed until it causes a fire. Always have an experienced electrician do your electrical work.

There is a National Electrical Code, commonly called the N.E.C. that all electrical work should comply with. The N.E.C is interesting in that most of the rules in the code resulted from past real-life mistakes. There good reasons why the rules should be followed. They are not simply bureaucratic overkill.

In new house construction, electricians can usually figure out where electric outlets, lighting fixtures, and switches should be placed. Their experience and the guidelines in the N.E.C. are enough to go on. That does not, however, mean that you should leave those decisions entirely up to them.

Before the electrical work begins, you should walk through the house with an electrician and mark where you want your electric outlets, switches, and lighting fixtures to be placed.

There are some general rules you can follow such as outlets should be available within six feet of the corner of a room and at least every twelve feet along a wall. It is best to add extra outlets. Light switches should be placed at all access doors to rooms. Electricians are all familiar with wiring multiple switches to control a light.

The most critical locations to mark are those of your lighting fixtures. Visualize the use of each room. Choose your fixture locations to match that use. Mark fixture locations on ceiling joists or on the floor.

## **Hints to make construction go smoother**

Probably the most important hint to give about house construction or remodeling is to keep relations with the contractors and workers friendly. Do not make it an adversarial process. You will not get the best work from people whom you are fighting with.

Put out a small ice chest of soft drinks each day for the workers. That cost only a couple dollars a day but lets them know you care about them as people. Make a point of staying on friendly terms with all of the people who work on your house. You want them to feel free to talk to you at any time.

Walk through the work site at least every hour or two and chat with the workers as you look around. This both lets the workers know you are interested in what they are doing and it makes you available to answer questions. There are hundreds of small details the construction workers make decisions about as they are building a house. They usually make good choice on these items but if you are available, you can be included in the decision making process. We found that they would suggest minor changes or adjustments that were nice zero cost improvements. Likewise, we caught minor dimensional errors before corrections became expensive rework.

Something you can do to help the building without interfering with workers is cleanup. You can pick up trash and sawdust. The workers appreciate this as it makes their work easier. I found that a snow shovel was very good as a cleanup tool. While cleaning up, though, you must be careful to not remove wood scraps and tools. Often, wood scraps are left lying where they were cut. When smaller pieces are needed, those scraps are used instead of cutting them from a new un-cut board.

Don't let the house construction project load you down with stress. Dump any worries or problems you encounter onto your general contractor. That is one of the things that you pay him for. Enjoy the process. It is part of the retirement experience.

## **Lessons learned about building a house**

- 1. Mark out a house location before you begin excavation. Sometimes a little fine-tuning on the house location and orientation can make major improvements in views from the house.*
- 2. Whenever a contractor or worker suggests a change to your construction project, always ask how much it will cost. That will keep you from unknowingly approving extra cost items but more importantly, it will let you approve improvements that won't add cost.*
- 3. It's OK to hang around the construction site watching the work. After all, the amount of money you are paying entitles you to see how it is done.*
- 4. Workers usually respond favorably to someone showing an interest and appreciation for their work. Just don't get in the way while you are at it.*
- 5. Don't ask a crew boss if there is anything you can do to help unless you really want to work. You will probably find yourself stuck on one of those trash pickup jobs that no one else wants.*