Chapter 4: Beginning Building Construction

Building Layout

The building layout establishes exact reference lines and elevations. Care in layout makes construction easier and helps keep building square.

REMINDER: Building width and length are from corner post *outside* to corner post *outside*! See Width and Length in Glossary.

After all framing has been installed, finished framework will normally be 3" wider and longer than ordered or "call out" dimensions. **Not paying attention to this will likely result in more effort during construction.**

To start, stake out a "base" line string. This will become either the building front or side. If trying to align building with an existing structure, roadway or property lines, have the first wall line parallel to the reference point.

See Figure 4-1 below.

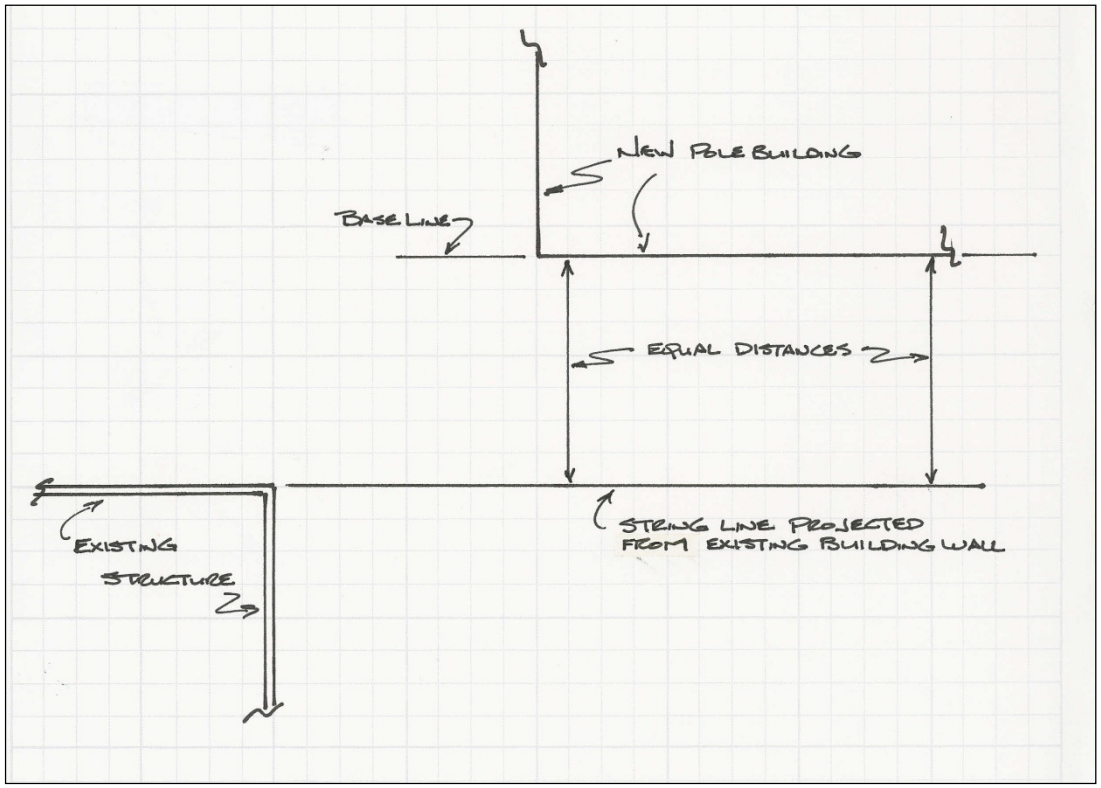

Figure 4-1

Locate and set front corner stake “A” along baseline. Drive a nail partially into stake top as a reference point. **See Figure 4-2.**

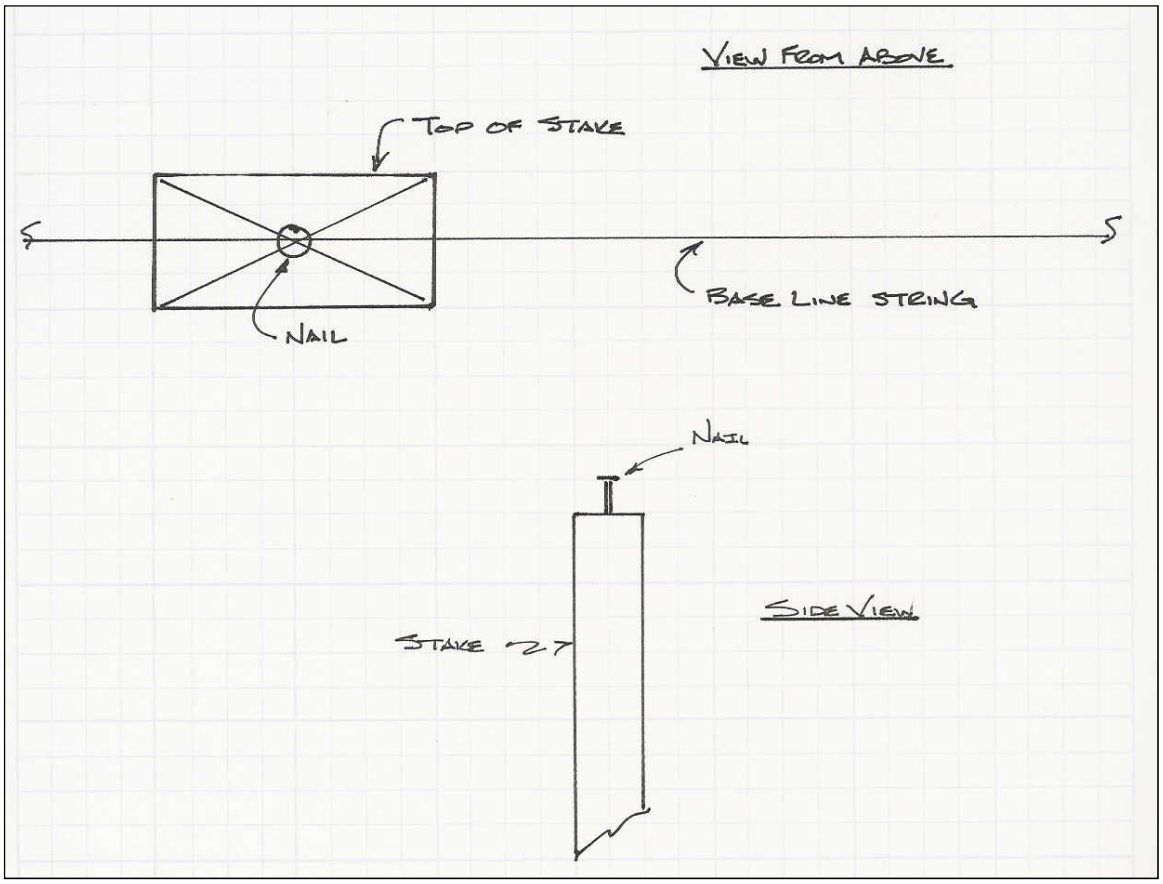

Figure 4-2

Hook a tape measure on nail at Stake A. Measure building length along base line from Stake A and set corner Stake B. **See Figure 4-3**.

Use a construction level (transit) and drive Stake B in so Stake A and B tops are level. Drive a nail partially into Stake B top at exact building length (as measured from column outside to column outside).

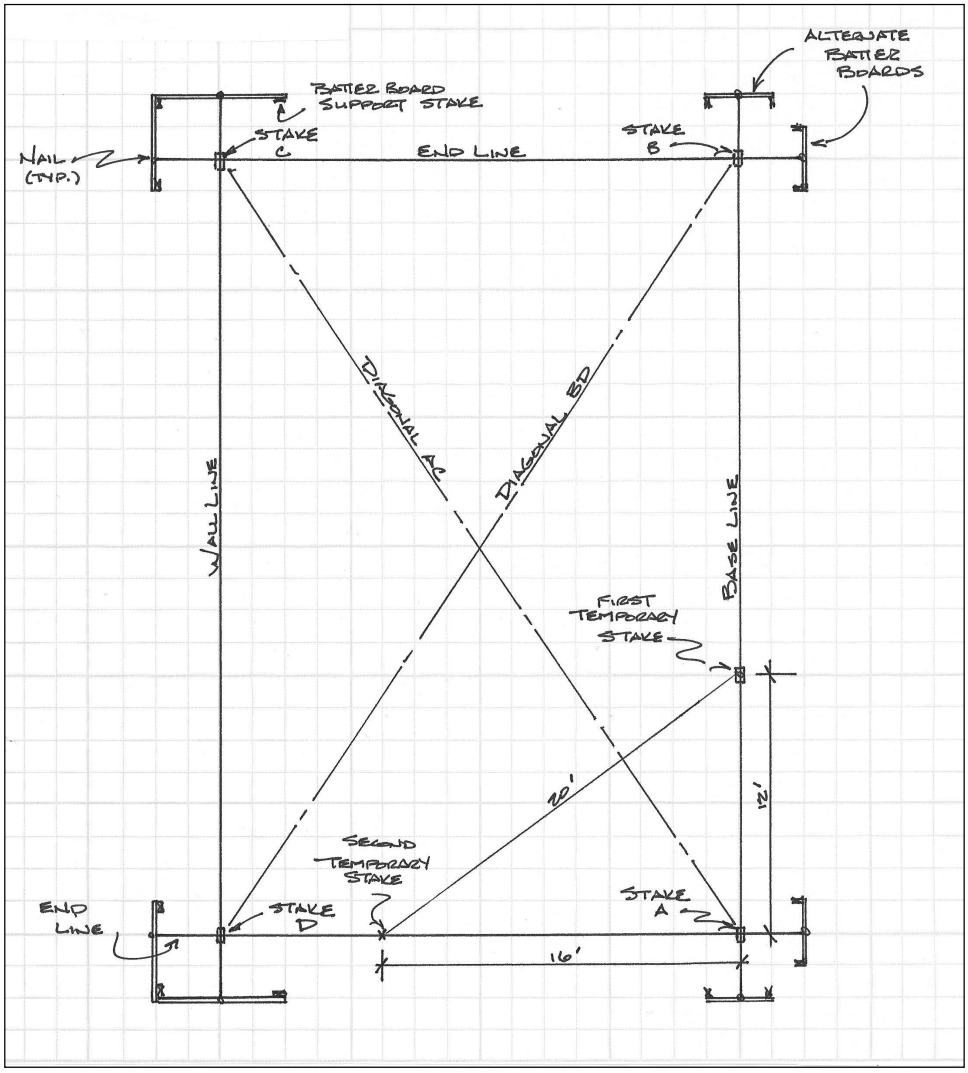

Figure 4-3

Next make endwall perpendicular to sidewall. Measure 12 feet along base line from Stake A and set a temporary stake. The intersection point 20 feet from this temporary stake and 16' from Stake A is perpendicular to base line. Set a second temporary stake at this point. (**Figure 4-3**)

Measure outside building width along this line and set Stake D. Drive Stake D into ground…level with Stake A and B tops. Drive a nail partially into Stake D top at exact outside building width. (**Figure 4-3**)

From nail in Stake D top, measure outside building length. From nail in Stake B, measure outside building width. At the two measurement intersection, drive last corner Stake C, with top level with earlier three corner stake tops. As before, partially drive a nail into Stake C top, at exact outside corner point. (**Figure 4-3**)

Before proceeding, make certain all four corner stakes tops are level. Then double check, in this order – baseline length (A to B), Width B-C and A-D and then length C-D. Adjust nails or stakes B, C, or D as needed.

Diagonals AC and BD are to be equal for a rectangular building. Adjust by shifting C and D along rear wall line.

Do <u>NOT</u> move A or B.

Keep widths B-C and A-D equal. Recheck any shifted stake levels.

Drive batter board stakes 8 to 12 feet from all corners. While batter board materials are not provided with building kit, girts make excellent batter boards, as long as they are not cut or otherwise damaged. The batter boards provide a level reference plane for building layout. Place so as not to interfere with excavation, pre-mix deliveries or construction and remain undisturbed until columns are backfilled.

Level and fasten batter boards to stakes at same heights as corner stake tops.

Stretch building string lines between batter boards, barely touching nails on corner stake tops. Partially drive nails into batter board tops to line up string lines.

The temporary and corner stakes can now be removed. Corners will be located **where lines cross.**

Photo above shows corner column in hole with batter boards in place.

<u>Mark Post Locations</u>

Measuring along building lines, use small temporary stakes or nails painted with fluorescent paint to mark each post location center. Remember to locate the ***post center, ½ post thickness <u>inside</u>*** string lines. (Example: 5-1/2" post, post center is 2-3/4" inside string lines.) **See Figure 4-4.**

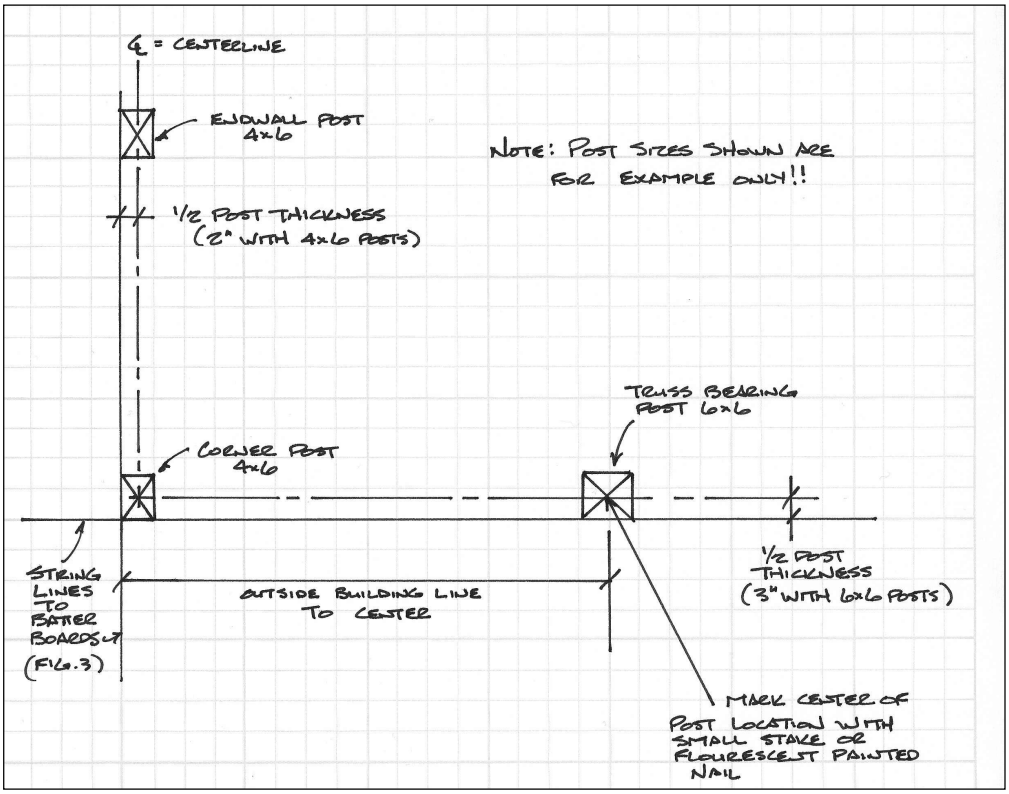

Figure 4-4

Figure 4-4 shows post centers as compared to “outside” building line.

After post centers have been located, offset (move) building line strings 1-1/2” (skirt board width), from post face outsides.

Why offset string lines? While this may sound confusing, not offsetting string lines could result in finished walls which are not straight, due to posts inadvertently touching lines. We’ve seen professional builders make this error far too often, and in this case, an ounce of prevention, is worth a pound of cure.

Once offset, building string lines will now measure 3” greater in dimension than building width and length (post outside to post outside).

Measure in from building string line 1-1/2 inches to set each post. Rather than having to use a tape measure each time, a 2x4 or 2x6 scrap block (which is 1-1/2” in thickness) can be placed between post and string line.

Digging Holes

Temporarily remove string lines. If building in an area requiring inspections, call building inspector to schedule a hole inspection.

 **This is important!** Get off on the right foot with building inspectors. Call for all required inspections!

 Confirm hole diameter from building plan. While usually 18-or 24-inch diameter, verify from building plans.

Building holes may be made larger in diameter or greater in depth (provided posts are long enough) without adversely affecting building structure. Holes which are too small in diameter, or not to depth shown on building plans, could cause a myriad of future structural issues – or even a failure.

Why would smaller diameter holes be an issue? The building weight, including a “loaded to failure” roof load, must be adequately distributed to soil beneath concrete around columns. Hole diameters specified on building plans include a sufficient area to resist settling, given stated soil strength. Avoid the temptation to use concrete “cookies” placed beneath columns, as they also do not offer enough surface area to resist settling.

To help prevent frost “heave”, dig holes so width at top is less than width at bottom. This can be done by “belling” out hole bottom with a shovel.

Using an auger mounted on a skid steer, bore holes to depth required on building plans. Holes slightly larger in diameter than auger bit can be created by first digging a pilot hole then offsetting auger slightly from hole center and boring again.

NOTE: High water tables or water in holes will not cause premature decay of pressure preservative treated columns. Treatment is for structural in ground use, which includes being exposed to ground water.

 **Helpful hint** – an auger will NOT remove any rocks larger than half the auger bit diameter.

In cases where two adjacent posts will be located in close proximity to each other, the two holes may resemble a short “trench”. This is acceptable.

Holes maybe dug larger in **diameter** than what is shown on building plans, as well as oblong or rectangular. Dimensions stated on plans are “minimum” requirements.

Do not "**over dig**" holes! If holes are too deep, extra concrete will be needed and concrete is expensive fill! A visible marker, placed on the auger bit at required depth, is often helpful. If large rocks are present, dig holes with a backhoe, mini- excavator or other similar equipment.

Extend hole depth below area frost line. If unsure about frost depth, ask the local building inspector.

After digging, clean any loose materials from hole bottoms.

Setting building columns into "sonotubes" or other forms is not recommended. Use will lower the friction coefficient which is created by the concrete encasement cast against native soil. This may adversely affect building performance (or longevity), and is not approved by Hansen Buildings or our engineers.

Our engineers also do not recommend concrete "cookie" placement or pouring concrete "punch pads" at hole bottoms, beneath columns. Neither will be shown on building plans. With column holes properly backfilled with poured concrete, either is usually both structurally inadequate and a needless expense.