



# DIY BACKYARD HOOPHOUSE

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# DIY Backyard Hoophouses

If you are a gardener, sooner or later you are going to consider a Hoophouse. You begin to investigate, to research and eventually to shop. What most of us discover is that there is such a depth and breadth of both information and options, that we quickly become overwhelmed.

If you are fortunate enough to have the budget and the space to purchase one of the commercially available kits, you are ahead of the game. For the rest of us, we struggle to find a solution that fits our budgets, our space constraints and our abilities.

I made this same journey considering all the alternatives. I realized that if I was going to have what I wanted it was going to be a do it yourself project. Fortunately, having been in and out of the construction business throughout my career, I was not daunted by the thought of taking on such a project. I began to research on the internet plans and projects that others had planned and completed.

I quickly found that the range of the information in the internet ran from the most rudimentary tunnels to projects that would rival the most expensive and professional looking installation of a commercial hoophouse. I studied all of the plans that were available, even purchasing a few plans packages.

What grew out of that study was the plans that I have produced here. These are not the plans I started with. In fact, when I started I really didn't have a set of working drawings. I had a vision. I had some scrap material and I had a space. These three things were the major factors that influenced the first hoophouse that grew in that corner of my garden area.

Over the next few years, it was modified, expanded and enhanced. The plans I have produced here are based on what I learned, what I wish I had done differently and what I intend to add or change on my current installation.

If you decide to wade into the world of DIY hoophouses, I believe this is a good place to begin. It isn't perfect. It isn't, by any stretch of the imagination, a professional plan. I would suggest that it is a starting point. I encourage you to change the plan to fit your needs. Look at the construction techniques and use what works for you and change what you need to. This was never meant to be a cut and dried, step by step, screw by screw instruction book.

Most of all, make your hoophouse your own. We all have different ideas, different concepts and a different set of goals.

# Concepts

When I sat down to put this booklet together, the first thing I thought was that many of those who would pick this up or download it, would not enjoy a lot of the luxuries that I enjoyed in building my hoophouse. I have extensive background in the construction business. I have a fairly complete shop with a lot of tools that the average homeowner and gardener might not possess.

I also wanted to make the design extensible. I wanted it to be easy for the average gardener to expand or contract the plans to fit their own situation. I also wanted the design to use only readily available materials and not to depend on special fittings or hard to source parts.

Lastly, I wanted the design and the finished product to provide value for the cost. That meant that it had to be economical to build, economical to maintain, yet provide a reasonable level of quality and durability.

These plans detail the construction of a 10' by 20' hoophouse. In truth it is not a greenhouse as the basic construction does not have the capability of controlling or regulating temperature or humidity. It is certainly possible to add these features to this hoophouse design and I have, in fact, added many of these to mine.

# Materials

The list included of materials is not exhaustive. It includes the structural materials to build the hoophouse frame. We have, wherever possible, to chose materials that are readily available from any of the big box home improvements stores and are in sizes that can be transported in a full size SUV. The estimated costs are based on the cheapest material we could find.

QTY	Description	Est. Cost
2	2" x 6" x 20'	36.00
2	2" x 6" x 10'	16.00
12	1. X 10' Rigid Electrical Conduit	216.00
15	1" x 10' Grey PVC Electrical Conduit	60.00
6	2" x 4" x 10'	36.00
25	6.5' C Channel Wire Locks	187.50
25	8' Wiggle Wire	75.00
	Assorted Hardware (screws, hinges, PVC fittings)	75.00
	<b>23/4" self-tapping wood screws, 2 1/2 "deck screws, 1" 4 way pvc fittings, hinges, 1" self-tapping sheet metal screws</b>	
		<b>701.50</b>

# Tools

The list of required tools is rudimentary and represents in our view what the average home gardener might have in their garage or workshop. We recognize that many of the tasks can be performed easier and faster with different tools, we did not want to produce a plan that would require a homeowner to purchase or rent specialty tools. The one exception to this is the post driver. This is a tool that most home gardeners will not possess. However, we have found that they can be rented cheaply.

<b>QTY</b>	<b>Description</b>	<b>Est. Cost</b>
	Electric Drill with screwdriver bits and drill bits	
	Handsaw (wood)	
	Hacksaw	
	Hammer	
	Tape Measure	
	Carpenters level or bubble level	
	Post Driver	
	Folding Ladder or step stool	
	Construction stakes	

# Disclaimer

These plans are provided for direction and information only. No warranty of fitness or completeness is either implied or stipulated.

Drawings and illustrations are not to scale and are for informational purposes only

# Preparation

## Select your site

Select and prepare your site. You should have a minimum of 12' by 24' to allow room around your hoophouse for construction. There are a host of factors to consider when siting a hoophouse. We cannot go to those lengthy discussions here. You should do your own due diligence when deciding where to place your hoophouse.

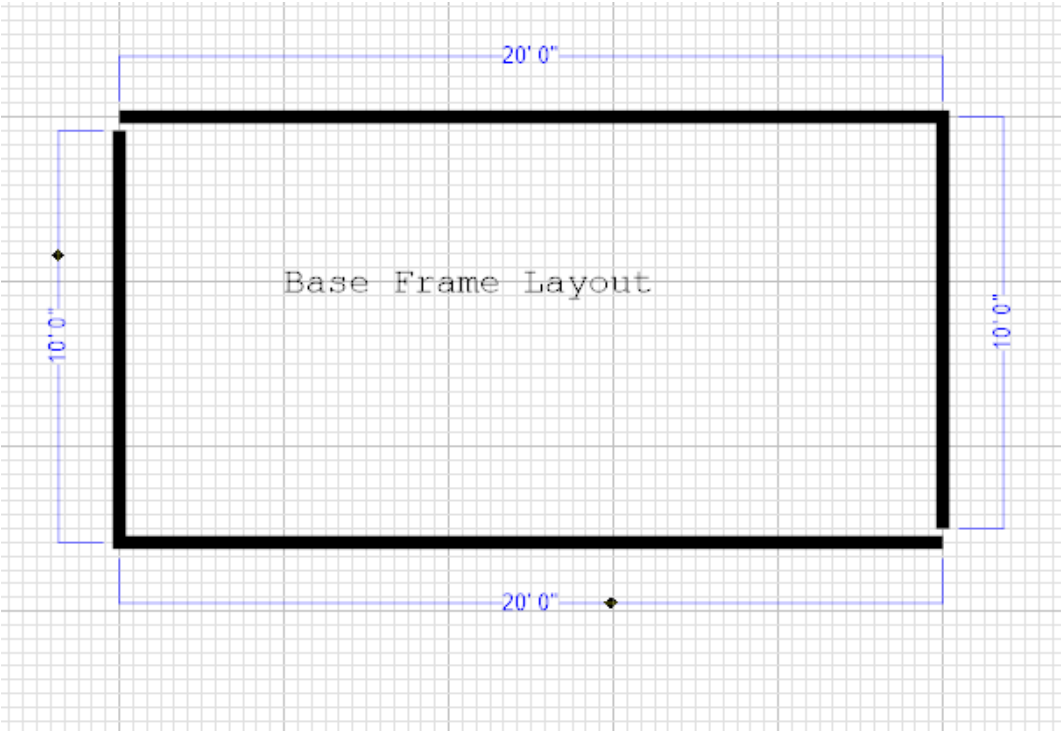
With your site selected, clean up any debris or waster materials. You site should be as level as possible.

## Base Frame Construction

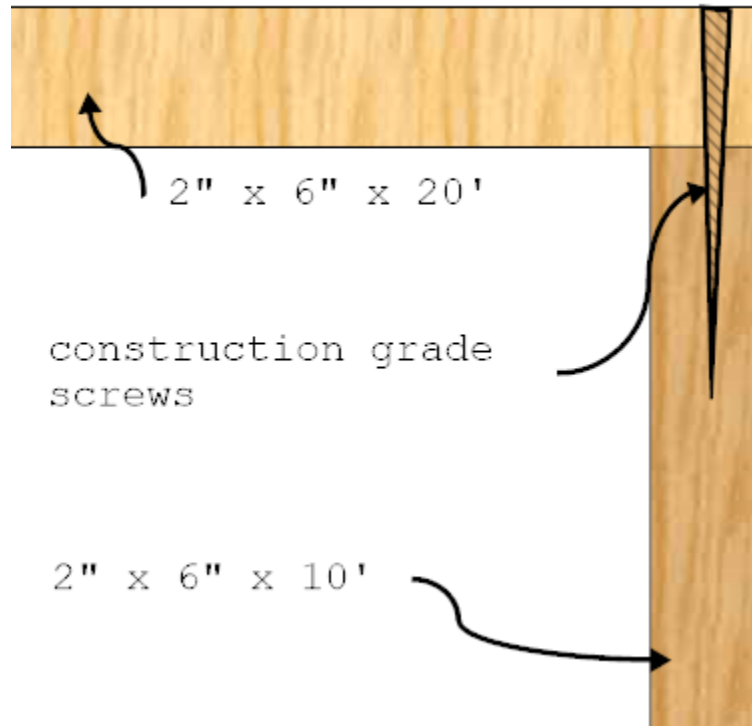
The base frame is the key to this whole project. You will use it to layout the supporting structure and it becomes the guide for the rest of the construction.

We suggest using construction grade or decking screws for this construction. They seem to work better and last longer in the hoophouse environment than conventional nails.

Layout your frame lumber in the approximate position it will be in when it is complete. For this construction we are basically building a box of 2" x6" lumber



Construct the corners so that the 10' length of 2" x 6" butts to the inside of the 20' length.



With the frame together, square the frame in the position that you want the hoop house. Squaring can be accomplished easily by measuring across the diagonal and adjusting the frame until both diagonal measurements are the same.

Drive construction stakes on the outside of the frame being careful not to disturb the frame position. Do not drive stakes flush with the frame as we have yet to level the frame.

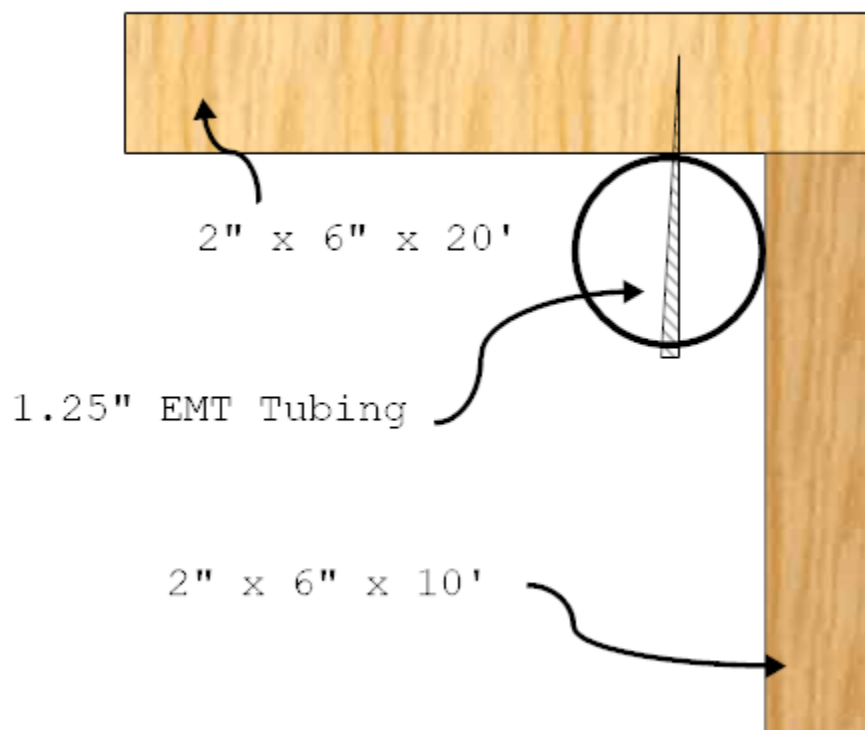
Level the frame by using your level. Use scraps of wood to shim the frame into position. When the frame is level, use screws to attach the construction stakes to the frame.

Avoid stepping on the frame at this point to prevent the frame from being shifted out of square or level.

## Preparing and placing the uprights.

Prepare your upright posts (1 ¼ inch EMT tubing). Decide how tall you wish to make your sidewalls. The maximum height is 7ft. You must drive 3 ft of the tubing into the ground for stability. If you wish to have 5ft sidewalls, you should use the hacksaw to shorten the tubing to 8 ft.

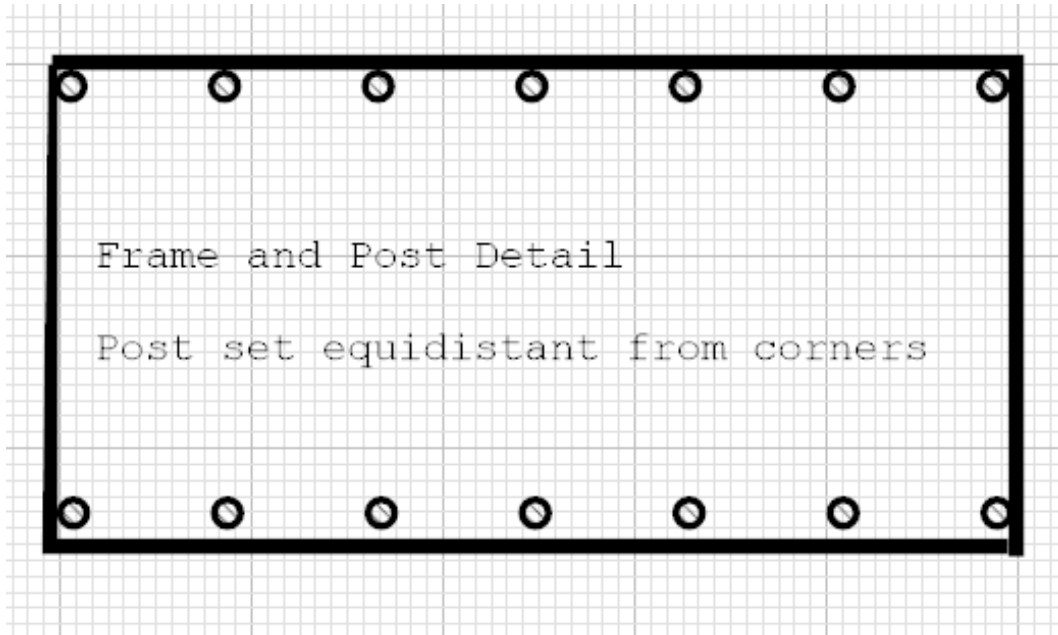
When your side wall posts are ready, begin by driving one post into each corner of your frame as shown in the diagram below. Measure from the bottom of the frame to the top of your tubing to set the height of your side wall posts. This is important so that the tops of the tubing are level and equidistant from the frame. Drill a hole through the tubing and use a screw to fix the tubing and the frame wall together. Make sure everything is still level and square before screwing the tubing to the frame wall.



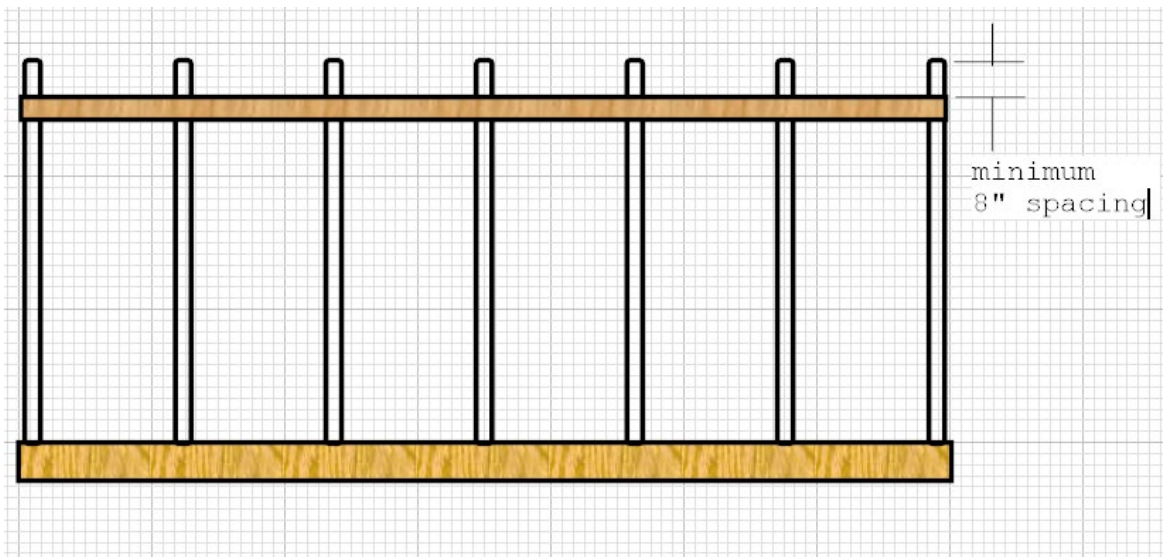
With the four corner posts in place, measure the long side of the frame (20') and mark the center on each side. Drive a post on this mark, measuring as before from the bottom of the frame to the top of the post. Take care to keep the post straight as it is driven into the ground.

Secure the center post to the frame.

The rest of the posts are set on 4' centers measure from the center post to the ends.



It is now time to add the side support rails. These should be placed with the top of the rail 4ft from the bottom of the frame base. If you have elected to make your side walls shorter than 4 ft, place the side support rails 8" below the top of your side support tubing.





Place a side rail support on the end which will not have a door. Side rail supports are secured by drilling the tubing and using a wood screw.

## Bows and Stringers

Prepare your bows by cutting 4 of the 10' pieces of gray PVC conduit in half. Join 7 of these to seven full length sections of the PVC conduit using the molded in connection joint. DO NOT CEMENT THIS JOINT. Use a  $\frac{3}{4}$ " self-tapping sheet metal screw in the slip joint to secure the two pieces of conduit together.

Measure 6" from each end of your bows and make a legible mark. Find the center of each bow and make a mark.

To install the bows, tie a length of light rope to one end in such way that it will not slip from the tubing. Place the other end of the bow into one of the support posts to the 6" mark on the plastic tubing. Secure it by driving a  $\frac{3}{4}$ " sheet metal screw through the support post and into the plastic conduit inside the post.

Grasp the rope and slowly pull the end of the bow down and insert it into the corresponding post on the other side of the hoop house. Insert it to the 6" mark and secure it with a  $\frac{3}{4}$ " self-tapping sheet metal screw.

Repeat this process for all the bows.

## Stringer installation

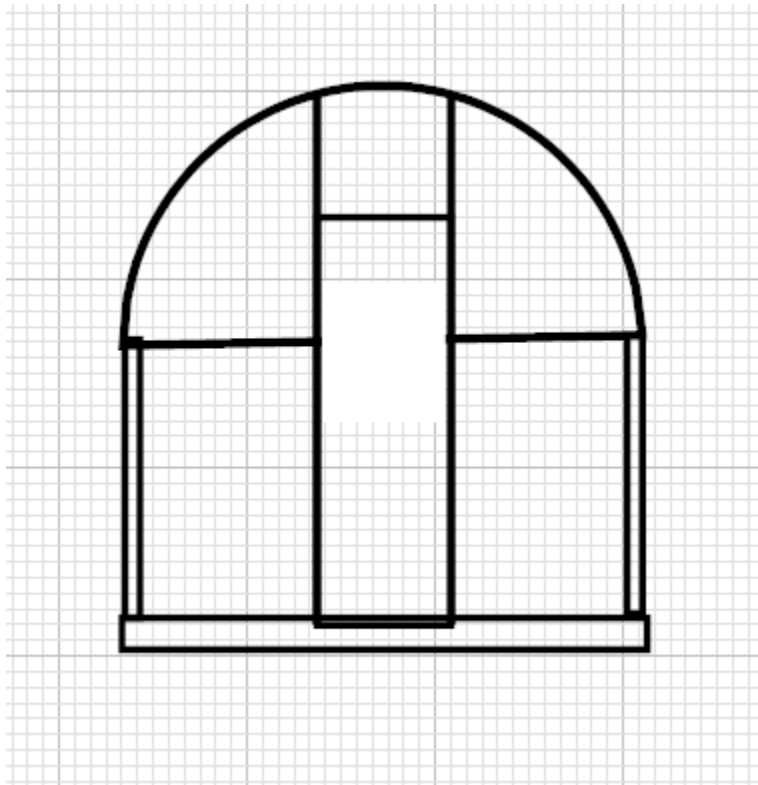
Prepare the stringers for installation by measuring the distance between your support posts. Cut 1" PVC conduit to the proper length making sure to allow for the fitting length. With your stringers but, use the hacksaw to cut each bow at the center mark you made earlier. This is safer done with two people to hold the bow as the cut is made to control the bow and keep it from springing wildly.

On the end bows, place a T fitting on the bows with the top of the T facing inward. ON the interior bows place a 4-way T. Insert a stringer into each of the T's. This will stiffen the whole bow structure and keep your bows in position.

Do not cement these joints. Use  $\frac{3}{4}$ " self-tapping sheet metal screws to fix the joints. Always place your screws on the underside of the joints to prevent the screw heads from damaging your plastic.

## Frame the end wall for a door opening

The end wall must be framed to accommodate a doorway. Using 2"x 4"'s construct your frame similar to the diagram shown below. The size of your door is up to you. The illustration is a suggestion only.



## Install C Channel

C channel should be installed along the side support rails. We suggest that you install it flush with the top edge of the support rail. Use 1" self-tapping sheet metal screws to attach the c channel.

If you are going to cover your end wall with out the door opening in plastic install c channel on that support rails as well. If you are going to enclose the end wall, you will need to add additional 2x4's to support whatever material you will use.

C channel must also be installed along the top edge of the end bows. This is easily accomplished by securing one end of the C channel to the bow and then carefully bending it down, adding additional screws every 8 to 10 inches along the bow.

## Plastic

We designed this hoophouse to be used with 6m hoophouse plastic. It will also work with fiber reinforced plastic.

We currently use inexpensive 6m painter's plastic available in 100' x 20' rolls from Home Depot. It doesn't have as good light transmission as the commercial hoophouse plastic and its life expectancy is about one season because it is not UV protected. However, at less than \$100 per roll, it is considerably cheaper than the commercial grad UV inhibited plastic. One roll is more than enough to cover your house with a double layer of plastic on top and do the end walls and the lower sidewalls.

We chose not to attach our lower sidewall plastic. We did later extend the C channel from the side support to the ground which allows us to attach the plastic securely there during the winter months. We use hay bales or straw bales to hold the bottom edge to the ground. This allows us to remove that portion of the wiggle wire and roll up the sides in the spring when the hoophouse starts to overheat. The straw bales we then use to mulch our raised grow beds.

We also suggest doubling your roof material and installing a blower to inflate the two pieces of plastic. This creates a taut surface which prevents the wind from buffeting the plastic which prevents tearing and damage. The plastic, when stretched like this, is amazing resistant to hail damage. Using the cheap painter's plastic, we find that our plastic almost always fails from sun damage and not mechanical damage.