ZIPGROW DESIGN, LAY-OUT AND PRICING

using SketchUp

™

www.zipgrow.com

INTRODUCTION

This document will introduce proper tower spacing and farm design for both indoor and greenhouse farms. The ZipGrow team provides downloadable components for use in the SketchUp design program. SketchUp is a free software package that is user friendly and easy to learn.

The goal of the design process is to troubleshoot system design, calculate pricing and budget, visualize workflows and prepare for a trouble-free installation.

This tutorial will rely on SketchUp components to build your layout. Download your ZipGrow SketchUp components here:

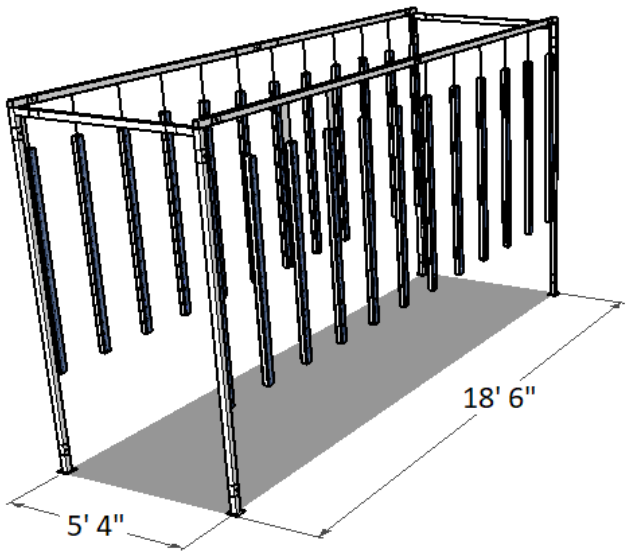
ZipGrow SketchUp Components [DOWNLOAD]

IN THIS GUIDE

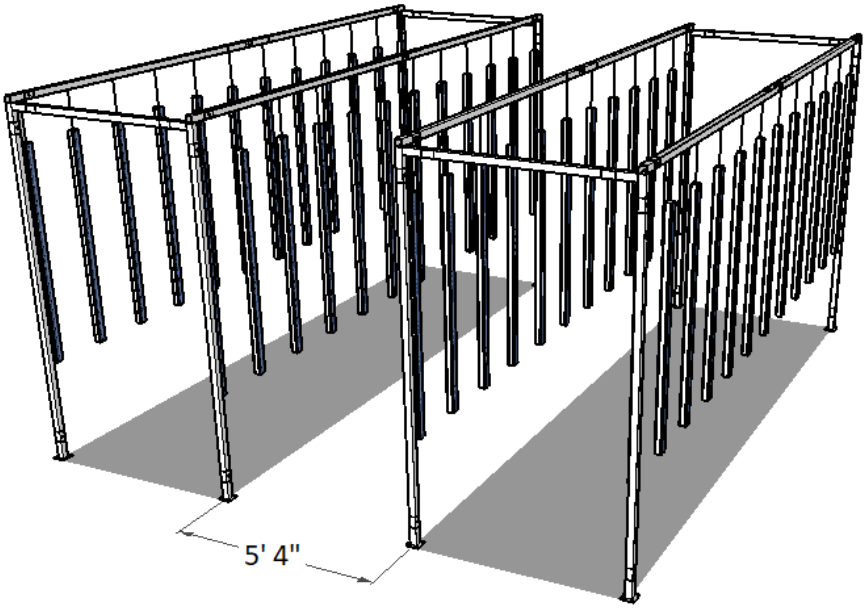
THE ZIPFARM - INDOOR FARM DESIGN AND LAYOUT

When planning a ZipFarm™ installation, the best place to start is with the light rack. The light racks are bolted to the floor and provide the "skeleton" for your indoor farm. Since photosynthesis is the beating heart of the farm, it will be important to space these properly.

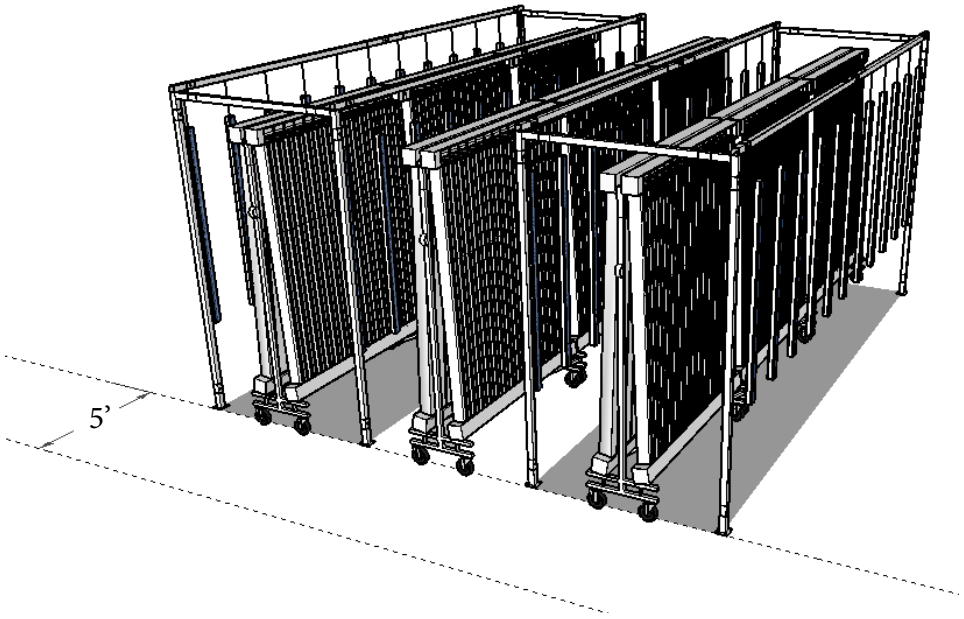
The racks measure 5' 4" wide by 18' 6" long. ***Minimum height for the light racks is 10'. Your facility should have ceilings at least 10' high to allow adequate clearance for the light racks.***



When spacing out your light racks, keep in mind that the lights are double sided. Measure 5’ 4” in between each of the racks.



This provides room for another row of ZipGrow Towers.



We recommend a minimum aisle width of 5’. This allows you to remove a ZipRack from the growing floor for planting, harvesting, and maintenance.

The ZipRack

Once your Light Racks are in place, you can place your ZipRacks inside the Light Racks. Each row will have three (3) ZipRacks.

The ZipFarm is spaced to provide consistent lighting to your towers. The distance from the lights to the surface of the towers will be approximately 2', which gives you plenty of room to walk down the aisle for regular maintenance.

TO GET STARTED IN SKETCHUP

Download SketchUp Make (not the Pro version) to your computer at SketchUp.com. You will be given a 30 day trial. At the end of the trial, simply decline the Pro version.

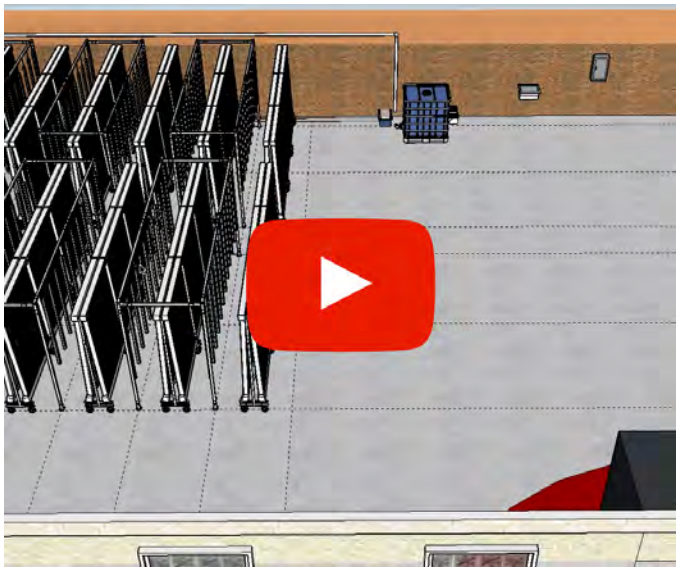
You will be able to keep using the free version of SketchUp Make for as long as you need. There are several features that you won't have access to, but these are used mostly in professional presentations

SketchUp provides some very useful tutorials to help you get started.

Recommended: complete the first two lessons.

ONCE YOU ARE READY

1. Sketch out your floor plan with the correct spacing.
2. Import your ZipGrow components using file → import.
3. Place your components using the guidepoints provided.
4. Price out your equipment and estimate crop yields



View a short tutorial to help you start your farm design in SketchUp.

Pro-tip:

1. Use the tape measure tool  (shortcut = " t ") to set guidelines before starting your farm layout.

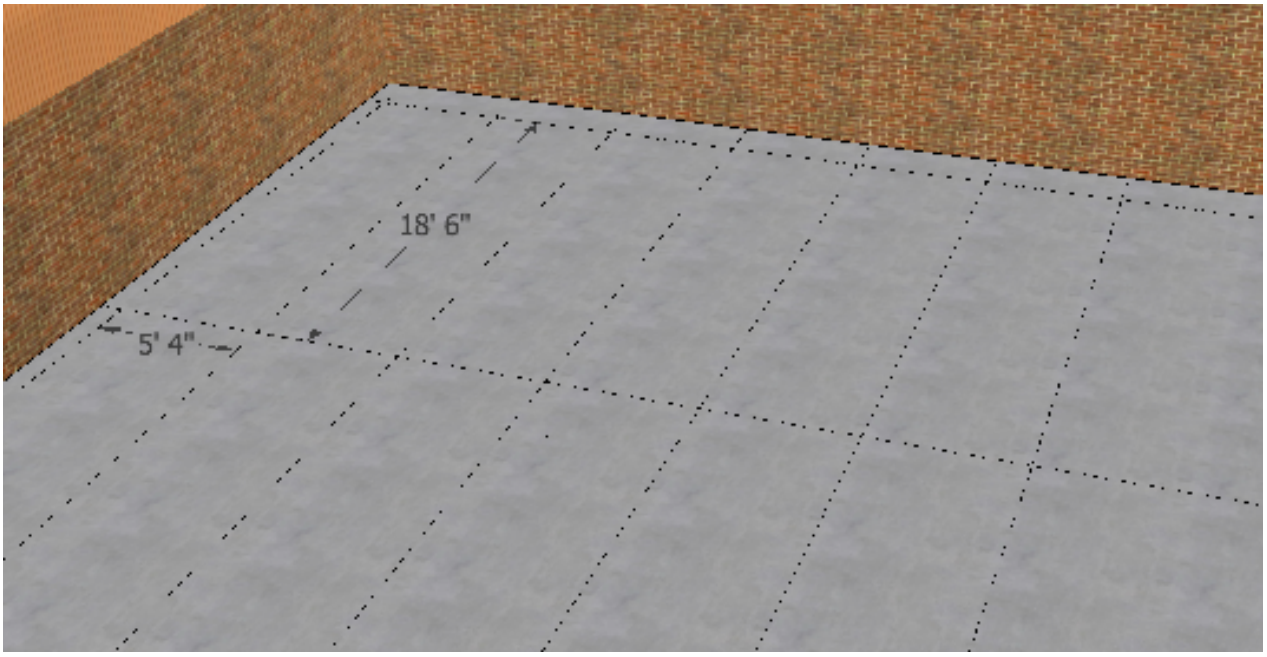
2. Get familiar with rotate  (shortcut = " q ") and move  (shortcut = " m ") tools.

LAYING OUT THE ZIPFARM - TUTORIAL

Ready to start sketching? Here are some quick tips to get you up and running.

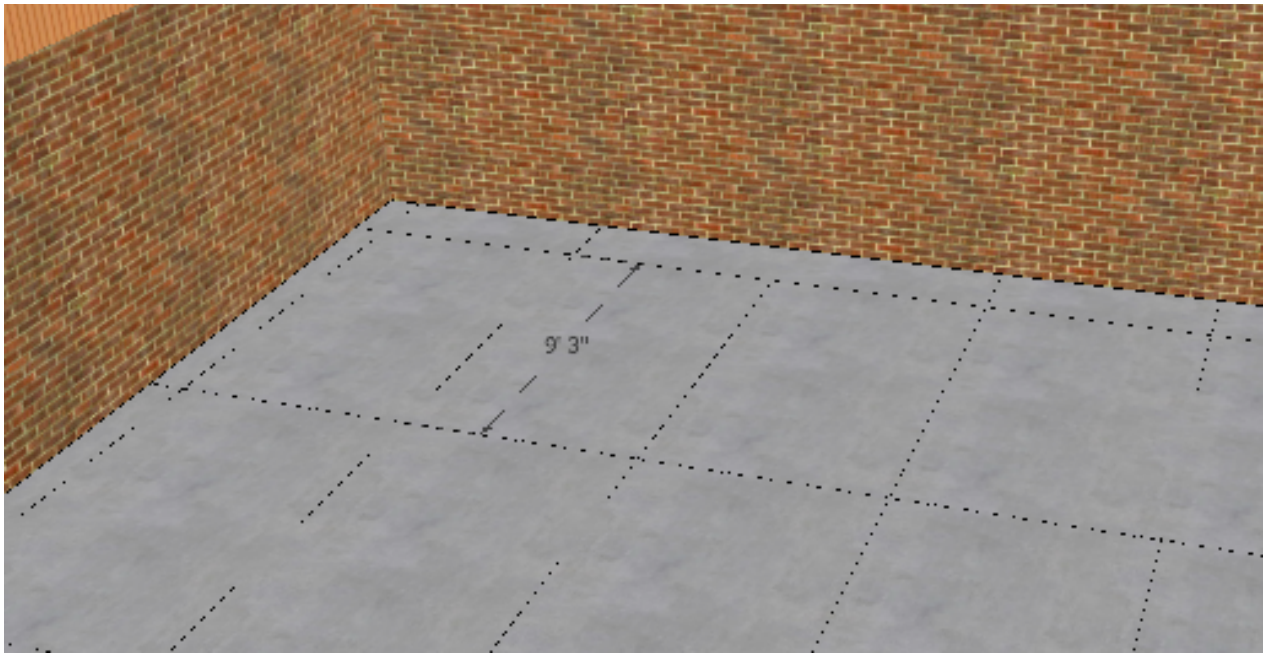
1. Sketch out the floor plan using guidelines.

ZipFarm components are provided as (1) Light Rack with (2) rows of ZipRacks. Each row of ZipRacks will require a footprint of 18' 6" by 5' 4".



The tape measure tool  provides quick measurements to help you reach an accurate layout. Use these guidelines to give you an accurate floor plan before building out the farm design.

Recommended: add a center line. This will help you place the equipment properly.

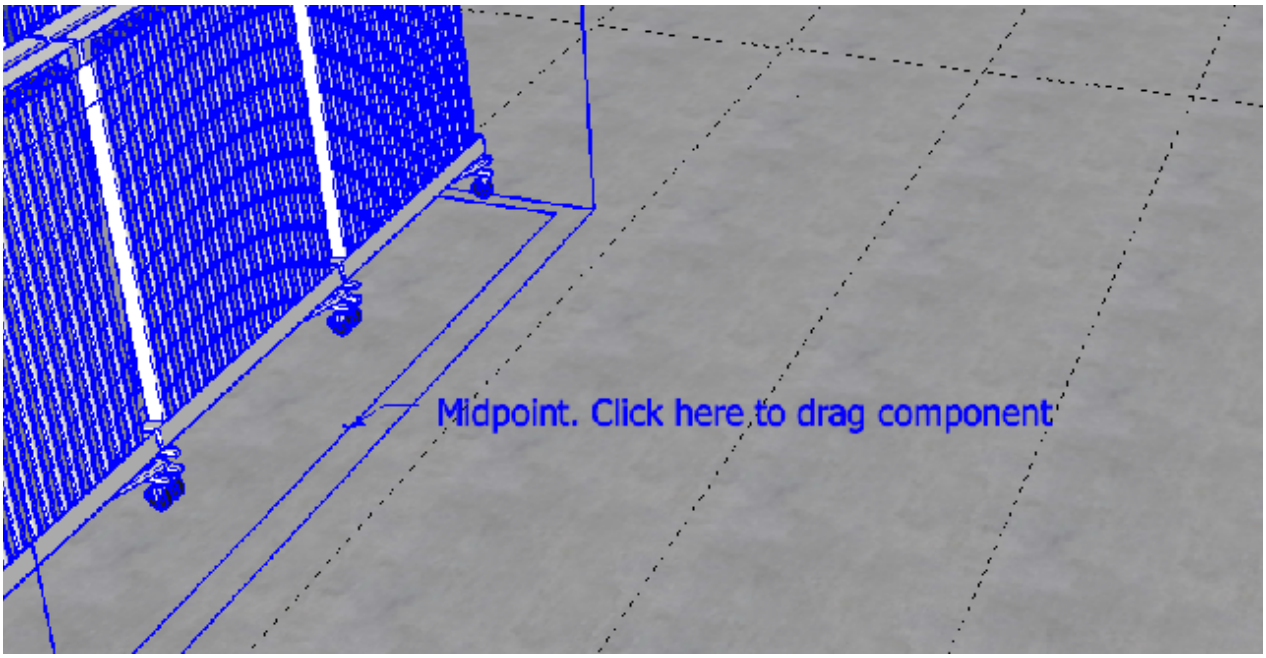


2. Import your ZipRacks using File ⟶ Import

[ZipGrow SketchUp Components [DOWNLOAD]]

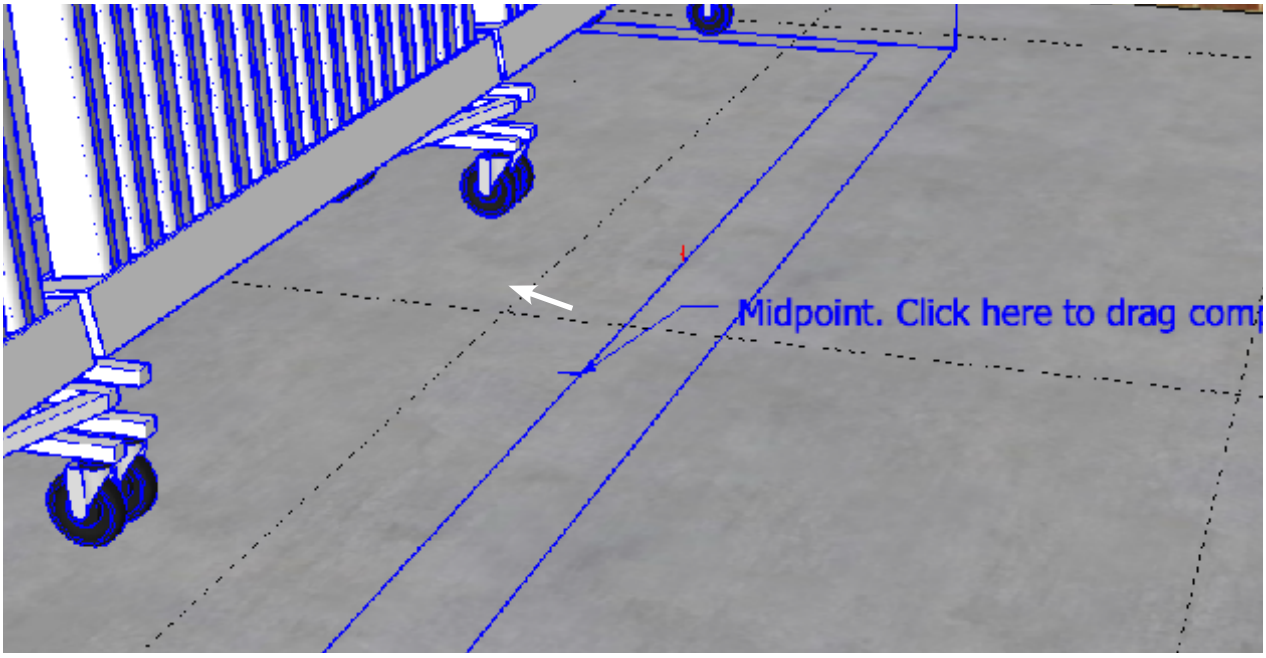
Download the correct component to your computer, and then import your files using File → Import.

Use the Move tool  (shortcut = " m ") to grab onto any part of the ZipRack. A guidepoint is provided to make it easier to place the component.



3. Place your components using the guidepoints provided.

Snap the ZipRack to the guidelines. ZipRacks have a guide point provided at the midpoint of the component. Snap the guidepoint at the intersection of the center line and the guide line.

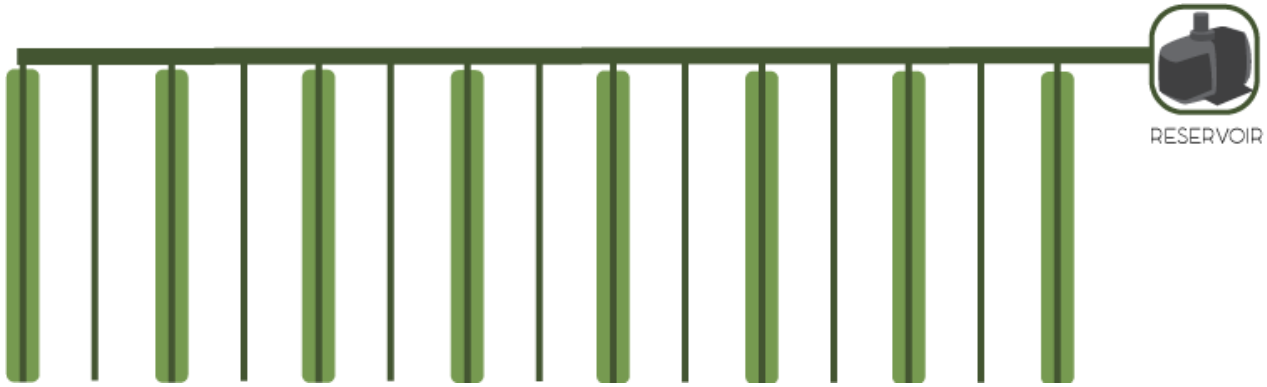


Repeat for additional ZipRacks. (a) Mark out floor plan using guidelines. (b) Import ZipGrow equipment. (c) Snap into position using guidelines.

DESIGN TIPS

Use a grid layout

As you expand your farm, you will want to keep light racks and ZipRacks in a straight line. This helps avoid too many twists and turns in your layout, which can lead to problems with plumbing and nutrient flow. If your floor space is irregular, or there are pillars or columns in the way, you may need to be creative to achieve a functional layout.



PRICE OUT YOUR EQUIPMENT

Designing the right-size farm can be a challenge. You need to balance production goals with budget and space limitations.

The ZipFarm can be deployed at a relatively small scale starting with 12 ZipRacks requiring approximately 350 ft². From your initial footprint, you can easily expand by simply adding additional ZipRacks to your farm. The plumbing package is able to supply up to 35 ZipRacks on a single 330 gallon nutrient reservoir, giving you a 1,500 square foot vertical farm supplied by a single nutrient reservoir.

To learn how much it will cost to scale up the ZipFarm, click here to view ZipFarm specifications and ordering information.

Keep in mind:

- You will need to plan for additional plumbing units for any ZipFarm installation that exceeds 45 ZipRacks.
- Additional CO2, HVAC, ventilation, will add expenses not shown here.

THE GREENHOUSE - ZIPGROW DESIGN AND LAYOUT

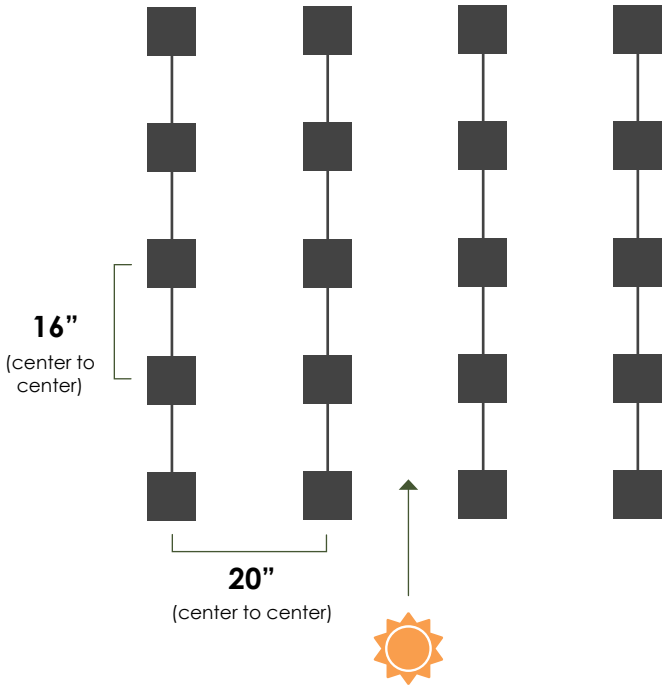
ZipGrow Towers are designed for simplicity. If you have a layout in mind, you can usually find a way to accomplish it. We have seen many unique projects over the years, and in general there is no one-size-fits-all solution.

Greenhouse design by Mackenzie-Jessica Smith

Tower Spacing

To take advantage of available sunlight, Towers should be spaced 16 inches front to back, and 20 inches side to side. (Both of these from center to center of the Towers.)

Smaller statured crops may be spaced closer together, while larger crops may need more space. When adjusting your tower spacing, always check to make sure the crops near the back / bottom of the Towers are receiving enough light.



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CUSTOM RACK DESIGN

A custom rack will measure 5’ x 10’ and will hold approximately 25 towers at standard spacing.

We often recommend a low cost rack solution. The materials can be bought at the local hardware store, and include:

Custom racks - estimated at $60 per rack*

- (2) - 2”x4” boards 12’ length
- (4) - 2’x4” boards 10’ length
- (5) - 10’ lengths of electrical conduit piping
- Screws and fasteners

*While you may choose to design your own custom support racks for your vertical farm, we find that the most economical solution is to build a rack from standard 2’ x 4’ lumber and electrical conduit piping. These materials result in a rack with a footprint of 5’ by 10’. Materials are available from your local hardware store, with costs estimated at $355 for 6 racks, or roughly $60 per rack.

Each rack is capable of supporting 25 to 30 ZipGrow Towers.

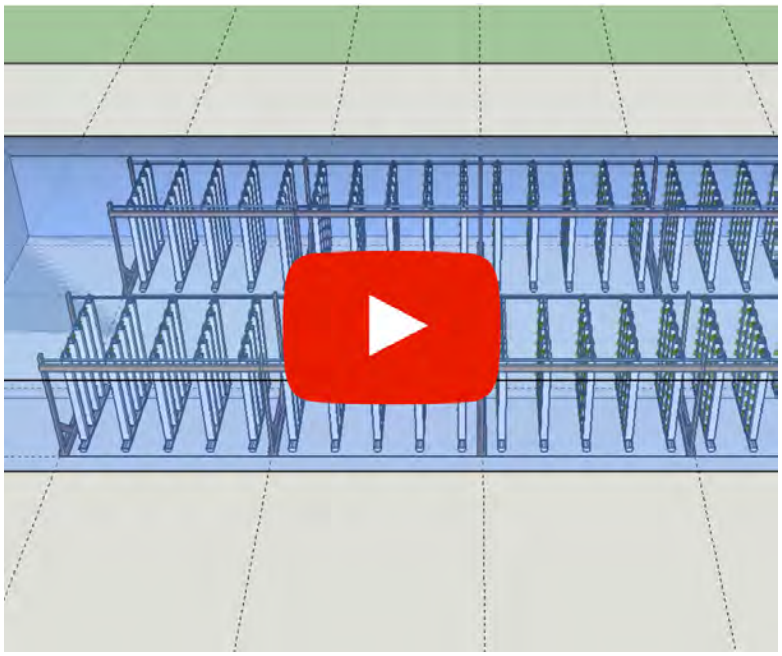
TO GET STARTED IN SKETCHUP

1. Sketch out your floor plan with the correct spacing.

2. Import your ZipGrow components using file → import.

3. Place your components using the guidepoints provided.

4. Price out your equipment and estimate crop yields.



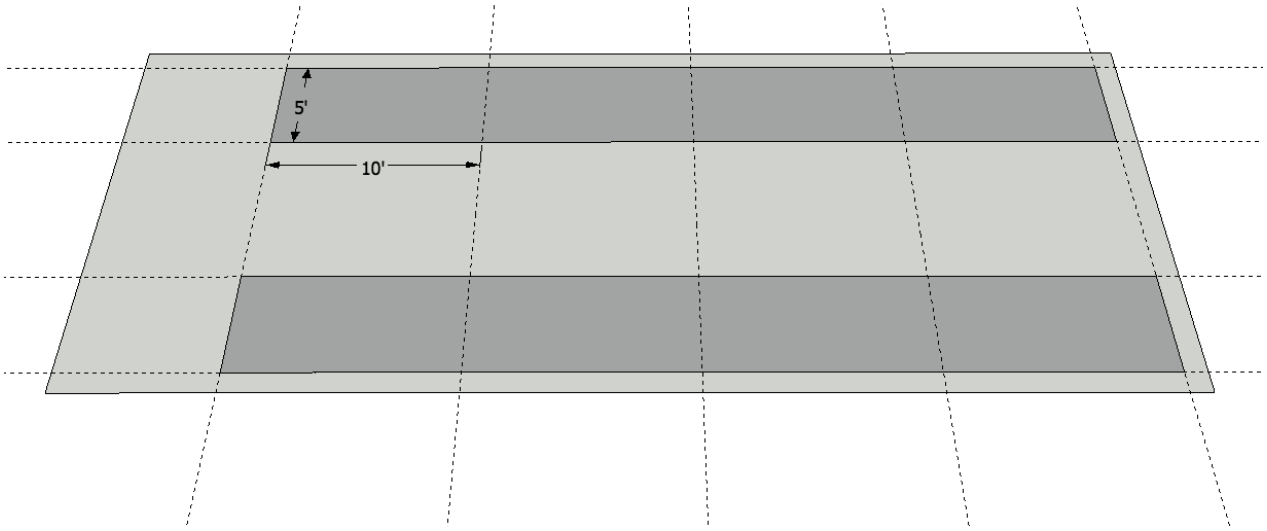
View a short tutorial to help you start your greenhouse design in SketchUp.

1. Sketch out your floor plan with the correct spacing.

Build the floor plan for the greenhouse. Use the tape measure tool (shortcut = "T") to layout guide lines for your floor plan.

Each row of ZipRacks will measure 5' wide x 10' long.

Racks are 6' high at the highest point. Depending on how tall your greenhouse is, you may be able to space the ZipGrow Towers up next to the walls of the greenhouse.



2. Import your ZipRacks using File → Import

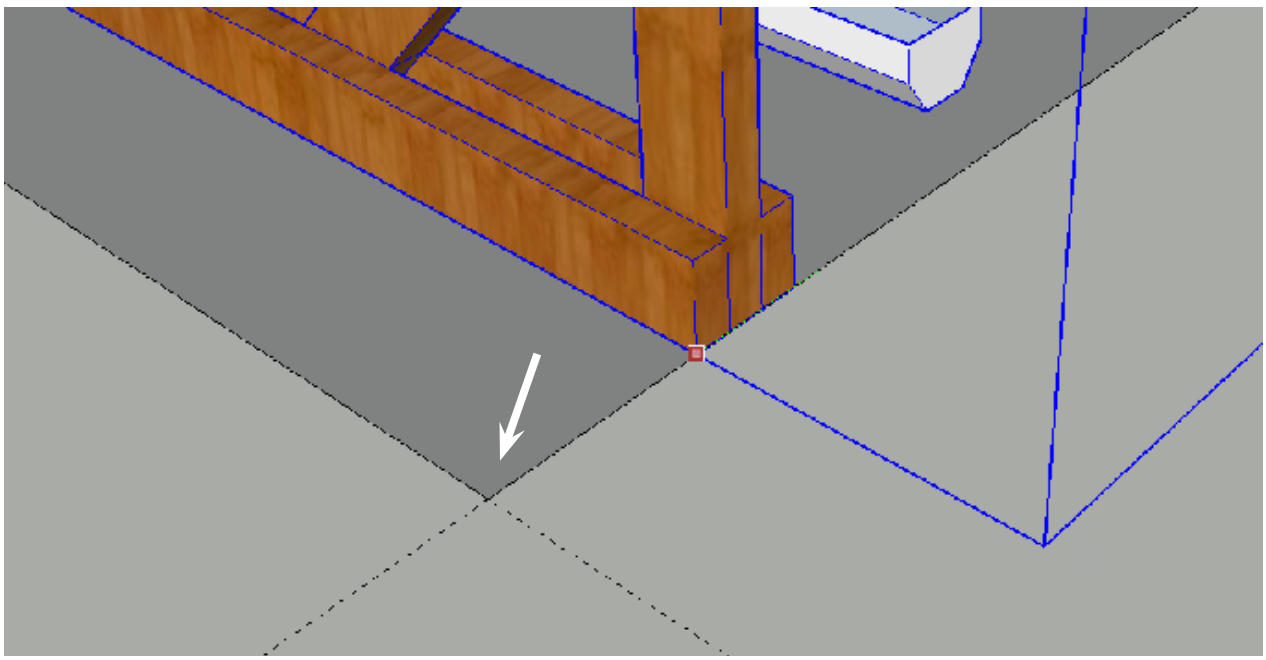
ZipGrow SketchUp Components [DOWNLOAD]

Download the ZipGrow component to your computer, and then import your files using File → Import.

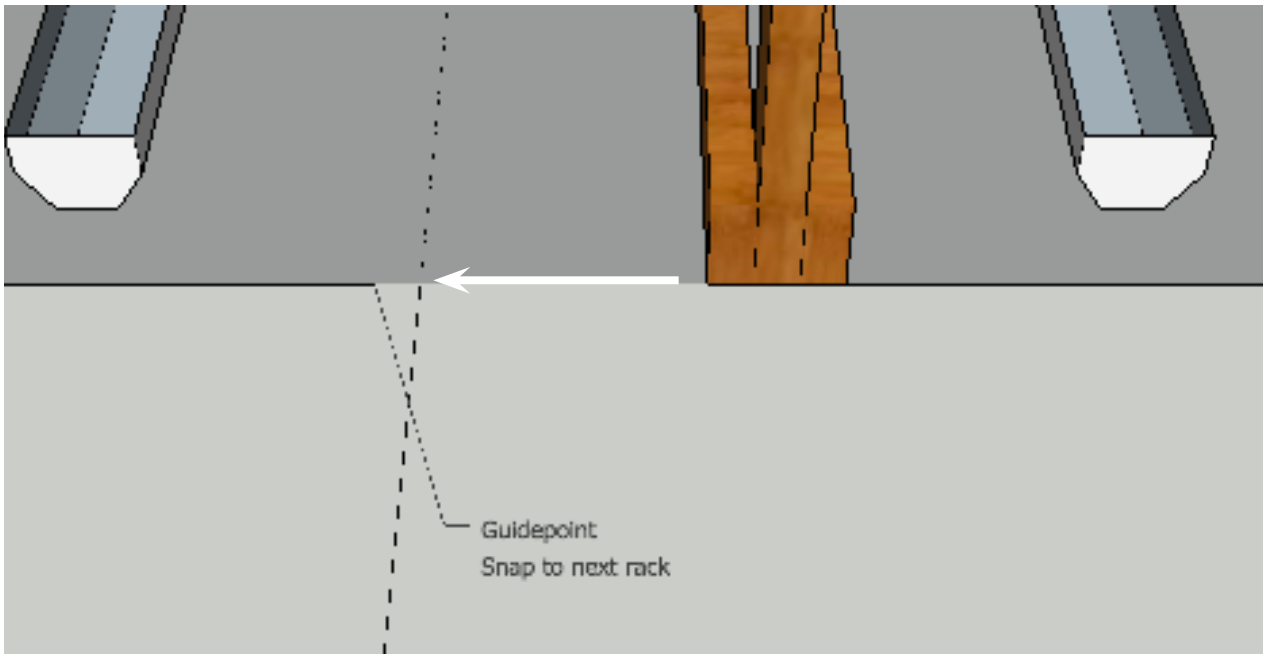
Use the Move tool  (shortcut = "M") to grab onto any part of the ZipRack. A guidepoint is provided to make it easier to place the component.

3. Place your components using the guidepoints provided.

Place your ZipRacks onto your floor layout. The racks will snap in place.



Copy and paste additional racks into place. A guideline is provided to assist in placing additional racks.



Repeat for additional ZipRacks. (a) Mark out floor plan using guidelines. (b) Import ZipGrow equipment. (c) Snap into position using guidelines.

DESIGN TIPS

A single 1 hp pump can supply up to 500 ZipGrow Towers

Pump sizing is one of the trickier topics in your greenhouse. The final size and capacity of your pump will depend on the height of your supply lines. This is known as "head height". Good system design will seek to avoid too many twists and turns in your layout, which can lead to problems with plumbing and nutrient flow.

For more information, see this guide to sizing a pump from Upstart University.

PRICE OUT YOUR EQUIPMENT

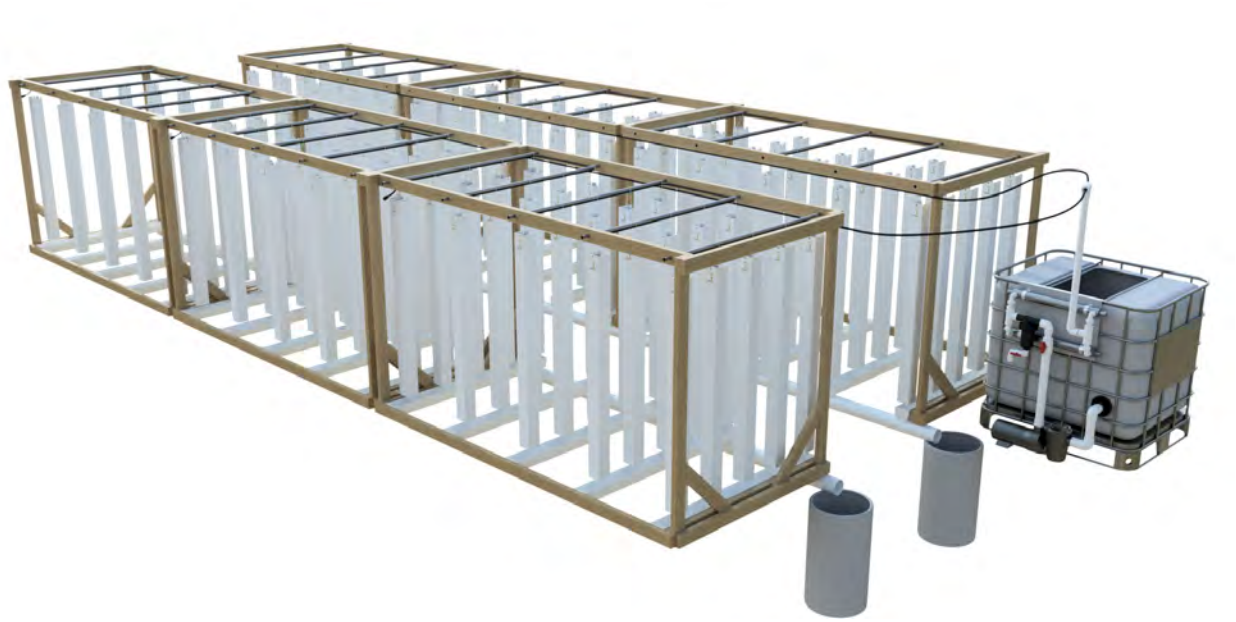
When you are finished, you will have a design ready for pricing. You should have:

- Number of racks to be installed
- Number of Towers to be installed.
- Number of irrigation reservoirs/pumps you will need.

To find pricing for your ZipGrow farm, see the Greenhouse Bundle Pricing and Ordering Guide.

Keep in mind:

- You will need to plan for additional plumbing units for any farm that exceeds 1,500 square feet.
- Heating and cooling the greenhouse can add additional costs to your budget. Speak with a qualified greenhouse consultant to reach a cost estimate for your greenhouse slimate manage-ments.



WHO IS ZIPGROW?

The ZipGrow team is composed of a rapidly growing group of incredibly hard working, passionate individuals committed to empowering the farmers of tomorrow.

Our ZipGrow vertical farming Towers help growers see maximum yields and economic profit. We want to help farmers live better, increase their margins, and give their consumer the most high quality produce possible.

GOT A QUESTION?

We would love to help you get started. Please see the Frequently Asked Questions for solutions to common challenges.