

**Paul J. Petretti**  
Civil Engineer & Land Surveyor  
Certified Wetland Delineator  
Certified Floodplain Manager

CIVIL ENGINEERING - LAND SURVEYING & MAPPING - SITE DESIGN & PLANNING  
ENVIRONMENTAL & GEOTECHNICAL - DRAINAGE & STORMWATER QUALITY  
EROSION & SEDIMENT CONTROL STORMWATER POLLUTION PREVENTION PLANS  
FLOODPLAIN MANAGEMENT & HYDROLOGY

September 3, 2019

Village of Hastings-on-Hudson  
7 Maple Avenue  
Hastings-on-Hudson  
New York 10707

Attention: Mr. William O'Reilly, Chairperson and Planning Board

Re: New Greenhouse for the Harvest-on-Hudson Restaurant, 1 River Street  
Hastings-on-Hudson

Dear Chairperson and Planning Board:

We are returning to the Planning Board with a submission, a narrative prepared by the Harvest and a set of plans, A1 PLAN ELEVATIONS, A2 ELEVATIONS EXIST GARDEN VIEWS, A3 PROPOSED GREENHOUSE VIEWS, A4 ELEVATIONS EXISTING & PROPOSED with the original Site Plan and Greenhouse & Garden Plan revised showing the roof leaders from the proposed greenhouse feeding underground stormwater retention, perforated pipes in the garden area.

The peak of the proposed greenhouse is set at elevation 24.00 which is the elevation of the existing canopy covering part of the trellis.

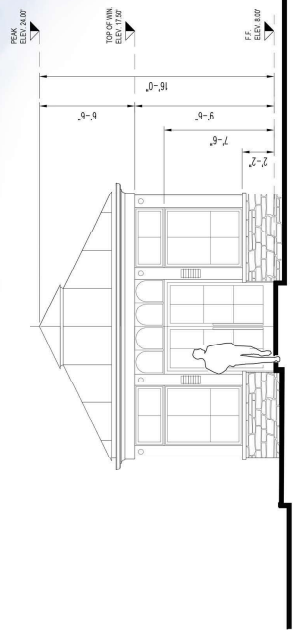
Please place this matter on the agenda of the Planning Board.

Very truly yours,



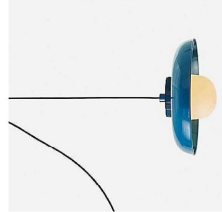
Paul J. Petretti, P.E., L.S., CFM

30 GOULD AVENUE DOBBS FERRY, NY 10522  
914-674-9827 - Fax 693-0124 - Cell 672-1518  
E-Mail [PJPCELS@aol.com](mailto:PJPCELS@aol.com)



EAST ELEVATION  
SCALE: 1/4" = 1'-0"

- PENDANT LIGHT
- WALL SCONCE



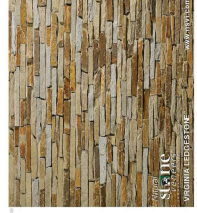
Holst Pendant Light  
By Rich Brilliant Willing

INTERIOR LIGHT FIXTURE

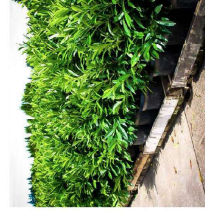


Rockbridge Outdoor LED Wall Sconce  
By Acton

EXTERIOR LIGHT FIXTURE

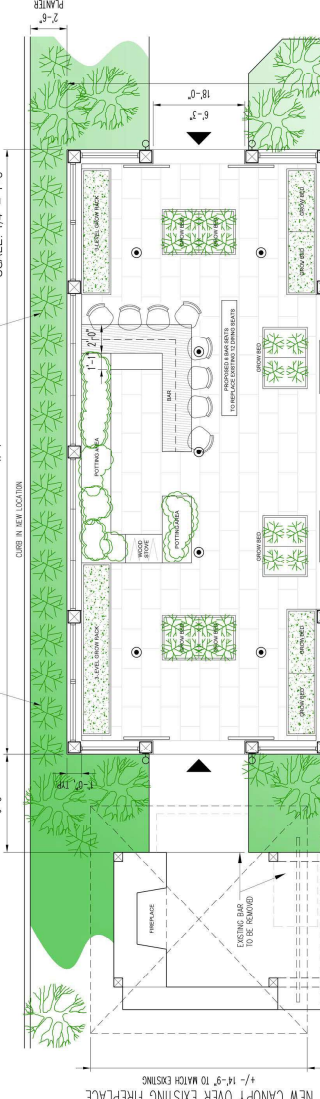


EXTERIOR STONE VENEER

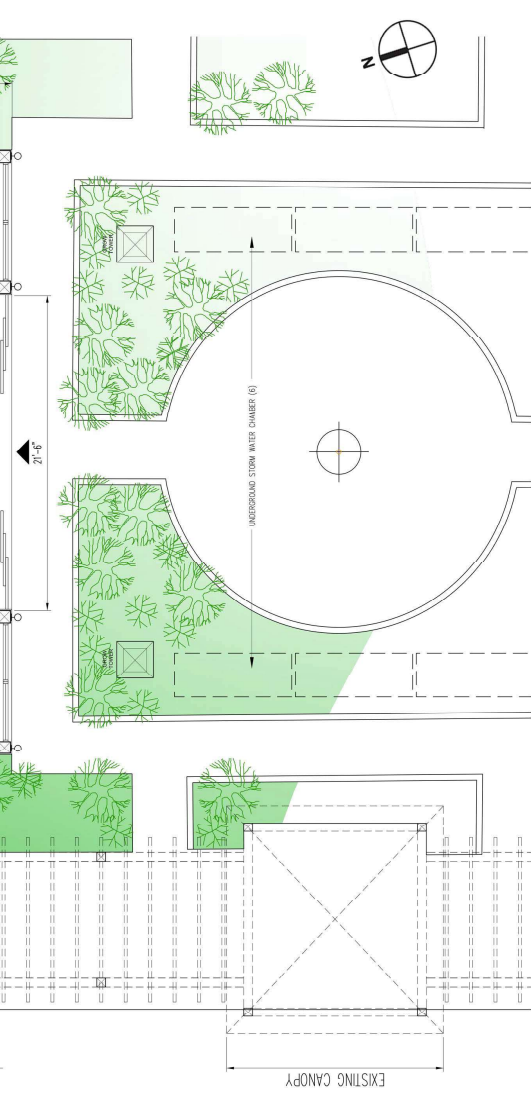


PROPOSED SCREEN PLANT  
- PLANTER AT SOUTH

NORTH ELEVATION  
SCALE: 1/4" = 1'-0"



PLAN ELEVATIONS  
- revised height

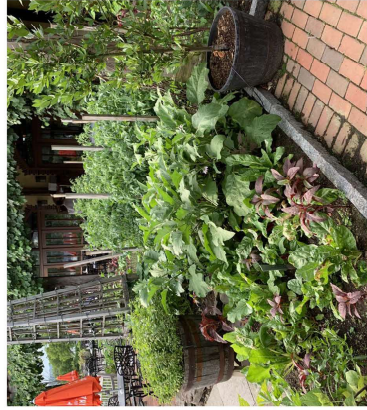
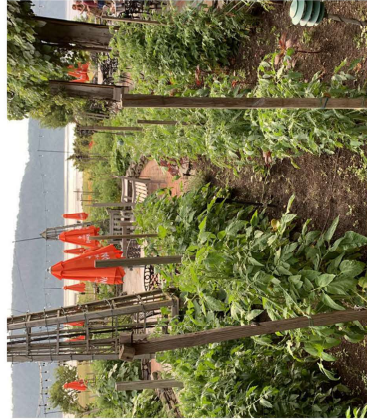
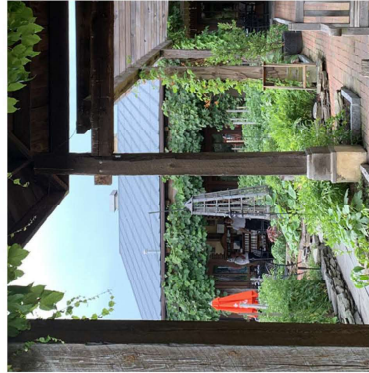
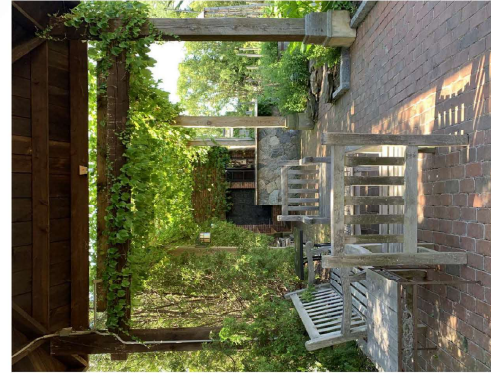


GREENHOUSE PLAN  
SCALE: 1/4" = 1'-0"

EXISTING VEGETABLE GARDEN





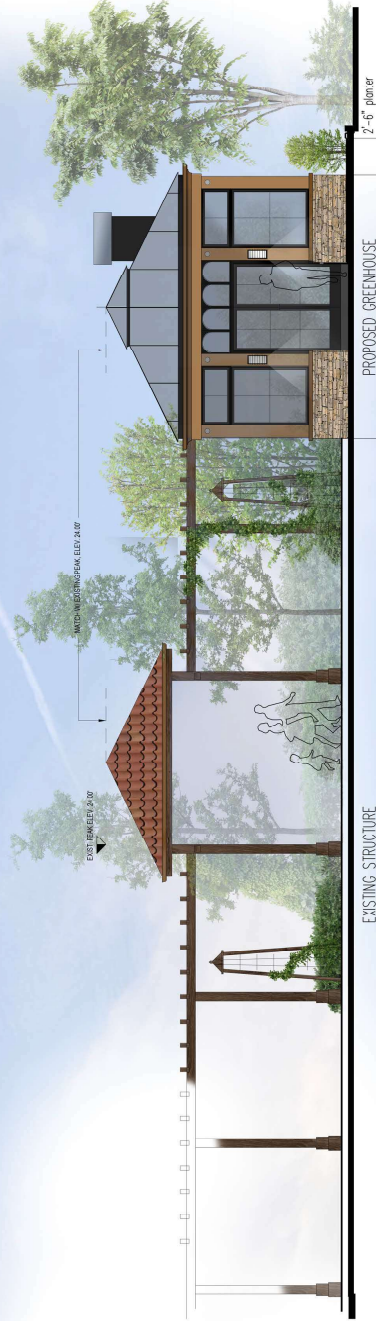


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OWNER & LANDSCAPER  
30 GOLD AVENUE, DORSET TERR., NEW YORK 10022

NYS P.E. LIC. 05111

EXISTING VEGETABLE GARDEN - miscellaneous views

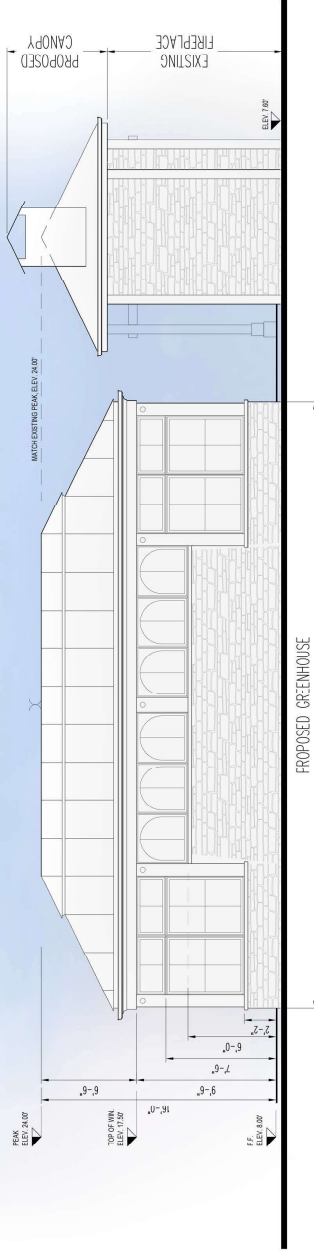
A2



EXISTING STRUCTURE

PROPOSED GREENHOUSE

WEST ELEVATION  
SCALE: 1/4" = 1'-0"



SOUTH ELEVATION  
SCALE: 1/4" = 1'-0"

ELEVATIONS  
EXIST. GARDEN  
VIEWS  
- revised height

TLCONCEPT  
ARCHITECTURE  
1400 AVENUE C  
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TEL: 212.688.1515  
WWW.TLCONCEPT.COM

PROJECT  
GREENHOUSE ADDITION  
TO  
HARVEST ON  
HUDSON  
Hastings-on-Hudson,  
New York 10706

07.24.2019 SCHEMATIC DESIGN  
08.15.2019 PLANNING BOARD MEETING



## DRAWN-

GREENHOUSE ADDITION

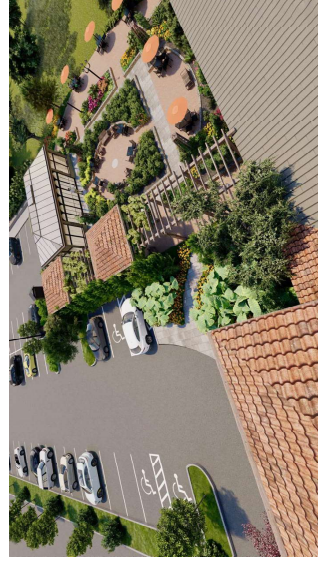
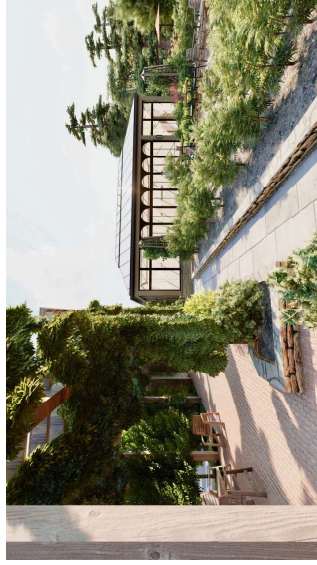
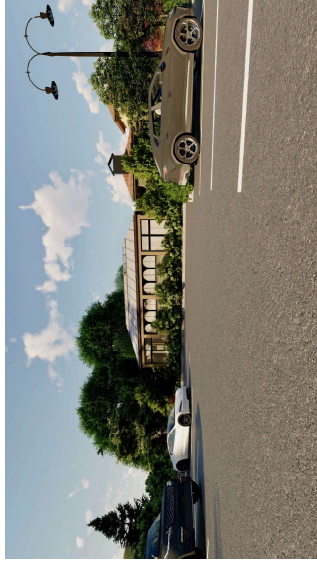
TO  
HOUSE ADDITION

HARVEST ON HUDSON

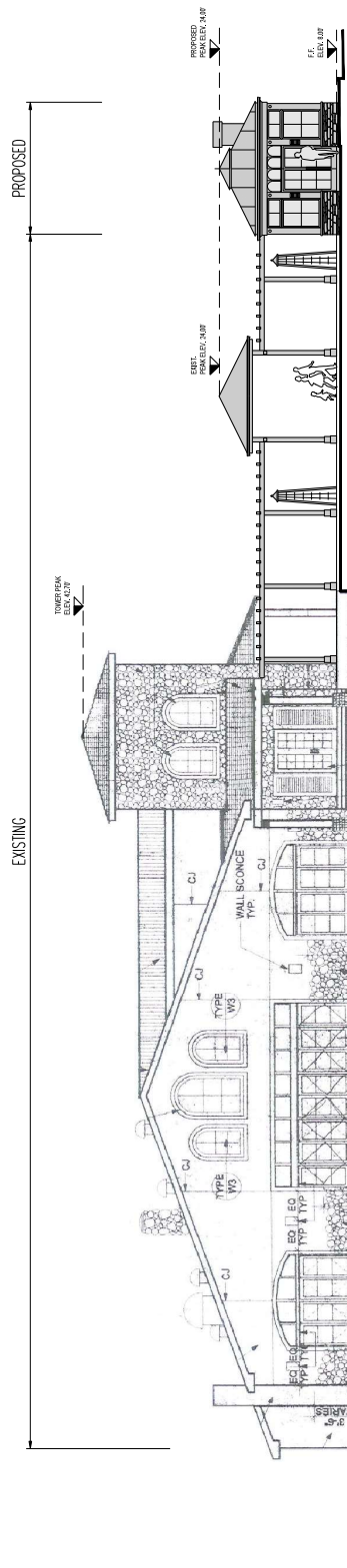
PROJECT:

PROPOSED  
GREENHOUSE  
VIEWS

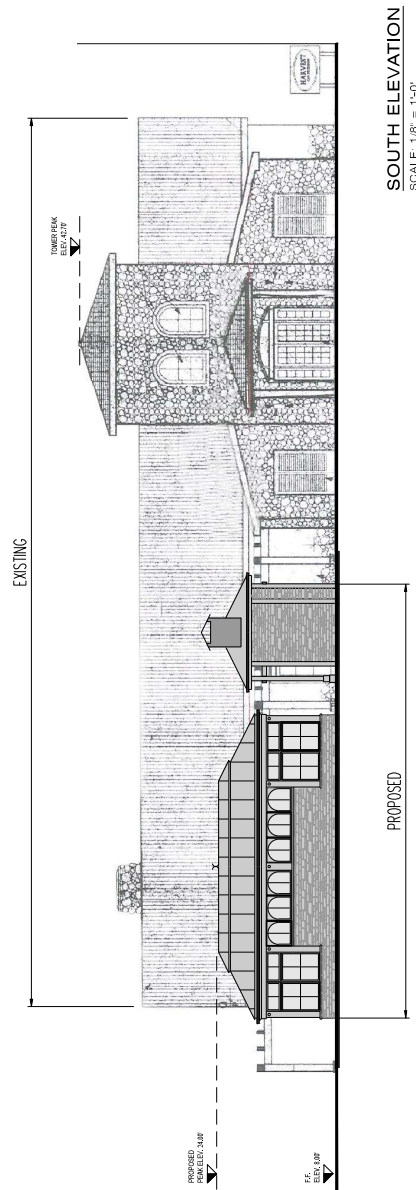
- revised height







**WEST ELEVATION**  
SCALE: 1/8" = 1'-0"



**SOUTH ELEVATION**  
SCALE: 1/8" = 1'-0"



## Height of greenhouse structures

Height is one of the most important aspects of a greenhouse. The height of a structure directly impacts on natural ventilation, the stability of the internal environment and crop management. Greenhouse structures with wall heights of at least 4 metres should be constructed wherever feasible. These structures should be built in preference to designs of lower height. The natural 'chimney effect' of rising hot air and falling cooler air which is the basis for passive ventilation becomes truly effective above approximately 3.5 metres.

A tall, roof ventilated greenhouse can achieve a more uniform, stable and ultimately superior growing environment for the crop. During hot weather, a taller structure avoids trapping heated, humid air around the plants.

Many of the problems that are encountered in greenhouse crops can be directly attributed to the capacity to manage the growing environment. Better control of the growing environment directly impacts on how well other problems in the greenhouse can be managed. A significant proportion of yield loss in Australian greenhouse crops can be attributed to poor management of heat. The capacity for a grower to manage heat in summer is greatly improved with increasing greenhouse height.

Effective management of pests and diseases using non-chemical management strategies is also dependent on good control of the growing environment and the value of height in the structure can not be overstated.

Although some crops can be grown relatively well in lower profile greenhouses, taller structures are more versatile, are suitable for a wider range of crops and therefore a better long term investment.



## How Important is the Height of a Greenhouse?

Ambitious gardeners planning their own customized greenhouse design for their property are commonly concerned with overall square footage; the property size and budget dictates the final greenhouse shape. However, the structure's height should not be overlooked during design since it plays a large role in plant health, based on surrounding air temperatures and humidity levels. In fact, it is best to have a tall greenhouse for better internal temperature control.

### Heat Rising

Greenhouses are not the perfectly enclosed bubble that they may appear to be; any structure has some air leaks to the outside environment. Sunlight warming the greenhouse's interior creates a large warm air mass. Since the warmer air molecules have less density than cooler air pockets, the warm air rises. An extremely petite greenhouse exposes plants to warmer air than they may prefer, based on the individual species.

However, a tall greenhouse allows warm air to rise away from plant foliage so that temperatures remain relatively balanced at the floor level; a greenhouse height of approximately 13 feet is optimal for proper airflow and temperature control.

### Extreme Temperature Fluctuations

The amount of physical air inside a greenhouse provides more airspace so that to night; the air molecules are not compact they would in a small growing space. In general less than 15 degrees Fahrenheit for optimal Georgia. Extreme temperature changes cau



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## **Functionality**

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Since most greenhouses are built for permanent purposes, the height greatly influences functionality. Plants that require more space, like vines, could be planted in hanging baskets within the greenhouse; you need enough greenhouse height to support both a floor level growing space, as well ceiling-hung baskets. Simply walking into the greenhouse must be considered since you do not want to be constantly concerned about striking your head on low clearance doorways or overhead beams. If you want to grow taller plants, such as dwarf fruit trees, you must have an ample greenhouse height so that the plants can spread upward for fruit cultivation.

## **Fan Space**

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Horizontal fans installed inside the greenhouse need enough clearance above the growing plants to be effective in their air movement design. These fans provide air circulation so that the greenhouse retains a balanced temperature throughout its space; cold and hot air pockets do not become issues near the structure's corners. However, fans too close to plants cause improper temperatures and affect the immediate area's humidity levels. Sensitive plants may have stunted growth while exposed to excessive airflow across their foliage; a minimum 2-foot space must be between the fans and plant tops.

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**References (5)**

- [West Virginia University Extension Service: Planning and Building a Greenhouse](#)
- [Virginia Tech Cooperative Extension: Dealing with the High Cost of Energy for Greenhouse Operations](#)
- [New South Wales Department of Primary Industries: Height of Greenhouse Structures](#)
- [Clear Choice Glass Construction: Your Guide to Selecting a Greenhouse](#)
- [University of Georgia: Hobby Greenhouses](#)

**About the Author**

Writing professionally since 2010, Amy Rodriguez cultivates successful cacti, succulents, bulbs, carnivorous plants and orchids at home. With an electronics degree and more than 10 years of experience, she applies her love of gadgets to the gardening world as she continues her education through college classes and gardening activities.

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FEATURES

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7/30/2014

## Inside the Greenhouse: The Height of the Issue

*Al Sray*

It's short. It's dark. It's almost claustrophobic.

No, it's not a deep cave filled with bats and stalactites in some far-off land. It's a greenhouse—and it's expected to grow quality plants!

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*Pictured: Dallas Johnson Greenhouses have 16 ft. of sidewall height on their Nexus Zephyr greenhouse range. It allows them to*

*double stack baskets without affecting the plants below.*

---

That may be a bit of an exaggeration, but we all have either walked into, or actually own, pre-90s built greenhouses. And one thing always seems to stand out—a very short sidewall/under-gutter height. That was just how it was done in those years. It was very common to see an 8-ft., or even a 6-ft., sidewall/under-gutter height.

The thought process was simple. It's not only cheaper to build shorter greenhouses, but it's also less space to heat. Continuing with that rationale, shorter also meant stronger. If you didn't plan on heating in the winter in Northern climates, and there would be no snow melt-off, then a shorter structure was less likely to collapse.

As we have come to learn, most of the assumptions were correct thinking at the time, but didn't prove to provide the best environment for what counted most ... the plants.





return on your investment?

At Nexus Corporation, we highly recommend a minimum gutter height of 12 ft., but that's the minimum. There are a lot of advantages to going with a 14-ft. or even a 16-ft. tall sidewall height.

Because all of Nexus' structures are engineered to meet snow and wind loads, many of the old assumptions about shorter structures being better because they're stronger have been thrown out the window. You really can have the best of both worlds—the ideal growing environment, at an affordable cost, that will stand up to your local snow and wind load requirements.

Here are some of the key factors to consider when determining what gutter height you should build your new greenhouse.

## **Not all gutter heights are created equal!**

You need to be careful when comparing gutter heights on different styles of greenhouses, as that number can be deceiving. For example, the gutter height of a Nexus Vail or Zephyr is the same as the under-truss height. This is an important point as it allows a lower gutter height to give you the under-truss clearance you need for hanging basket systems, booms, lights and other mechanical systems with certain styles.

Some greenhouse styles do have “energy”-style trusses. These styles have trusses with bottom chords that can extend to as much as 3 ft. below the gutter height. This means that a greenhouse with this style truss and a 14-ft. gutter/sidewall height would only have an 11-ft. under-truss height.

Comparing this scenario to the use of an energy truss to support greenhouse roof systems lowers the clearance height inside the greenhouse in relationship to the gutter height. These houses, like the Venlo styles, will need higher gutter heights than a Nexus-trussed structure to achieve the same inside clearances. Make sure you aren't paying for additional height when it won't be needed.

This under-truss height affects plants growing overhead. These taller heights allow you to hang overhead hanging basket systems, booms and other mechanical equipment below. In fact, many growers with tall greenhouses are now double, or even triple, stacking their hanging basket systems. Obviously, increasing the number of hanging baskets you're able to produce in the same square footage means a much better ROI on your new greenhouse



using them for dual purposes—they're both growing hanging baskets overhead and using the area below as headhouse/shipping facilities.

Another advantage of tall truss heights is when you're utilizing supplemental grow lights. Since most grow light systems hang from the bottom chord of the truss, those lights are further away from the plants. This not only keeps the quality of the light better and more uniform, but it also keeps the immense heat generated by the lights further away from the plants.

Lastly, no matter what style of greenhouse you have, there's always a certain amount of steel or aluminum roof structure overhead. This can create shadowing in parts of the greenhouse below. In a 14-ft. to 16-ft.-tall greenhouse, that roof structure is much further away from the plants. The light gets reflected much better and lessens those shadows and potential issues on the plants.

## Ventilation

In a wide span greenhouse with a standard 6/12 greenhouse roof pitch, the taller your sidewall height, the better ventilation you'll get. For example, in a standard Nexus Vail, A-frame structure, a 14-ft. gutter height will give you a grade to peak height of more than 24 ft.

This height gives you a very large attic. Because hot air rises it allows for a much larger air mass and area for that hot air to go. If you're naturally ventilated, particularly using atrium-style open roof vents, that air will not only escape at the highest point in the house, but will actually be pulled out by the prevailing winds blowing over the top of the vents. This is a big difference when you compare the gutter heights of a traditional Venlo style house with the smaller peak heights. To get an equivalent peak height to release your heated air, you would need to be nearly 8 ft. taller with your gutter height. Again, not all gutter heights are the same.

If you're cooling mechanically with exhaust fans and evaporative cooling pads or swamp coolers, the same concept applies. That heat gets pulled away from the plants at either grade level or on the growing benches and goes into the large attic. The cooler air below coming from the mechanical cooling system then has a much better chance of being effective.

## Door height

This seems like a minor issue, but have you ever tried to wheel an 8-ft. cart through a 7-ft. tall greenhouse door? What about trying to drive a tow motor or forklift through that same door?

Overhead doors (especially with automatic openers) offer the most convenient way to transport carts from one zone to another or from one zone to the headhouse for shipping.





Taller (and wider) doors give you more flexibility in your greenhouse operation. It makes for easier and faster transport. And as we all know, when May hits and every second counts in getting product shipped, a well-planned movement scheme with no door limitations can mean a lot.

Budget invariably plays a huge role in the decisions that are made when designing a new greenhouse. While all of the points above show that it's indeed ideal to build as tall a greenhouse as you can afford, every grower is different.

Where's that sweet spot between building the perfect plant-growing facility and being able to make that monthly loan payment? The answer is different for every grower. But at Nexus, our sales staff averages almost 20 years in the greenhouse structures design and sales experience. We use that experience to help you come up with the best possible solutions for your greenhouse needs. **GT**

---

*Al Sray is Midwest Sales Manager for Nexus Corporation in Northglenn, Colorado..*

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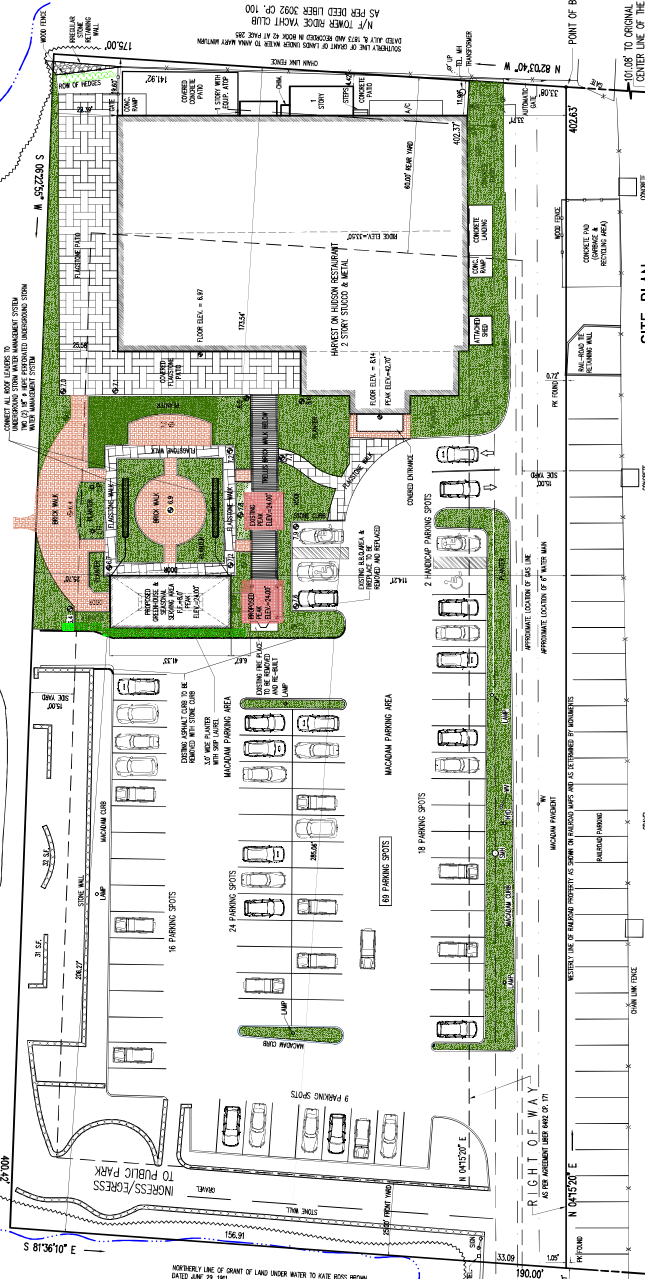
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VERTICAL DATUM:  
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PUBLIC PARK N/F VILLAGE OF HASTINGS-ON-HUDSON

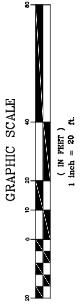
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SITE PLAN



NO.	DATE	DESCRIPTION
1	7/2/19	AS PER P.P.
2	8/13/19	FOR AUGUST 19
3	8/13/19	FOR SEPTEMBER 19

GREENHOUSE ADDITION  
HARVEST-on-HUDSON  
VILLAGE OF HASTINGS-on-HUDSON  
TOWN OF GREENVILLE  
WESTCHESTER COUNTY, NEW YORK

PAUL J. PETRETTI  
CIVIL ENGINEER - LAND SURVEYING & MAPPING - SITE DESIGN & PLANNING  
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30 GOLD MARSH ROAD, WESTCHESTER, NEW YORK 10581  
TEL: 914-422-5188 FAX: 914-422-5189

Project Number: 19-01-0007 E-Mail: ppetretti@hmc.com

DATE: 8/13/19

SCALE: 1" = 20'

PROJECT: GREENHOUSE ADDITION

SHEET: 1 OF 3

DATE: 8/13/19

SCALE: 1" = 20'

PROJECT: GREENHOUSE ADDITION

SHEET: 1 OF 3

DATE: 8/13/19

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# Why Greenhouse Under-Gutter Height Matters



By **Michael Camplin** (<https://www.greenhousegrower.com/author/mcamplin/>)

June 3, 2013

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subject=Why+Greenhouse+Under-Gutter+Height+Matters&body=I+want+to+hear+from+you+about+this+site+https%3A%2F%2Fwww.greenhousegrower.com/author/mcamplin/under-gutter-height-matters%2F)

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I don't think there are many greenhouse manufacturers still left in the Dark Ages of "keep your greenhouse low or your heat costs will rise," but if you do come across one, run for your plant life! Here are some reasons to consider building higher.

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#### ADVERTISEMENT

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### **1. Taller houses cast less shadow on your crop.**

I was not being facetious when I used the term the Dark Ages to describe the period of 7- to 9-foot-tall greenhouses. The modern commercial greenhouse standard height in North America is 16 feet for floral crops and 21 feet to 24 feet for vine climbing produce, but don't quote me for too long on that one. Builders continue to raise their roofs with every build. Taller greenhouses allow you to produce more crop in the same footprint. They can accommodate double-hung and even triple-hung hanging baskets, while still providing a healthy environment for the plants at ground level, with better airflow and light levels.

### **2. Taller greenhouse environments can be controlled with less energy spikes.**

When you increase greenhouse height, you increase the air volume that you are controlling. The greater the air volume, the slower changes in temperature occur. By moderating temperature fluctuations, you create a healthier environment for your plants. Some of our customers told us they have been able to reduce their heating costs in greenhouse ranges that are 3 or 4 feet taller than standard height greenhouses. When it comes to ventilation, taller greenhouses also have more air drawing out of the roof vents, which creates more efficient cooling.

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**3. If you are going to put in energy curtains now or want the possibility for them in the future, plan for a taller greenhouse.**

No one wants their employees to have to duck between energy curtain wires. Put the curtains high enough that you don't have to worry about this. And while you are at it, we recommend you have 18 inches between the top chord of your truss and your gutter, which allows most shade systems to be installed with ease.

Although we recommend building higher, every greenhouse grower has an ideal growing environment that works for them. The structural decisions you make will of course depend on your geographical location, what crops you're growing and the climate of the market you are selling into.

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*Michael Camplin (mcamplin@ggsstructures.com) is sales manager at GGS. **See all author stories here.** (<https://www.greenhousegrower.com/author/mcamplin/>)*

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