

Before you build a new greenhouse, there are several factors to consider in the layout. In addition to permits and site issues, the design should reflect your crops.

By John Hoozeboom

Consider several factors when designing a greenhouse

YOU SHOULD carefully consider several issues before building a new greenhouse facility or expanding an existing greenhouse. Sufficient time must be reserved to ensure that all potential problems and issues are dealt with before construction starts. Proper planning of the complete construction process will make it possible to meet the agreed-upon completion date.

Obtain the proper permits

The process to obtain a building permit for a greenhouse project can be lengthy. Because the process differs between locations, it may be useful to arrange a meeting with local authorities to discuss issues that may come up in the permitting process.

Questions that may need to be answered include:

- Will the building site have to be re-zoned? If so, will that require public hearings?
- How much of the property may be covered with structures?
- Is a building permit required? If so, how long will it take to obtain a permit?
- What building code will be used?
- What is the cost of the permit?
- What drawings will be required with the permit application?
- Are stamped drawings required?
- Are there any water-use restrictions for the selected site?
- What are the requirements for



The greenhouse layout should allow employees to access plants quickly and efficiently with the possibility for one-way traffic when moving plants.

Costs instigate changes

Forged by increased labor and energy costs, the greenhouse industry is seeing significant changes.

For instance, systems and installations are being developed to bring the work to the workers. Several systems are now successfully operating in the Netherlands.

Many Dutch growers generate their own

electricity and use both the waste heat and carbon dioxide these systems produce. Different ventilation and cooling systems are being tested on a number of projects.

Alternative fuel sources are increasingly being used to heat greenhouses. Several (semi) enclosed greenhouses have been built in Holland, showing potential for significant energy savings.



Factors to consider when choosing a glazing material include light transmittance, life expectancy, energy values, drip control, flammability and maintenance requirements.

storm drain control?

○ Who will be involved in monitoring the construction project, (e.g., the building inspector, health department, fire marshal, EPA, etc.)?

It is also advisable to try to establish at this time the property tax base for the project and whether or not the project is exempt from sales tax.

Site-related issues

Here are several issues related to the actual building site that need to be checked and determined.

- How much soil needs to be removed or added to create a level building plot for the project?
- Is a soil compaction test needed?
- Where will the access road be located?
- Is there sufficient irrigation water available for the size of the proposed facility?
- Is the quality of the water source suitable for irrigation?
- Are the required utility services available at the building site (three-phase electric, natural gas, phone lines, etc.)?
- What is the size and location of the storm water basin?
- Is the property suitable for the construction of a septic field?

With more environmental protection regulations being enforced, it is

more important to pay close attention to greenhouse runoff. It may be necessary for a grower to include a holding pond in the design of the greenhouse facility.

Greenhouse layout

Overall layout. When designing the overall layout of the greenhouse, give careful consideration to the



A greenhouse master plan that will be built in phases should be designed with all systems and installations for the finished operation.

actual operating mode of the facility: which plants will be grown, the planting schedules, how the plants will be moved in and out of the greenhouse, how the orders will be gathered and how the orders will be staged for shipping. Design a layout that enables employees to move the plants quickly and efficiently through the facility. If possible, the layout should allow for one-way traffic when moving plants.

Phases. If a greenhouse will be built in phases, develop a master plan for the complete facility. Design all systems and installations with the finished operation in mind. Determine irrigation water and electric power requirements at this stage to ensure that water storage tanks, irrigation supply lines, transformers and electric cables will meet future requirements.

Structure. Base the type of greenhouse structure to be built on the crops produced and the growing systems to be used. Take the prevailing climate conditions at the building site into consideration. These factors also determine bay width and length and the gutter height as well as the size of the growing zones. If the



With the increasing concern for environmental issues and the enforcement of protective regulations, more growers are adding a holding pond.

greenhouse will produce plants requiring different climate conditions, each growing zone must be equipped with independent environmental-control systems.

Head house. Locate the head house centrally to provide easy access to all greenhouse zones. Site soil-mixing equipment and sowing and planting line in a way that the plants can be moved easily to various growing zones. This is especially important if the greenhouse will be equipped with a mobile growing system. The shipping areas, offices, break room, bathrooms, boiler room and the irrigation room are usually in the head house. Include a sufficient number of loading docks in the design of the head house.

Glazing. The selection of glazing materials depends on the same factors as those for the structure, although financial considerations usually play a larger role for this component. Personal preference and experience often play a role in choosing a glazing material. When selecting glazing, consider these factors: light transmittance, life expectancy, energy values, drip control, flammability and maintenance requirements.

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