

astic representatives from the horticulture industry onto these panels, and growers are encouraged to make enquiries if they want to become more involved.

A collaborative approach between the industry and colleges produces quality, well-rounded, knowledgeable students, which translates into quality, well rounded, knowledgeable staff.

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## Preparing for a New Propagation Unit®

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### INTRODUCTON

West End Nurseries is a wholesale specialist liner nursery producing a wide range of shrubs and climbers. In 2004, production was 2 million liners, 80% of which was from cuttings and seed, 15% micropropagated plants, and 5% bought-in cuttings or seedlings.

In Year 2000 we had an opportunity to change our business by investing in a new propagation facility. We knew we could not continue trading in the way we had done for previous years. The old propagation unit was highly inefficient, and the site did not lend itself to horticultural redevelopment. We purchased a neighbour's unused tomato nursery that had been redundant for more than 5 years. It included a 1970s 1,920 m<sup>2</sup> Venlo glasshouse with potential to build an additional 2,350 m<sup>2</sup> glasshouse. The purchase of the nursery was in order that West End Nurseries could become as self-sufficient in propagation as possible. It was becoming more difficult to buy in the plants that our customers wanted, and the cost of bought-in material was rising — we felt rising transport costs would only exacerbate this trend. With some competing nurseries abandoning their own propagation units, we felt investment was a good business opportunity enabling us to offer increased reliability to our customers.

### PREPARING FOR A NEW PROPAGATION UNIT

Based on our experience, these are the key steps in drawing up the specifications for a new propagation unit.

#### Preparation.

- Plan effectively and allow sufficient time for all the processes.
- Collect data, including current benchmarks for time/labour costs and your own current costings for production in your existing unit (Table 1).
- Seek information from as wide a variety of sources as possible. It is important to keep an open mind at this stage and view as many other propagation units as necessary. Variation is useful, and we included visits to nurseries in other sectors such as bedding and pot plants. We found other nurseries generally very willing to allow us to visit.
- Visit trade exhibitions (we included those in the U.K. and continental Europe) to obtain information on the current state of the technology in areas such as environment control and handling.

**Table 1.** Propagation annual comparisons Weeks 18 to 37.

Year	Cuttings produced	Hours spent per operation					Total (h)	Cuttings (h)
		Propagation	Movements	Watering	Plant maintenance			
2001	489,530	5079	962	201	525	6767	72.3	
2002	482,210	5027	818	142	576	6563	73.5	
2003	568,280	5354	268	88	729	6439	88.3	
2004	750,050	6474	244	288	1111	8117	92.4	
2005*	704,125	6132	211	147	592	7082	99.4	

\* Data up to and including Weeks 18–31.

**Establish What You Have.** List all essential features of the current set-up — staff contributions are valuable — and highlight all the unwanted features as a reminder. It is particularly important to collate information about your existing running costs in order to identify how savings can be made. Collate as much data as possible — don't forget to include building maintenance, heating, and lighting. Pay particular attention to costing the labour units in your existing setup; ensure you have systems in place to log inputs into all the various tasks (Table 2).

**Table 2.** West End Nurseries propagation staff time sheet.

NAME	Date 2005				
	Monday	Tuesday	Wednesday	Thursday	Friday
Propagation					
Plastic					
Watering					
Plug Maintenance					
Cutting Movement					
Stock Plants					
Training					
Repairs					
IPM					
Spraying					
Sick					

Then consider the potential facilities available for expansion, for example, relocation to a glasshouse that may be suitable, and identify your current position in the market and what may be available to you — you may end up concluding that buying in is the cheaper option for your particular situation. Throughout the planning process it is vital that you maintain awareness of what is happening in the market around you. Modern trading conditions mean changes are occurring very rapidly and your plans need to be able to respond.

**Establish What You Need.** At West End Nurseries we identified our needs were for improved production flexibility, reduced running costs through use of the latest heating systems, and low maintenance cost through use of up-to-date equipment.

We wanted to produce better quality crops by reducing stress on the propagation material and reducing disease incidence. Higher productivity would be obtained by reducing rooting times and labour input and improving facilities for staff.

In making your plans it is vital to review results from your own or industry- or public-funded research and development that will help you achieve your goals. We were particularly interested in integrated pest management techniques, disease prevention, reduced rooting times, and the effects of rooting environments on plant development.

When making a big investment, it is important to future-proof it as much as possible. We aimed to ensure our new facility would enable us to expand production, make use of future new techniques in plant raising, or explore the potential of new crops and new markets such as plug sales. It is very important to have a facility allowing plenty of flexibility, because it may be necessary to change the crops produced in response to market forces.

It is also vital to build in safeguards through thorough risk assessment: plan contingencies in case of failures of heating, electricity, or computer systems.

**Planning Considerations.** Ensure the terrain is suitable or plan how to deal with any disadvantages. On our new propagation unit we had to arrange for a mechanical lift to move benches between two levels because the site is on a slope. A unit's position within the nursery and access are also important considerations.

Remember that it is all too easy to allow build costs to go out of control. It is sensible to allow for 20% overrun in your costings, but ensure you have control over the build.

Availability of labour resources and key skills can make or break the efficiency of the new unit. Remember that you may need to ask some staff to relocate, work new practices, or learn new skills such as computer techniques and that this may need to be negotiated.

Consider your plant range in relation to the new facilities that will become available in the new unit. There may be potential to expand the range and grow crops that were previously not possible. On the other hand mono-cropping or specialisation may be more efficient. The production opportunities need to be balanced against the risks of overproduction.

## **THE FINAL RESULT: THE NEW PROPAGATION UNIT AT WEST END NURSERIES**

Our plans led to the specifications shown below. The new unit was completed in 2003.

### **Structure.**

- A 2,350 m<sup>2</sup> Venlo glasshouse.
- Thirteen spans, each 9.6 m wide and 5 m tall, one span 6.4 m wide.
- All cladding 1-m-wide glass; venting both sides of ridge.
- Manual internal and electric external doors, 2 m and 3 m wide.

**Heating.** Hot water via 50-mm pipe under the benches spaced in runs 2 m apart. A 40-mm pipe for return flow positioned under the shading. Temperature sensors positioned at strategic points, connected to the environmental control computer.

A 1-million-Btu oil-fired, insulated, aluminium boiler rated at 90% efficiency provides heat. A stand-by iron-section 500,000-Btu boiler is also incorporated into the system and is rated at 65% efficiency.

**Roller Benching.** Benches are 4.3 m long, 1.75 m wide, and made of formed lightweight aluminium with galvanised steel mesh base for drainage and heat access. The bench edges include a machined profile into which the film-plastic sheets used for humidity control can be clipped. Lightweight aluminium hoops with an easy-fitting lock system support the plastic film. We propagate 3,500 to 4,000 cuttings per bench.

**Water Cubicle.** Filled benches are watered in a cubicle from aluminium overhead spray lines controlled by timer or by dispenser into a plastic bench base liner.

**Treatment Cubicle.** Fungicide may be applied to filled benches from a totally enclosed aluminium cubicle via overhead spray lines controlled by timer or through a dispenser.

**Sticking Bench and Cutting Benches.** Sticking bench is height adjustable to  $\pm 30$  cm for operator comfort and optimum work rate. The cutting bench has two operator stations with aluminium worktops sloping away from operators and incorporates a shelf for prepared cuttings. Benches were designed with input from the propagation staff who use them.

**Lift.** A 2000-kg-capacity scissor lift is used to move benches between the two levels of the propagation house.

**Environmental Control Computer.** A weather station monitors wind speed and direction, outside temperature and light levels, and is backed up with Met Office downloads four times per day. The inside climate is monitored for temperature, humidity, and shading. The whole propagation unit is divided into four separate areas with unique environments (two weaning units and two propagation units). The alarm triggers automatic dial-up to 10 people to report any of the failures identified in our risk assessment. Additional software for extra-efficient heating has saved an estimated additional 25% on energy costs.

**Shading.** A 60% thermal shading screen can be supplemented by 20% additional summer shade sprayed onto the glass. We are also equipped with 50% side shading.

**Store Area.** We still work with a small amount of bought-in material. Up to 18 pallets of plug trays can be stored in a cold-store facility at the main entrance to the propagation unit, which includes box-washing facilities.

**Weaning Unit.** Consists of two existing former tomato nursery Venlo glasshouses already on site totaling 1,920 m<sup>2</sup>. Heating is by a 500,000-Btu air heater in each for frost-free protection only. Overhead irrigation incorporates injector for compost tea and liquid fertilizer.

## CONSIDERATIONS AFTER COMPLETION

It can be difficult to consider all the implications of a new build so a review of your unit and circumstances around it may be needed after completion. These may include:

- Effects on neighbouring land in winter and summer.
- Effects on wildlife. We have worked with conservation groups such as the Royal Society for the Protection of Birds to improve habitats

on our surrounding land. Consider new hedge planting or screening both for wildlife and to soften visual impacts.

- Meeting future legislation. Although this should be part of the initial planning process, once the new unit is in operation you may be able to identify ways to make further efficiencies in water recycling, reducing plant waste, material waste, pesticides, energy usage, and other impacts on your local environment.

### LESSONS LEARNED

Even though we planned as carefully as we could, once the new propagation unit was in operation we felt we did make some mistakes:

- Did not allow enough time to learn how to use the new facility before it was commissioned.
- Should have included more storage space.
- Set aside insufficient funds to finish the unit in its entirety.
- Chose incorrect shade levels (75% would be more appropriate).
- In some cases relied too heavily on advice from consultants rather than knowledge from our own experience or our own research.

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## Advantages of In-House Propagation at Bransford Webbs Plant Company®

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**In 2002–03, Bransford Garden Plants (now Bransford Webbs) needed to make a decision about whether to propagate in-house or buy in plugs and liners, because the old propagation unit had fallen into disrepair. The decision to propagate in-house was made for the following reasons: control of production, introduction of new lines, and to retain skills. The new unit was opened in January 2005 and consists of a 500-m<sup>2</sup> hi-tech mist unit and a 4500-m<sup>2</sup> liner unit, incorporating Eford sand-bed subirrigation.**

### INTRODUCTION

Bransford Nursery was established in 1963, evolving from a traditional fruit, hop, and livestock farm. The company founder, John Tooby, wanted to fully utilise the small number of glasshouses that were only productive for 3 months of the year for hop propagation, so he decided to propagate hardy nursery stock. By the mid 1960s, Bransford was seen as an innovator within the industry and had become an important producer of trees, shrubs, and roses. In the early 1980s Will Tooby became the nursery manager, and the wholesale production of nursery stock had become the core activity of the business. In 1993 the nursery became Bransford Garden Plants, and by 1996 the nursery had drastically reduced its standard A-Z range and become almost a purely promotional nursery. It merged with Webbs Nursery in 2005.

Currently, Bransford Webbs supplies more than 1 million trees, shrubs, roses, climbers, and herbaceous perennials to the garden centre market, of which about