

Anna Gresham School of Landscape Design

Diploma in Landscape Design

Module 18

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DECORATIVE STRUCTURES AND GARDEN BUILDINGS

To be outdoors in the open air but at the same time enclosed and surrounded by plants is one of the pleasures to be gained from a pergola, arbor, arched walkway or summerhouse. Decorative structures give substance to a garden, become focal points, and add interest and a touch of luxury. They make it possible to use the garden when it is wet, windy or just too hot. As supports for climbing plants they give us an extra planting dimension that allows us to appreciate fragrance and flowers close-up.

Not all garden structures have a solely decorative value. Garden stores (sheds) and greenhouses can be highly decorative but they also serve more practical functions.

Pergolas

Pergolas originated as a framework for climbing plants such as grapevines. Some are designed on a massive scale with stout masonry columns and sturdy overhead beams. More compact versions work in smaller gardens. A pergola is basically a series of overhead beams supported by posts or columns. They are most often used over a terrace or patio to provide shade and increase the sense of enclosure. Correctly positioned they offer screening from neighboring properties and block unwanted views. A long pergola positioned over a path becomes a shaded summer walk that may lead to a special part of the garden. Smaller versions can be used to make a front gate more attractive and inviting, or allow you to grow climbing roses around the door.

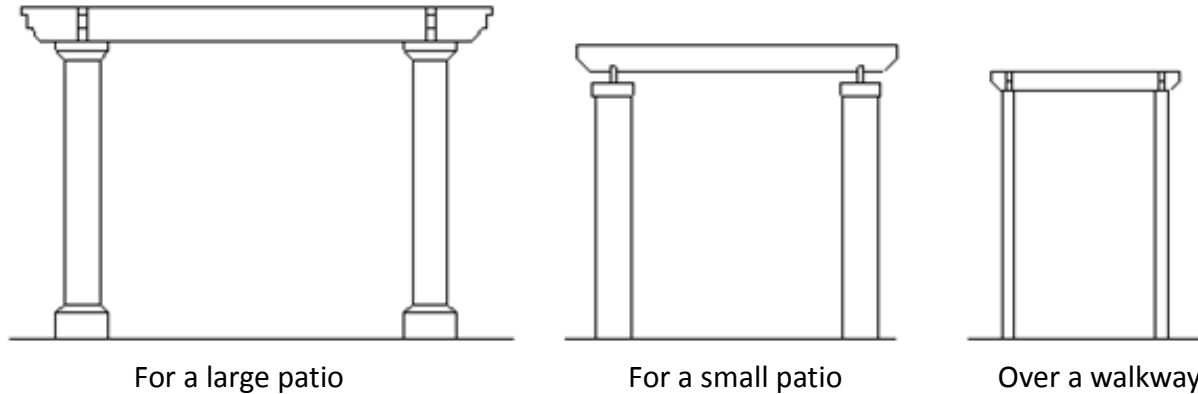
Pergolas need to be in scale with the garden but the proportions are ruled by height. A minimum distance of 7 ft [2.10 m] from the ground to the underside of the lowest horizontal timbers lets an adult pass beneath without hitting their head on the structure itself, or being hit in the face by overhead plants. The width of a pergola depends on where it is and its primary function. Over a patio, terrace or deck sufficient space between posts is needed to accommodate outdoor furniture. When used over a path a width of at least 4 ft [1.20 m] will allow one person to pass without having to fight through the foliage, but two walking side by side will require at least 6 ft [1.80 m]

Landscape designers traditionally worked with a cube system when working out the proportions of a pergola. The distance between the uprights was equal to the height. This would mean that a pergola of 7 ft [2.10 m] would have been 7 ft [2.10 m] wide, and the pairs of supports at 7 ft [2.10 m] intervals. Ideal as this might have been, today's smaller gardens often do not have the room to fully utilize these proportions.

Even if the garden size precludes the use of the traditional proportions, the principles of spatial dynamics and the three planes of enclosure should always be applied when designing pergolas. Close spacing of the uprights makes the pergola appear more tunnel-like, while wide spacing creates the appearance of a series of broad windows.

Overhead beams rest on the uprights with cross-pieces stretching over the beams. Increasing the frequency of the cross-pieces provides extra support for plants and creates more shade beneath. Remember that plants in full leaf are very heavy so the uprights and the horizontal timbers supporting the plants need to be strong and well anchored.

Below are some elevations of pergolas that may be used over patios and pathways.



Large scale pergola

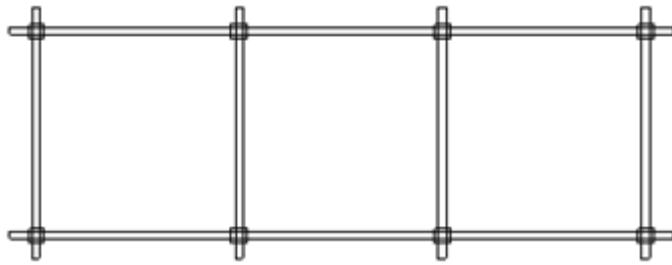
- Wide enough to accommodate large patio furniture
- Stone columns have a 18" [500 mm] wide base
- Crossbeams are 12" [300 mm] deep x 3" [75 mm] thick
- Height beneath the horizontal beam is 9 ft [2.70 m]
- Distance between pillars in both directions is at least 10 ft [3m]
- Both pillars and beams have decorative ends suitable for grand sites

Medium scale pergola

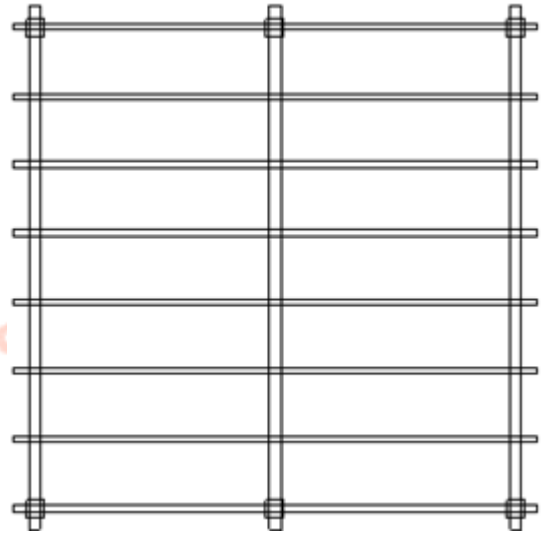
- Wide enough for two people to walk through side by side or to accommodate seating
- Brick columns are 1 ft [300 mm] square
- Crossbeams are 9" [220 mm] deep and 2" [50 mm] thick
- Height beneath the horizontal beam is 7' 6" [2.25 m]
- Distance between pillars in both directions is at least 6 ft [1.80 m]
- The crossbeams are raised above the top of the pillars, visually lightening the design

Small scale pergola

- Wide enough for one person to walk through comfortably
- Timber posts are 4" x 4" [100 x 100 mm]
- Crossbeams are 6" [150 mm] deep x 2" [50 mm] thick
- Height beneath the horizontal beam is 7 ft [2.10 m]
- Distance between posts in both directions is around 4 ft
- Simple style suits the compact size, making this pergola suitable for small, informal gardens



The above diagram shows a plan view of a typical pergola configuration over a pathway where climbing plants would be trained up the supports and across the beams. Adding cross-pieces over the beams, or stretching wires between the beams, will provide additional support for plants if required.



The diagram, above right, shows a plan view of a pergola that may be used over a patio, deck or terrace. Heavy beams span the distance between the widely spaced posts. Smaller cross-pieces are placed at 24" to 30" [600 to 750 mm] intervals to provide shade, privacy and support for plants. In extremely hot climates additional battens (lath) can be secured over the cross-pieces to provide maximum shade.

Spans and beam sizes

Pergolas over patios and terraces need to be designed with widely spaced uprights. As such the beams will also need to be heavier. All beams should be no less than 2" [50 mm] thick. For large spans, 3" or 4" [75 mm or 100 mm] thick beams often look more in proportion.



Pergolas can be splendidly formal or delightfully rustic, to suit whatever style of garden you are designing.



A guide to minimum beam and crossbeam dimensions (using treated softwood)

Beam sizes (inches x inches and mm x mm)

Span 6 ft	Span 8 ft	Span 10 ft	Span 12 ft	Span 15 - 20 ft
6 x 2	8 x 2	8 x 3	10 x 3	12 x 4

Span 1.8m	Span 2.4m	Span 3.0m	Span 4.0m	Span 5 to 6m
150 x 50	200 x 50	200 x 75	250 x 75	300 x 100

Cross-piece sizes (inches x inches and mm x mm)

Span 6 ft	Span 8 ft	Span 10 ft	Span 12 ft
4 x 2	5 x 2	6 x 2	8 x 2

Span 1.8m	Span 2.4m	Span 3.0m	Span 4.0m
100 x 50	125 x 50	150 x 50	200 x 50

NOTE: "Span" is the distance between one support and the next.

NOTE: These are suggested minimum sizes. In some cases better proportion, balance and a more attractive appearance may be gained by using heavier timbers. All timbers are used 'on edge'.

Pergola supports

The supports are more visible than the overhead beams so materials and style must be chosen with care, as they will contribute most to the pergola's character. Wood, brick, metal or stone can all be used to match existing garden architecture, or to provide their own architectural statement. The pergola can be monumental or elegant, traditional or contemporary, rustic or refined. The style and size of the supports will suggest, or even dictate, the size of the overhead beams. Be sure the scale of the pergola is in keeping with the size of the garden.

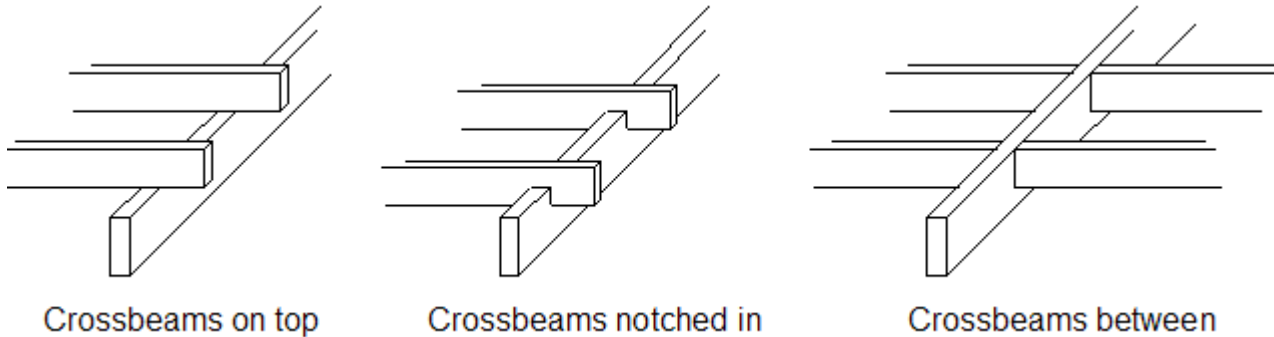
Pergola uprights use different materials from tree trunks to bricks, welded metalwork to local stone in any number of ways. You may also choose from a range of reproduction materials, with aluminum replacing cast iron, and concrete and fiberglass replacing stone. For a more elegant post, add a plinth, or base, at the bottom and a capital at the top. Moldings, grooves, and beveled edges also add a touch of flair. Metal dowels (pins) can be set into the top of the supports to serve as fixings for the beams.



A solid appearance results when the beam is set directly on top of the post or column. When the beam is supported on a thin metal rod or pipe the structure takes on a much lighter appearance.

Pergola overheads

The overhead structure of a pergola is usually made from timber beams, poles, slats or planks, or from metal. The style and strength of the uprights determine the style and weight of the overhead. Timber beams may be shaped at the ends for a lighter, more decorative finish, or left square and chunky to emphasize strength and mass. Cross-pieces, which run between the main beams, can rest on top of the main beams, be partially notched and seated down, or be attached between the main beams for a flatter structure.



The depth and frequency of the crossbeams will determine the amount of shade under the pergola. In the summer when the sun is more or less overhead the shadow will be cast as a pattern of beams alternating with strips of sunlight so a large amount of sun still able to reach the ground. In winter however, there may total shade both beneath the pergola and on adjoining house walls and windows as the shadow cast by the beams will be widened by the elongation caused by the low angle of the sun. Aligning crossbeams north-south will maximize midday sun and reduce morning and afternoon sun. Before designing the crossbeams think about how much shade is required, and at what times of the day and year.

Other decorative structures

The naming of garden structures can be a source of confusion with no clear definitions for terms such as pergola, tunnel, arch, arbor, gazebo, summerhouse, grotto, folly, dell etc. When designing any structure or decorative feature for the garden do not rely on a name alone to convey your idea. Always draw a plan view and elevation to make sure the client gets exactly what you intended.

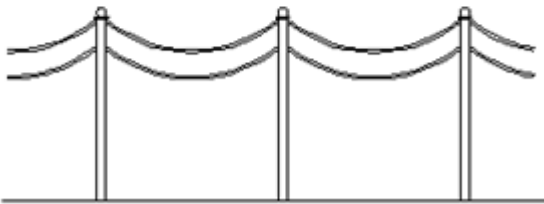
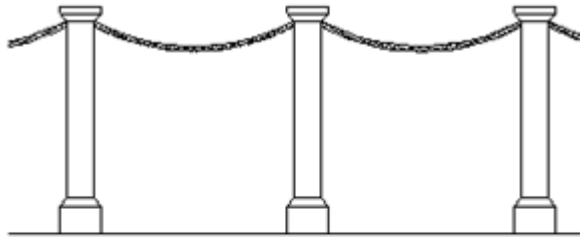
Arched walks and tunnels

In a large garden there is no more decorative way to set up a vista or display plants than with an arched walk or tunnel. Whether ready-made or custom-designed, these are a series of metal or timber arches linked into a continuous structure. While they may have an open and airy construction they impart a more closed-in feeling than a pergola. When planning where to position an arched walk or tunnel, place it so that framed in the arch of light at the far end there is an enticing focal point such as a seat, statue or urn of flowers to tempt you through.

Swags and pillars

Among the most romantic of garden structures, pillars draped with swags form part of the function of a pergola, but because they are two-dimensional they are more likely to be feasible in a smaller sized garden. Choose decorative uprights of timber, metal or masonry in a style to suit the setting. Position them at regular intervals along a path or behind some low planting where they form a series of 'windows' overlooking the garden.

The 'swags' are made of looping ropes or chains, which support vigorous climbers such as rambling roses or ivy. Plan the height and frequency of the uprights to suit the location of the structure and it's intended function. A row of pillars and swags on either side of a path would act like a 'roofless' pergola.



Wooden posts and rope swags are excellent for supporting vigorous climbing roses.

Trellis work

Trellis can be described as an openwork panel composed of a grid or lattice of wooden slats attached to a frame or wall. In the case of trellis screens the panels are set between supporting posts much in the same fashion as panel fences. Whereas a fence is primarily a barrier, a trellis screen is more suitable as a decorative feature providing a measure of privacy and disguise without completely blocking air and sunlight. As a support for climbing plants, trellis is ideal. The structure allows plants to cling or be tied to it, and in winter when deciduous plants lose their leaves the decorative lattice work continues to provide interest.

As a support for plants, trellis needs to be well constructed and strong. This is especially true for evergreen and woody climbers, as repairs to a failing structure would be difficult. Much ready-made trellis consists of thin slats held together with stainless steel staples, which after a few years, comes apart. Permanent trellis should be constructed from 1" x 1" [25 x 25 mm] slats, ideally notched into each other, and secured with either screws or clinched nails (nails are driven through to extend beyond the other side, the end is then bent over firmly against the face of the timber). Additional strength is gained from a sturdy frame. Thinner and wider slats may be desirable for certain styles of trellis. These should be joined with clinched nails and the whole panel framed. All timber and fixings must be suitable for exterior use.



Trellis can be used for decorative structures.

Trompe L'oeil

Meaning 'to trick the eye', trompe l'oeil is a time-honored tactic or technique intended to convince the viewer that false objects such as those depicted in a mural are real, or that a real object is larger, more spacious or further away than it actually is. One classic example is the practice of the Ancient Greeks to make the columns of their temples narrower at the top than at the bottom to give the illusion of greater height. A similar technique can be used in a small garden by narrowing the width of a path as it recedes away from the viewpoint, making it appear longer. Of course, the path may look strange when viewed from the opposite end. All trompe l'oeil must be carefully planned so as not to look obvious. For best effect the viewer should not be able to get too close or they will discover the ruse.

While trompe l'oeil can be affected by clever planting and use of color (misty grays, blues and greens all suggest distance), certain structures can also be used.

False door

Added to a brick or stone wall this suggests that the garden goes beyond the visible boundary. If the door is partially open, and a mural skilfully placed, this adds further to the illusion.

False opening

A mirror, framed to look like a doorway or arch, again suggests a garden larger than it really is. The mirror should be placed to reflect planting from another part of the garden and the viewpoint carefully chosen so the viewer does not see his or her own reflection. Use a specially treated outdoor mirror.

False perspective trellis work

Trellis work can be designed to create a three-dimensional illusion. Slats narrowing and converging towards the center of the panel represent the view into a tunnel, or recess. A small focal point hung in the center adds to the illusion. Use planting on either side, or in front of the trellis, to link the device to the rest of the garden.



false doorway plus mural
(the actual door is part of
the mural)



false perspective using
trellis



false opening using a
mirror

Exaggerated perspective

By altering the natural spacing and sizes of elements in the garden illusions of greater distance or size are achieved. Narrowing a path or border as it recedes makes it appear longer. An undersized seat at the end of the path furthers the illusion. A pergola with posts and crossbeams progressively getting smaller and closer together as it travels away from the viewer also gives the illusion of distance. These ploys must be used cautiously and wisely if they are to work well.

Murals

Painted murals create scenic illusions, introduce space and bring light and airiness to areas such as an enclosed basement garden. Simple themes work best. Strategically placed foreground plants enliven and lend credence to the illusion.

Garden Buildings

Whether purely function or purely decorative, small buildings in the garden are an opportunity to let creativity reign. You may acknowledge aspects of nearby architecture or draw on all sorts of additional factors. Traditional building materials can be completely disregarded, if desired, in favor of natural or found materials. Small buildings are garden features that can indulge exotic fantasies, or be plainly down to earth.

However you design a small garden building consider its primary function. A garden store needs to be weatherproof, durable and easily accessed. A green house must admit sufficient light. An arbor needs to accommodate a comfortable seat. Choose materials to compliment the function and style of the building as well as the surrounding garden.

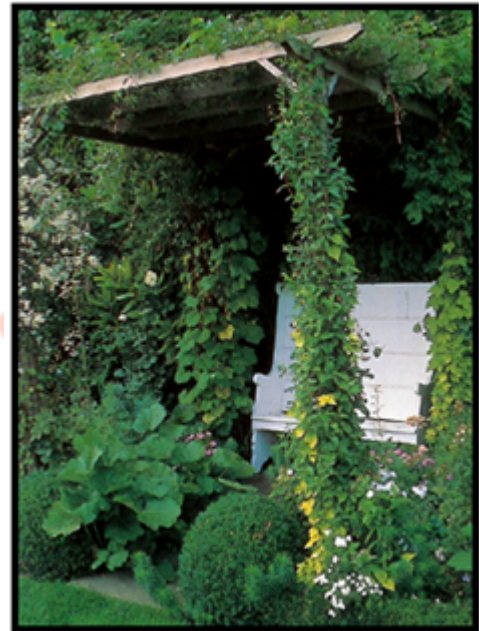
There is a myriad of structures that can be included in a garden. Some are purely functional, some purely decorative - most are a little of both. Names can be confusing and often the same type of structure is known by several different names.

Arbor

This is a 'structure' partially or fully enclosed by planting, designed for sitting in. This can be as simple as a semi-circle of closely planted trees or a clipped hedge, as rustic as a woven willow shelter, or a complex and highly ornate trellis structure smothered in climbing plants. An arbor must have a seat.



An arbor consisting of a semi-circular clipped hedge, with no actual 'building' required.



This arbor is created from a pergola-like structure smothered in plants.

Gazebo

Although the origins of the word are lost, popular opinion favors that the word comes from 'gaze about'. A gazebo should be situated to give a good view of the garden, ideally on slightly raised ground. This traditional building can be constructed from wood or metal and is usually fairly ornate in design. The roof may or may not be watertight, but the sides are mainly open. Gazebos look best if well surrounded by plants.

Grotto

Designed to imitate a cave, a grotto may be formed from a natural recess in a rock face, or constructed entirely from concrete. Shells and pebbles usually adorn the interior walls and floor and a small waterfall often features. A grotto is intended to provide a cool, quiet retreat.

Summerhouse

Despite the name, this traditional garden building is designed for use throughout the year, whatever the weather. The roof and walls are weather-tight, with generous windows allowing views of the garden. Seating is a must and a small table desirable as tea was traditionally taken in the summerhouse.

Chalet

Basically a type of summerhouse, the chalet is a prefabricated building, usually from stained or unfinished timber. The name suggests a Scandinavian influence and the chalet fits well into a less formal setting.

Greenhouse

This building needs no explanation. Greenhouses are available in every size, shape and style imaginable. Materials include glass and plastic in combination with wood, metal or brick. Primarily a building for growing tender or difficult plants the greenhouse can also be a highly decorative feature of the garden. Always site a greenhouse for maximum sunlight.

Garden store (shed, locker etc)

Functional requirements are the usual reason for placing a garden store in the garden. They are available ready-made in wood, metal and plastic or they can be custom-built on site. When tucked away behind a screen or tall planting appearance is less of a consideration, but a garden store can also be an attractive addition to the garden if the style and setting are carefully considered. Custom-made garden stores can match existing architecture or contribute to the chosen garden style or theme.



A traditional gazebo



A less formal gazebo

USING TREES WISELY

The selection of trees for the garden follows the same principles as the selection of any other plant, with height, width, foliage color, texture and flowers all to be considered. But any chosen tree, because of its eventual size, needs to be looked at from another perspective as well. Will it cause future problems?

The problems caused by trees near buildings

Large trees can have a detrimental effect on the foundations of buildings. They withdraw large amounts of water from the soil causing shrinkage, particularly in clay soils. This causes shifting and subsidence of foundations. During periods of hot summers and dry winters this problem becomes even more pronounced. When large, well-established trees are removed there will be a sudden change in the water content of the soil. Moisture that would have once been withdrawn by the tree remains in the soil causing the soil to swell, which will again disrupt foundations.

Large trees have wide spreading roots that can push aside foundations. Strong winds cause trees to rock and their roots to move in the soil. Lifting and heaving of roots that grow under or through foundations will cause the foundations to fracture or displace. Water-seeking roots break open and block drains.

Tall trees next to buildings drop leaves onto the roof and into the gutters, blocking drains, which may cause the house to become damp. Constant shade from evergreen trees can make a house cold, damp and gloomy.

Trees can become a nuisance to others

A tree planted near the boundary of the site will eventually spread over the neighboring garden. Neighbors may find the increased shade, dropping leaves and fruit very annoying.

In most countries property owners can

- Pick the fruit that overhangs their property
- Cut back branches overhanging the boundary line, but may have to return the wood
- Not do anything that will kill a neighbors tree
- Claim damages if a neighbors tree damages their property
- Claim compensation if livestock is poisoned by the neighbors overhanging trees

Tree protected by law

In many countries, laws protect certain trees, especially native or rare species, trees of historical interest, and significant mature trees. Before recommending to a client that a tree be removed or pruned obtain advice from the local authority as to what is permissible. When choosing a tree for a new garden it pays to be aware of whether or not the tree will be automatically protected once planted, or when it reaches a certain size. This may be important some time in the future if the tree ever needs to be removed. For example, in New Zealand, a native tree over a certain size is not allowed to be removed without permission, even if the person planted the tree in the first place and owns the land the tree is on.

HEDGES

When choosing a hedge style the main issues to be decided are function, the degree of formality, texture and color. Planning a hedge is comparable to planning a wall. You must ask yourself if the hedge to be primarily a functional barrier or a design statement.

Reasons for using hedges and things to consider

- Privacy
- Evergreen if possible
- Minimum height is dictated by the distance and height from which the site is overlooked

Shelter

- Evergreen if possible
- Useful wind shelter = 10 x height
- Makes a better wind break than a fence or wall as wind is filtered rather than redirected

Pattern

- Low clipped hedges used for Parterre's, edging, mazes etc
- Evergreen, small leafed species are best

Division

- Both to mark boundaries and give division within the garden, including screening
- Can be deciduous or evergreen
- Can be low or tall depending on whether physical or visual division is required

Security

- Not as effective as a fence or wall
- Use stout, barbed or prickly species such as Hawthorne or shrub roses
- Can be evergreen or deciduous
- Must be closely planted

Formal hedges

Formal hedges are those that are kept neatly clipped. They can incorporate topiary-style features such as clipped pillars and balls. Small leafed species such as Taxus (yew) and Buxus (box) produce the smoothest surfaces, the thickest barriers and look the most formal. Large leafed species such as Ilex (holly), Laurus (laurel), Fagus (beech) and Carpinus (hornbeam) produce a softer formality. Choose species that are long-lived and amenable to regular clipping. Because they have definite architectural properties use formal hedges as you would walls.



Avoiding damage from trees

New trees

One way to avoid root problems is to maintain a safe distance between the tree and the building so that the tree does not effect the stability of the ground beneath the building. Some trees are very aggressive in their search for water and extract large volumes of moisture from the ground. Fast growing trees are more likely to be a problem in this respect than slower growing species.

To be safe, a good policy to adopt is to never plant a tree closer to a building than its mature height. So if a tree is expected to reach 60 ft [20m], it should be planted at least 60 ft [20m] away from the house. Similarly, if a tree is expected to reach 10 ft [3m] in height, then it should be planted at least 10 ft [3m] away from the house.

Existing trees

If it is proved that a certain tree is the cause of damage to a building, or creates undesirable shade, it may have to be removed. Removal of large trees from clay soils can cause further damage to foundations as the soil fills with water again. An engineer may need to be consulted if the trees are very close to a building. New buildings to be constructed near large trees may require special foundations.

Drains can be protected from tree root damage by using flexible and watertight joints, using flexible pipe, surrounding in concrete, or increasing the depth of the drain so that it is not affected by ground shrinkage.

Remember that precautions are needed even when the trees are on an adjoining property. Tree roots do not respect property boundaries.

Informal hedges

Flowering shrubs, tall grasses and bamboo can be closely planted in straight lines to form screens and informal hedges. The hedge can be comprised of only one type of plant, or several different ones. You might consider non-suckering bamboo, various bush roses, Camellias or low-growing shrubs such as lavender. Although informal hedges, by definition, do not require clipping, the plants will probably need at least an annual trim after flowering. To preserve the informal look of the hedge trim each plant individually with secateurs (small pruning shears) rather than with a hedge trimmer, to maintain the natural form.



Syringa vulgaris (Lilac) used as an informal hedge backing a picket fence creates an idyllic country look.

Stilt hedge

Formed from pleached trees such as lime (Tilia), beech or hornbeam, a stilt hedge is basically a hedge on legs. To pleach trees, the young side branches are first trained along a series of parallel wires or battens until they overlap. Regular pruning and tying in of branches encourages the heads to thicken and form a box-like shape; eventually the framework of supports can be removed. A stilt hedge is useful when an eye-level screen is required, but not a completely solid wall.



The lime walk at Sissinghurst, England.

Choosing the right hedge plants

Consider the following points when choosing hedge plants.

- Function
- Desired height and width
- Degree of formality
- Style or theme of the garden
- Foliage color and texture, flowers, fragrance etc
- Site conditions (soil type, aspect, climatic zone, wind, moisture levels etc)
- Level of maintenance
- Desired longevity
- Speed of establishment

Plants that grow and establish quickly usually require clipping 3 or 4 times a year. Slow growing species such as yew or box need clipping once a year. Some conifers can be extremely fast growing so clipping little and often is the best strategy as they do not respond well to being heavily cut back.

Formal hedges - heights and clipping frequency

<u>Species</u>	<u>Recommended height</u>	<u>Clipping times</u>
Buxus sempervirens	1 - 2 ft [30 - 60 cm]	2 - 3 times, during growing season
Chamaecyparis lawsoniana	4 - 8 ft [1.2 - 1.5 m] or more	Twice, spring and early autumn
x Cupressocyparis leylandii	6 - 12 ft [2 - 4 m] or more	2 - 3 times, during growing season
Escallonia	4 - 8 ft [1.2 - 2.5 m]	Once, immediately after flowering
Ilex aquifolium	6 - 12 ft [2 - 4 m]	Once, in late summer
Lavandula	18 - 36 in [45 - 90 cm]	In spring and after flowering
Ligustrum	5 - 10 ft [1.5 - 3 m]	2 - 3 times, during growing season
Lonicera nitida	3 - 4 ft [1 - 1.2 m]	2 - 3 times, during growing season
Taxus baccata	4 - 12 ft [1.2 - 4 m] or more	Twice, in summer and autumn
Thuja plicata 'Fastigiata'	5 - 10 ft [1.5 - 3 m]	Twice, spring and early autumn
Berberis thunbergii	2 - 4 ft [60cm - 1.2 m]	Once, in summer
Crataegus monogyna	5 - 10 ft [1.5 - 3 m]	Twice, in summer and autumn
Fagus sylvatica	4 - 20 ft [1.2 - 6 m]	Once, in late summer

Informal and flowering hedges - heights and when to prune

<u>Species</u>	<u>Recommended height</u>	<u>When to prune</u>
Berberis darwinii	5 - 10 ft [1.5 - 2.5 m]	Immediately after flowering
Cotoneaster lacteus	18 - 24 in [45 - 60 cm]	After fruiting
Escallonia	4 - 8 ft [1.2 - 2.5 m]	Immediately after flowering
Garrya elliptica	5 - 7 ft [1.5 - 2.2 m]	Immediately after flowering
Ilex aquifolium	6 - 12 ft [2 - 4 m]	In late summer
Lavandula	2 - 3 ft [60 cm - 1 m]	After flowering
Berberis thunbergii	3 - 4 ft [1 - 1.2 m]	After flowering
Crataegus monogyna	10 ft [3 m] or more	In winter, remove unwanted shoots
Corylus avellana	6 - 15 ft [2 - 5 m]	After flowering
Forsythia x intermedia 'Spectabilis'	5 - 7 ft [1.5 - 2.2 m]	After flowering, remove old stems
Fuchsia magellanica	2 - 5 ft [60 cm - 1.5 m]	In spring, remove old stems
Potentilla fruticosa	2 - 4 ft [60 cm - 1.2 m]	In spring
Prunus spinosa	8 - 12 ft [2.5 - 4 m]	In winter, remove unwanted shoots
Rosa 'Nevada'	5 - 6 ft [1.5 - 2 m]	In spring, remove thin twigs
Rosa 'Roseraie de l'Hay'	5 ft [1.5 m]	In spring, remove thin twigs
Ribes sanguinum	5 - 6 ft [1.5 - 2 m]	After flowering, remove unwanted shoots

BULBS, CORMS, TUBERS AND RHIZOMES

The term Bulb is often used to describe any plant with an enlarged root or stem used for storing food. In actual fact such plants belong to one of several classifications.

Bulbs

Bulbs, such as onion, daffodil and lily, consist of a short basal stem covered with fleshy leaf scales wrapped around the growing point. The scales are attached to the basal plate from which the adventitious (water seeking) roots grow. Buds develop in the scale axils and these develop into daughter bulbs.

Corms

Corms, such as Crocus, Crocosmia and Gladiolus, also contain embryo flower shoots and are made up of solid modified stem tissue. The original storage organ dries up every year and a new one is formed.

Tubers

Tubers, such as Anemone, Dahlia, Cyclamin and potato, are also formed of thickened stem tissue but instead of an embryo flower shoot they have eyes on the upper surface that give rise to new growth.

Rhizomes

Rhizomes, such as bearded iris, are fleshy modified stems and usually grow horizontally below ground and occasionally near the surface.

All 'bulbous' plants have similar life cycles. A period of growth and flowering is followed by an annual rest period known as dormancy. During dormancy the food storage organ maintains the plant until the growing season when it puts out new growth. It is important that the foliage is not cut back after flowering as it is required for the manufacture of food that will sustain the plant through the dormancy period. Because of this, lawns in which bulbs are naturalized must not be cut until the foliage of the bulbs begins to die off.

Using bulbs

- To maximize the use of soil plant bulbs to grow beneath and through other plants. Plant late winter and early spring flowering bulbs under deciduous trees and shrubs for early color. Bulbs planted in amongst low growing groundcover plants will provide additional color during summer.
- To extend the flowering season throughout spring, summer and early autumn scatter mixed bulbs for all seasons throughout borders and beds.
- Naturalize bulbs in lawns.
- Bring potted bulbs into flower in a greenhouse, then place outdoors for instant color.

Cultivation of bulbs

The majority of bulbs need well drained soil and full sun, although many that are spring flowering will grow under deciduous trees and shrubs, and some (Fritilaria) will grow in moist conditions. Most tender bulbous species will appreciate being grown at the foot of a wall that faces the midday sun. Where soils are fairly wet over winter bulbs should be lifted and stored in a dry dark place, then replanted nearer to spring according to the variety.



Bulbs in a mixed border



Bulbs in lawn

PLANT TOXICITY

The subject of plant toxicity is very complex with many, if not most, plants exhibiting some degree of irritant or toxic effects. Some have toxic roots, some have toxic berries or leaves, and some are toxic in all parts. Levels of toxicity range from mild irritation to death, and may be caused by only the briefest contact, or by the ingesting large amounts.

Plants that cause irritation are more of a nuisance than a hazard. Rashes, burning sensations, swelling and inflammation, usually caused by contact rather than ingestion, is normally short-lived and can be alleviated by anti-histamine preparations.

Plants with poisonous berries are very hazardous to young children as the bright colors are an attractant. While most poisonous berries cause no more than a stomach upset a few can cause severe vomiting, hallucinations and even death. While children are more likely to eat berries, they are less likely to eat foliage, but livestock will eat all parts of a plant.

The degree of toxicity varies between species and a landscape designer must be aware of what plants not to use in gardens where children and livestock are likely to be. In all cases, plants where all parts are toxic are probably best avoided altogether unless the affects are known to be mild.

If plant toxicity is a concern, lists of dangerous plants are obtainable from the local Authority, Poisons Units at large hospitals, botanical gardens, and horticultural societies, and the appropriate Government Agencies.

General advice would be

- Never eat any part of a plant unless you know it is safe to do so
- Avoid using poisonous plants in gardens where children are likely to be
- Always wear gloves when handling plants, especially those known to be irritants
- Wash hands thoroughly after handling plants, especially before eating
- If poisonous plants are used in the garden make sure the owner is provided with information about symptoms and first aid treatment

As a garden designer you have a duty to design safe gardens. Always ask clients if they are allergic to any particular plants and if children will be using the garden. If you intend to include poisonous plants in the design inform the clients about the degree of hazard and obtain their approval. Include information about symptoms and treatment, relevant to the particular plants, with the plant schedule.



Laburnum, Rhododendron, Convallaria majalis - all beautiful garden plants, but all potentially fatal.

Some commonly used garden plants that are toxic if eaten

<u>Species</u>	<u>Toxic parts and level of hazard</u>
Daffodil, Hyacinth	bulbs, moderate - bulbs unlikely to be eaten but can be fatal
Oleander	leaves & branches, high - can be fatal
Rosary Pea	seeds, high - a single seed can be fatal
Castor bean	seeds, high - one or two beans can be fatal
Larkspur	young plant & seeds, moderate - can be, but not likely to be, fatal
Monkshood (Aconitum)	roots, moderate - digestive upset, nervous excitement
Lily-of-the-valley	leaves & flowers, high - affects the heart, can be fatal
Iris	underground stems, low - severe but not serious digestive upset
Foxglove (Digitalis)	leaves, low - unless a substantial quantity is eaten
Bleeding Heart (Dicentra)	foliage & roots, low - large amounts maybe harmful
Rhubarb	leaves, low - large amounts may cause death
Daphne	berries, high - a few berries can kill a child
Wisteria	seeds & pods, low - mild to severe gastric upset, especially children
Laburnum	seeds & pods, high - can be fatal in quite small amounts
Rhododendron, Azalea	all parts, moderate - can be fatal if foliage or flowers are eaten
Laurel	all parts, high - can be fatal
Jasmine	berries, high - can be fatal
Lantana camara	green berries, high - can be fatal
Yew (Taxus baccata)	berries & foliage, high - foliage is worse producing sudden death
Cherry, wild and cultivated	leaves & twigs, moderate - contains cyanide and can be fatal
Oak	foliage & acorns, low - large quantities required over extended period
Elderberry	stems, leaves & roots, low - nausea and digestive upset
Black Locust	bark, shoots & foliage, low - nausea and weakness, depression
Mistletoe	berries, high - berries can be fatal
Nightshade	all parts, high - unripened berries the worst, can be fatal
Jimson Weed	all parts, moderate - can sometimes be fatal
Hemlock	all parts, high - can be fatal
Helleborus	roots, low - ingested roots can be fatal

This is a very small list of toxic plants and is offered only to make you aware that many common plants have toxic properties. The hazard rating is subjective and based on the actual toxicity of the plant in combination with the likelihood of it being ingested. Therefore, while a daffodil bulb can be fatal the likelihood of ingestion is low so the hazard rating is also low. On the other hand Daphne has toxic berries that can cause death, and berries are always attractive to children. Therefore Daphne is a high risk plant. While it is quite unlikely that the foliage of Taxus baccata would be eaten by children or adults, it is so deadly that this plant is rated as a high risk.

The effects of poisoning from toxic plants varies between individual humans, with children being more susceptible to serious poisoning because of their small size. What may make one person mildly ill may prove fatal to another. As a designer you must inform your client if you intend to use moderately or highly toxic plants in the garden. The client must then decide if they find the risk acceptable.

Most plants are toxic to a degree and planning a garden with only zero-risk plants would probably be impossible. Plant toxicity must be kept in perspective. Be aware of the toxic nature of commonly used plants, inform your client, and keep information about symptoms and treatments close by.

CLIMBERS, VINES AND WALL SHRUBS

Climbers and wall shrubs are invaluable whenever height without width is needed in the border. Shrubs planted in narrow beds become too wide without regular cutting back, and tend to overwhelm lower growing plants or lean across pathways. When a light screening effect is required a tracery of green over a trellis screen is ideal. Wall shrubs are shrubs that can be clipped and trained to grow flat against a wall. Climbers, including vines, are plants that can be trained on supports to grow upward, or have a natural tendency to self-cling and climb.

Using climbing plants and wall shrubs

- Wall shrubs and climbers are useful not only for softening structures and giving a visual link between house and garden, but also because they can quickly add a third dimension to borders, particularly narrow ones at the base of walls and fences.
- Climbers can be used to enhance or hide a structure, their irregular pattern of growth will soften harsh lines.
- Climbing plants and wall shrubs can grow rapidly giving an established look quickly.
- In small gardens it is desirable to make use of the vertical plane, allowing a greater number of plants to be used.
- A wider range of plants can be planted due to the microclimate found in association with walls. The sunny side of a wall provides extra warmth and protection from frosts in cold climates, while the shady side protects plants from scorching sun in hot climates.
- Many climbing plants can be grown without supports and allowed to flop over the ground, taking on the role of a groundcover plant to suppress weed growth.
- Attractive flowers and fragrance of plants are better appreciated when at eye or nose level so grow climbing plants along walkways supported by fences or arches, and over patio areas supported by a pergola.

Microclimates

Walls are the primary means of support for climbing plants and wall shrubs, but the microclimate associated with the wall must be fully considered before deciding which species to plant.

In cold climates a south-facing wall (north-facing in the southern hemisphere) may enable more tender species to be grown. Walls that face the midday and afternoon sun absorb the sun's heat during the day and then steadily radiate it through the evening. This extra warmth encourages early growth in the spring, giving a degree of frost protection for soft growths, but more importantly it ensures that the wood of more tender species is sufficiently ripened throughout the late summer and autumn. The formation of flower buds is encouraged for the following season for both flowers and fruit.

Depending on the aspect, a wall may cast a rain shadow for a short distance away from its base. This dry area can be beneficial to certain plants but may be too dry for many.

In colder or more exposed climates the microclimate sustained by the wall can be most useful, particularly when extra shelter is provided from windbreaks. Care should be taken to avoid frost-pockets.

In hot climates a stone or masonry wall maintains a more even temperature and provides a cooler, shaded environment for plants too tender to withstand intense sun.

Aspects of walls

When considering walls it is the direction in which they face that determines the aspect.

Northern Hemisphere

South facing wall

The sun shines onto this wall for most of the day so the south-facing wall is the warmest and usually the driest situation. In hot climates this aspect may be too severe for most plants. In cooler climates plants grow well, and if shelter from harsh wind is provided then even tender plants can be grown in fairly cold climates.

West facing wall

This situation is very similar to the south wall but sun does not reach the wall until afternoon - consequently there is less build-up of heat.

The combination of these two directions, the south-west facing wall, is probably the most ideal in cold climates, but the least desirable in hot climates.

East facing wall

As the sun reaches this wall in the morning only, there is little build-up of heat. In cold climates the early morning sun on frosted blooms or young foliage can rupture plant cells causing damage. Generally, an east facing wall does not receive enough sun to ripen fruit.

North facing wall

Very little, if any, sun reaches this wall. A sunless but otherwise well-lit north-facing wall is fine for many plants that prefer shade as long as tall dense trees or buildings do not make the area too dark.

Southern Hemisphere

North facing wall

The sun shines onto this wall for most of the day so the south-facing wall is the warmest and usually the driest situation. In hot climates this aspect may be too severe for most plants. In cooler climates plants grow well, and if shelter from harsh wind is provided then even tender plants can be grown in fairly cold climates.

South facing wall

Very little, if any, sun reaches this wall. A sunless but otherwise well-lit north-facing wall is fine for many plants that prefer shade as long as tall dense trees or buildings do not make the area too dark.

The east and west facing walls are the same as for the Northern Hemisphere.

Fences and hedges

As supports for climbing plants, fences and hedges provide wind shelter and shade, but do not offer plants much protection from the cold.

How plants climb

True climbers possess various mechanisms to assist themselves to grow through other plants and up towards the light.

Self-clinging plants

This group attach themselves directly to a surface by adhesive or sucker pads (e.g. Boston Ivy *Parthenocissus tricuspidata*), or by aerial roots (e.g. *Hedera* species or *Hydrangea petiolaris*). Most plants in this group will grow in the shade.

Twining plants

The largest group of climbing plants, they attach themselves to supports with various parts of the plant. Stems may twine around objects (e.g. *Actinidia chinensis* and *Wisteria* species), leaf stalks may twine (e.g. *Clematis* species), or the plant has special twining tendrils (e.g. *Passiflora* species and grapes).

Scrambling plants

These send up long shoots that grow through other plants. The stems are prevented from falling back by having hooked thorns or prickles on the stems, and sometimes on the petioles, that catch onto whatever is available. This is especially successful when plants are growing in a thicket (e.g. *Rosa* and *Rubus* species).

Lax plants

These plants send out long thin shoots but lack the ability to attach themselves. While they are natural groundcovers, they need to be tied to a support in order to climb.

Wall shrubs

These are shrubs grown close to a wall and are clipped and trained to lie flat against it (e.g. *Cotoneaster horizontalis*, *Garrya elliptica*, *Pyracantha*, *Camellia*, some fruit trees). They are not climbing plants but are trained to emulate climbers.

Support systems

Plants with adhesive or suckering pads don't need additional support other than the wall they are to climb against. Don't put climbers with self-clinging pads against painted walls or where brickwork or mortar is in a crumbling state. On a sound brick or stone wall self-clinging plants do no damage.

Wires

High tensile wire is threaded through 'vine eyes', with the ends attached to wire strainers or turn-buckles. The vine eyes hold the wires out from the wall or fence to allow air circulation. Space wires 10 inches [250 mm] apart, but they can be closer together near ground level and more widely spaced high up. The wires can be arranged horizontally, vertically or in patterns such as fan-shape or zigzag, and may be used, not only on walls and fences, but pergola posts and across overhead beams.



Wall shrubs and climbers can be supported on wires securely attached to a structure. There must be at least 1 ft [300 mm] between the plant and the supporting structure.

Trellis

Whether timber, metal or wire, trellis must be strong enough to bear the weight of the **mature** plant. On painted walls trellis panels should be hinged at the bottom so it can be carefully swung down for repainting and maintenance to the wall behind the plant.

Mesh

Galvanized or plastic-coated wire mesh, or solid plastic mesh if strong enough, can support plants growing up pillars. It must be securely anchored, with spacers between the mesh and the pillar. Be wary that many plastic meshes are not strong enough to support a climber against a wall.

Natural support

Many plants climb and scramble up and through trees, shrubs and hedges. This is the natural way for climbing plants in the wild.

Planting climbers

In their natural habitat the lower parts of climbing plants are frequently shaded. The soil surface is cool and provides a moist root zone for the plant, while the top get all the benefits of being in full sunlight. This is the situation most climbers prefer. Climbers benefit from a deep layer of humus, which acts as mulch, helping to keep roots cool and moist. Shade at low levels can be provided by planting shrubs and other low plants in front of climbers. Narrow borders along fences and walls ideally consist of climbers in the back row and low edging plants in front. A narrow border planted this way will look attractive and lush, not out-grow its confined space, and the low plants keep the roots of the climbers shaded and cool.

Climbers for scrambling up trees, shrubs and hedges

Plant the climber 1 - 2 ft [300 - 600 mm] away from trunk taking great care to avoid damaging the main roots of the host plant. If possible plant the climber between main roots, excavating the planting hole carefully. The smaller the climber is at planting time the less disturbance to the host. Support and direct the climber towards the host with canes.

Climbers for walls

Wall foundations are often wider than expected so climbers may have to be planted some distance away. Use canes or wires to guide the plant to the supports provided by or on the wall. On new sites soil may be contaminated by rubble, and on long-established sites lime mortar from old walls may make soil alkaline so soil may have to be replaced, or alkalinity rectified, before planting. It is wise to do a soil test prior to selecting the species of climber.

PLANT SCHEDULES

Accompanying the planting plan are the Plant Schedules. These are lists of all the plants used in the planting plan, quantities and grades, and may also include suppliers and plant maintenance information. The planting plan is often a complex drawing, so it is unreasonable to expect the client or contractor to have to count up every plant shown on the plan.

A plant schedule is essentially a plant shopping list and must be organized in a logical manner. Plants should be categorized by type (e.g. tree, shrub, perennial, climber etc), and in alphabetical order. For large sites with several distinct areas it is helpful to the client if the planting schedule is organized by area as well.

Format

The schedule must have a front cover, similar to the cover of a report, showing the client's name, address of the garden, date and designer's identification. Every page of the schedule should have a header showing the garden identification and a footer bearing the page number and designer's identification. The first page should also start with the following, or something similar:

*The following plants are to be supplied and planted as per the Soft Landscaping Specification.
NO SUBSTITUTES WILL BE ACCEPTED WITHOUT THE PRIOR APPROVAL OF THE DESIGNER OR THE CLIENT.*

This Schedule to be read in conjunction with plan number/s 1234-05

Following the list of plants, additional information such as specific soil preparation, advice about planting, staking of plants, mulching and watering can be included. Supply the client with one bound copy and one unbound.

Plant sizes and grades

The way plant sizes and grades are expressed varies between countries. Trees may be sized by height at time of purchase, or by a code that takes into account several factors including height, stem circumference, container size etc. Plants in containers can be graded by container volume (e.g. gallons, liters) or by a code related to the container type and size (e.g. PB6 means planter bag 6, 20 cm pot means a 20 cm diameter pot, RTT & RTH relate to root trainers and plugs). Some plants, such as fruit trees, roses and rhododendrons, are graded by age, and grafted standardized trees by the distance from the roots to the top of the grafted stem. Buying bigger is not always best since a short bushy plant is healthier than a tall, spindly one.

While a bigger grade of tree or shrub will be taller when initially planted smaller grades usually catch up very quickly. But if a more mature garden is required straight away than bigger grades are always preferable. The plant grade is generally determined by the client's budget.

How plants are purchased

Plants are available in containers, bare rooted, or root-balled. Deciduous trees and shrubs are often available in winter, bare-rooted. This means they have no soil about their roots and are normally packed in a moisture holding medium such as damp sawdust or paper. The plants are field grown and wrenched from the ground just prior to shipping. They must be replanted as soon as possible. If planting beds are not ready the plants can be heeled into a temporary bed of moist, friable soil or soil mix. Bare root plants are only available in late autumn and winter.

Root-balled plants are also field grown but are taken up with a quantity of soil. The whole root-ball, with the attached soil, is bundled into sacking or other similar material for shipping. This method is used for field grown evergreen trees and shrubs. While root-balled plants can survive longer out of the ground than bare-root plants, they should be planted as soon as possible. It is very important that the root-ball does not dry out.

Containerized plants arrive in the containers they were grown in. As such they are available all year round and can be planted all year round, as long as the ground is in a fit state. Containers include long narrow tubes, plugs, hard plastic pots and polythene planter bags. Sizes range from very tiny to extremely large. Some trees and large shrubs are available in big wooden crates. Containerized plants can live in their containers until they become too large for them and must be kept well watered. Plugs and root-trainers (long narrow tubes or pots) are intended for immediate planting.

Below is an example of the body of a plant schedule.

Plant Schedule for the Smith Garden				
The following plants are to be supplied and planted as per the Planting Specification. NO SUBSTITUTES WILL BE ACCEPTED WITHOUT THE PRIOR APPROVAL OF THE DESIGNER OR THE CLIENT. To be read in conjunction with plan number/s 1234-05				
Location: Front Garden				
TYPE	NAME	QTY	GRADE	SUPPLIER
tree	Acer palmatum	2	3.50m	Top Trees Ltd
shrub	Choisya ternata	6	PB 6.5	Moores Valley Nursery
shrub	Rosa rugosa 'Alba'	9	2yo	Yesterdays Roses Ltd
perennial	Ajuga reptans 'Atropurpurea'	25	PB 5	Moores Valley Nursey Ltd
Location: Rear Garden				
TYPE	NAME	QTY	GRADE	SUPPLIER
tree	Prunus subhirtella 'Autumnalis'	2	2.50m	Top Trees Ltd
shrub	Viburnum tinus 'Eve Price'	16	PB 28	Moores Valley Nursey Ltd
perennial	Ajuga reptans 'Atropurpurea'	15	PB 5	Moores Valley Nursey Ltd
perennial	Phlox paniculata 'Fujiyama'	10	1 litre	Perennials Unlimited
Prepared by Anna Gresham Landscape Design Consultancy June 23 1998 page 1				

Plant maintenance schedule

A plant maintenance guide, or a full garden maintenance program, should accompany the plant schedule. Which one to include depends on the designer, and the client's requirements. A few lines about trimming/pruning, fertilizing, dead-heading etc may be all that is required and falls within the scope of the plant schedule that normally accompanies a planting plan. But if a comprehensive year-round garden maintenance program is requested this will take a lot more time to prepare and should attract an additional fee.

Below is part of a basic plant maintenance guide that would be included with a plant schedule.

Plant Maintenance Guide for the Smith Garden

PLANT	MAINTENANCE GUIDE
Choisya ternata	Trim lightly after flowering.
Geranium endressii	Cut back in late winter.
Hebe 'Garden Beauty'	Cut back by 1/3 after flowering and apply fertiliser.
Liriope spicata 'Silver Dragon'	In early spring cut back shabby leaves, just before the new ones appear.

A more comprehensive program would be divided into months of the year with all the seasonal tasks fully detailed.

The plant maintenance guide or program should appear after the plant lists, the whole being neatly bound.

Sourcing plants

As a designer you want the garden you design to be planted as you intended. A lot of time and effort goes into the production of a planting plan, every plant carefully chosen for maximum effect. The use of a badly chosen substitute can throw an entire scheme into disarray. So that clients are not tempted to substitute plants it pays to make sure the plants you choose are relatively easy to obtain. Suggesting suppliers in the plant schedule helps the client obtain the specified plants. In order to do this you need to know who is growing what.

Plant catalogues and plant database

Most plant producers publish catalogues once, or several times, a year. Once you are on their mailing list you usually get them automatically. Even suppliers that charge the public for catalogues are only too happy to send them to designers free of charge if you tell them that their business will be listed on your plant schedules against the names of the plants they supply.

Once you have a huge pile of catalogues you need to find a way to organize the information. Some producers specialize, growing only trees, or only shrubs, or only perennials. If their catalogues are well laid out you can refer to them as you develop a planting scheme by flicking through them to see if they have the plant you are looking for. But badly organized catalogues are more difficult to use.

It is best if you find your own special way to organize plant information. One way is to keep a plant database on computer using a simple spreadsheet program (e.g. Microsoft Excel) is more than adequate. Once the initial information is entered, updating it a few times during the year is a quick and simple task. If you add additional information about the plant such as soil type, aspect, height, spread, flower color and season etc you can also use it to help find the right plant for the right place by using the search, sort and filter functions. My plant database has the following fields (headings): name, type of plant, height, spread, aspect, soil type, evergreen or deciduous, leaf color, flower season, flower color, main uses, supplier, maintenance guide and additional notes. This allows me to find the perfect plant every time.

How to compile a plant schedule from the planting plan

In order to compile an accurate plant list some method must be devised so that every plant in the planting plan is accounted for once, and only once. Again, it's a matter of personal choice how you do this. One way is keep some scrap paper next to you as you work on the planting plan and list every plant the first time you select it, then enter a check mark against the name every time you add another to the plan. It is a simple matter to tally up on completion of the plan for the final quantities. Don't forget to reduce the count if you remove any plants from the plan.

Once the basic list is completed do a check by counting up the plants off the plan. This can be a bit difficult on very large plans but if you print or copy the plan first you can cross each one off as you count. Use a word processor to compile the final schedule with all the necessary information.

Other documentation

Apart from the Specification (which we will discuss later in the course) you may want to include additional information with the planting plan. This may include:

- Contractor and suppliers - a short list of reputable contractors and landscape suppliers, preferably those that have worked on your designs previously
- Contact telephone numbers and/or addresses of wholesale, mail order and specialist plant suppliers - especially those listed in the plant schedule
- General notes on soil preparation, planting, watering, mulching etc.

Clients appreciate lots of information as they feel they are getting good value for money. A full set of plans with accompanying documentation will tell the client everything they want to know about the new garden. All this information is presented neatly bound in a folder.

Assignment 18

Produce a concept plan for a real or imaginary back yard. The design must feature a prominent decorative garden structure as the main focus of the design. NOTE: This means the design focuses on the structure but the structure does not have to be in the 'middle' of the yard.

- As well the usual planting, there must be planting associated directly with the structure.
- Draw an elevation of the front and one side of the structure.
- Produce a separate planting plan.
- Prepare a plant schedule.
- Use ARCH C [A2] sheet size and a suitable scale.
- Prepare the drawings in a professional manner as you have been taught.

Submit:

1. Concept plan
2. Elevation drawings
3. Planting plan
4. Plant schedule

Submit the drawings as PDF.

Submit the document as PDF, MS Word or Excel documents.