ACT
LANDSCAPE

PUBLIC WORKS AND SERVICES

A DIVISION OF
DEPARTMENT OF URBAN SERVICES

CANBERRA LANDSCAPE GUIDELINES

Prepared in consultation with

the Department of Environment, Land and Planning

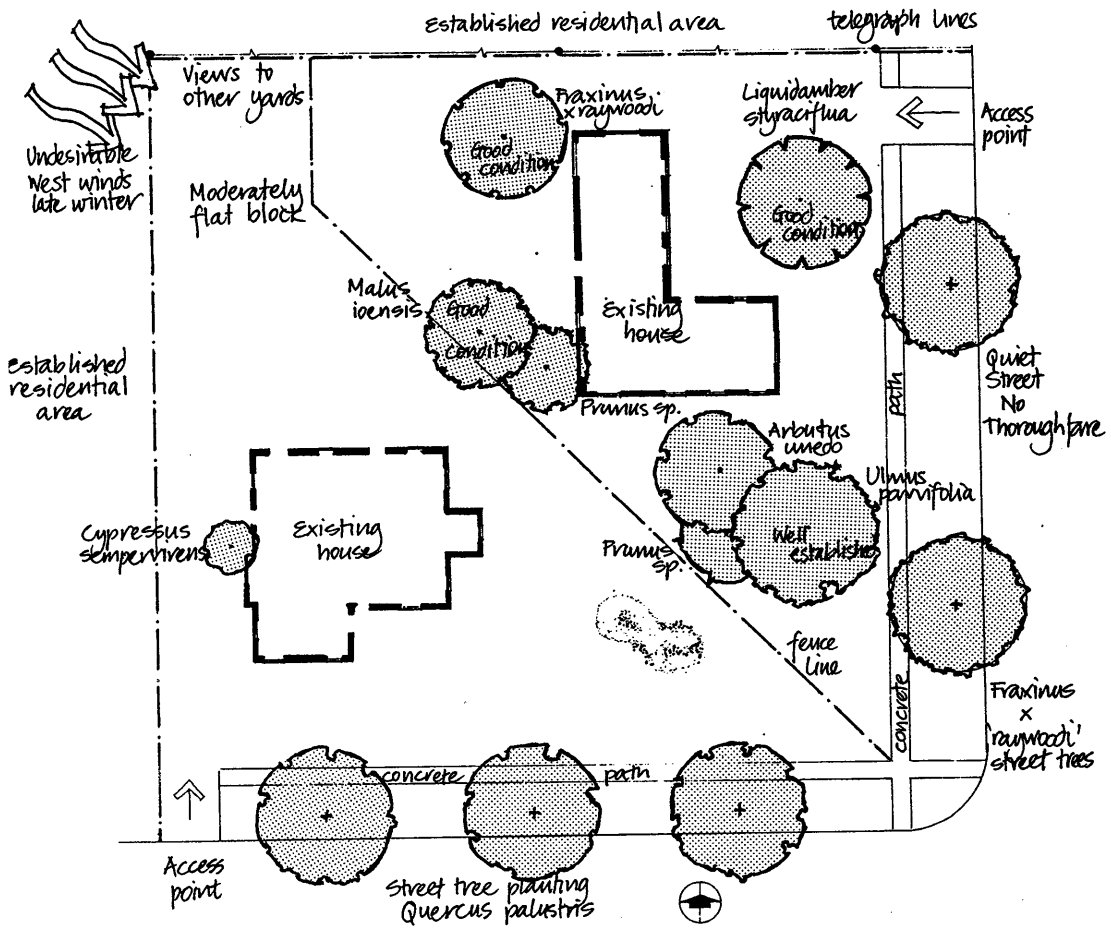
Site Planning

Sheet 1 of 2 | Site investigation and analysis | LGA 1.1

Site survey and investigation

The first stage of the design process involves the gathering and analysing of information about site characteristics. This includes possible factors that can affect a development proposal, and conversely, the impact of the development on the surrounding environment. This involves:

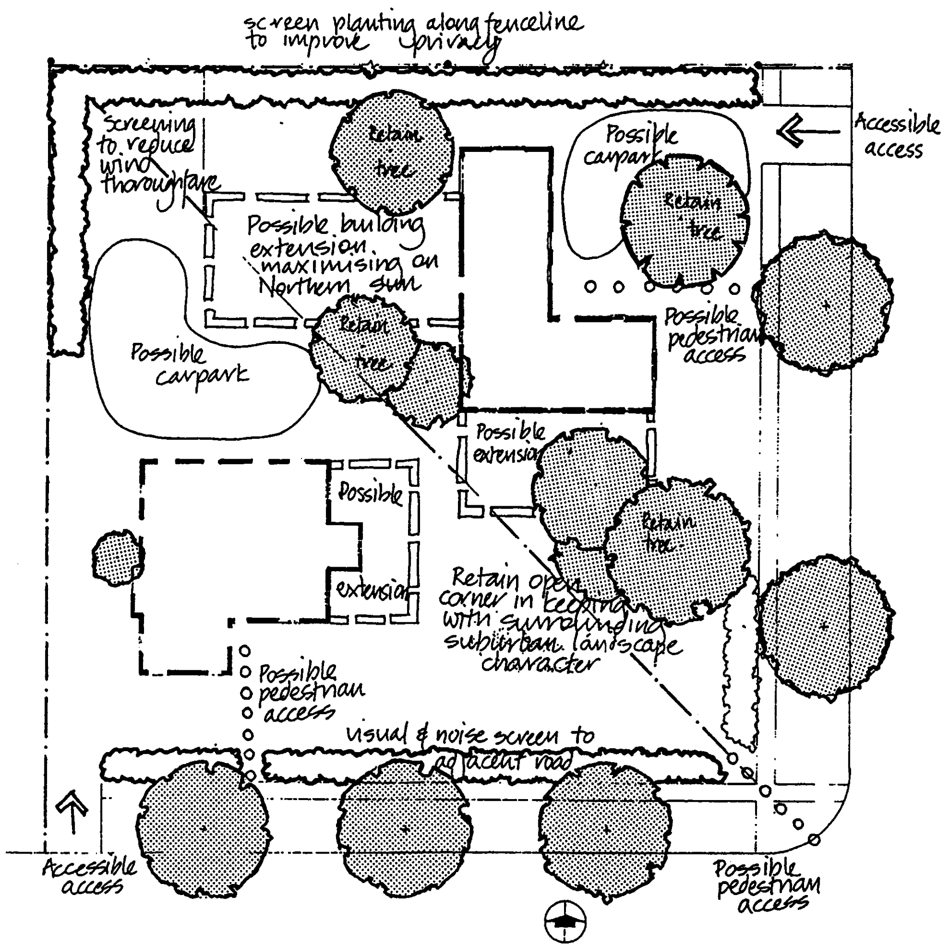
- Character of the site:
  - Urban, suburban, village, rural;
- Site boundaries and land use on adjoining sites;
- Landform (contour plan);
- Microclimate;
- Drainage:
  - Natural, man made;
- Existing vegetation;
- The quality and depth of existing topsoil;
- Views:
  - In to site from major viewpoints;
  - Out of site to surrounding features;
- Noise:
  - Roads;
  - Adjoining land uses;
- Services:
  - Above and below ground;
- Geology and soils;
- Wildlife;
- Historic features;
- Existing circulation and access;
  - Pedestrian, vehicular and public transport.



Site analysis

The information gathered during the site investigation should now be analysed and translated into broad landuse suitability zones on a copy of the base plan. The analysis should identify:

- Area suitable for building;
- Suitable road access and circulation;
- Trees or groups of trees worthy of conservation;
- Prominent visual elements to be retained in a natural state;
- Steep land unsuitable for building;
- Opportunities to exclude undesirable external influences such as noise, prevailing weather and screening unpleasant views;
- Staged construction proposals;
- Other ecological and siting considerations.



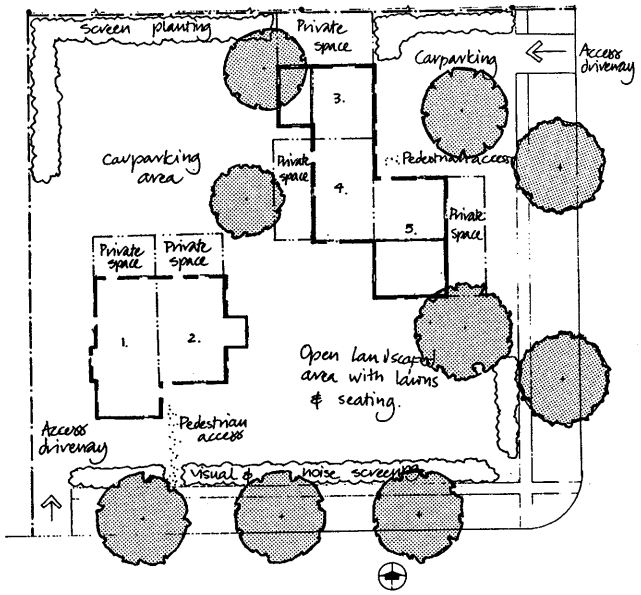
Sheet 1 of 1

Preparing a concept plan

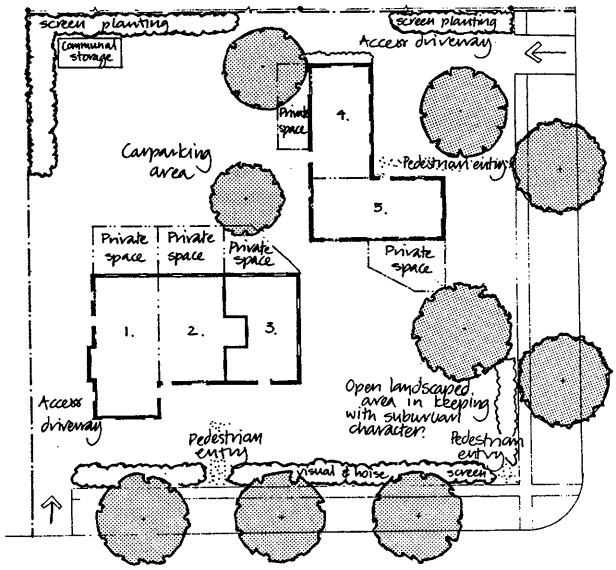
LG A1.2

Preparation ot the Concept Plan involves the combination of all of the information gathered during the site investigation and analysis, and consideration of the various options available.

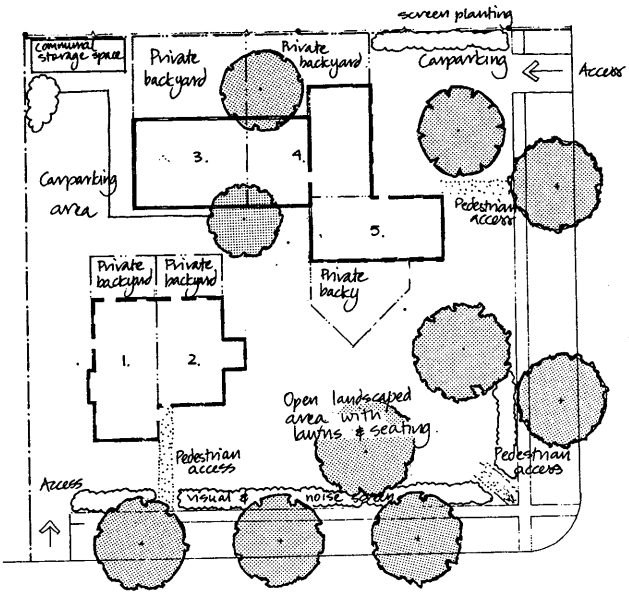
Before drawing feasibility plans to scale, conceptual diagrams should be made to show possible layouts and the functional relationships of the various elements of the proposed development on the site - buildings, service yards, carparks, paths, major screens and planting areas. One or more of the conceptual diagrams which seem to have the most merit should then be drawn up as feasibility plans to test their potential and practicability.



Concept 1



Concept 2



Concept 3

The various feasibility plans are studied and assessed. The option which appears to be the best is then developed into a more refined site development / preliminary landscape plan. This should be drawn on tracing paper at a scale of 1:200 using a site plan showing site information including existing vegetation as a base.

The preliminary landscape plan should include:

- Location of buildings, structures and storage areas;
- Location of roads, parking, embankments, and path systems;
- Arrangements of earth cuts, fill and mounding;
- Existing trees to be removed or conserved;
- General massing of planting;
- Fencing and screening positions;
- Location of site sheds and car parking.

At least one cross section should be drawn up at this stage so that a clear idea of proposed building heights, future tree cover and vegetation cover can be appreciated in relation to the ground levels and adjacent properties.

Where the Planning Authority requires Final Sketch Plans, the preliminary landscape plan should be included with that submission. Where Final Sketch Plans are not required, developers are encouraged to discuss their preliminary landscape plan with ACT Landscape prior to formal submission for design and siting approval.

Test that the proposals are consistent with the following principles:

Principle 1

Each proposal should recognise the landscape character of the area.

For example; does the proposal deal with the:

Urban character where hard paving edges dominate. An urban structure often displays a simple design vocabulary consisting of hard paved verges, building form and external finishes, entrances and street furniture.

Suburban character which may be a mixture of hard and soft landscape elements. Generally the most pleasing suburban environments are dominated by soft landscape elements, with buildings set in a leafy green environment.

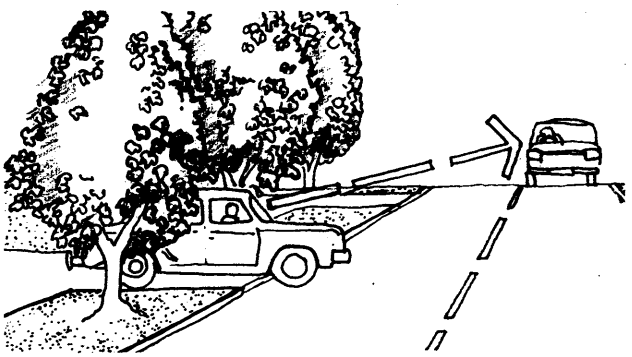
Rural character which may be characterised by groups of buildings integrated into a patchwork of rural landuses.

Natural environment in which nature dominates and man made features are concealed.

Principle 2

The design should acknowledge adverse effects of the development and show how the impact can be reduced by effective planning and design.

Have the basic components been arranged in such a way as to reduce the effects of excessive noise, poor views or traffic problems?

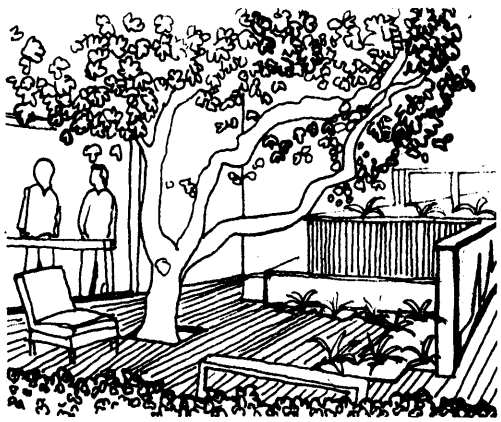


Principle 2 (cont'd)

Have landscape screens been used to reduce the visual impact of the development, such as unrelieved walls and extensive car parking or service areas.

Principle 3

The proposal should take into account the value of existing site features. For example, if existing trees are incorporated in the design they can contribute to an 'instant' landscape that adds value to the development.

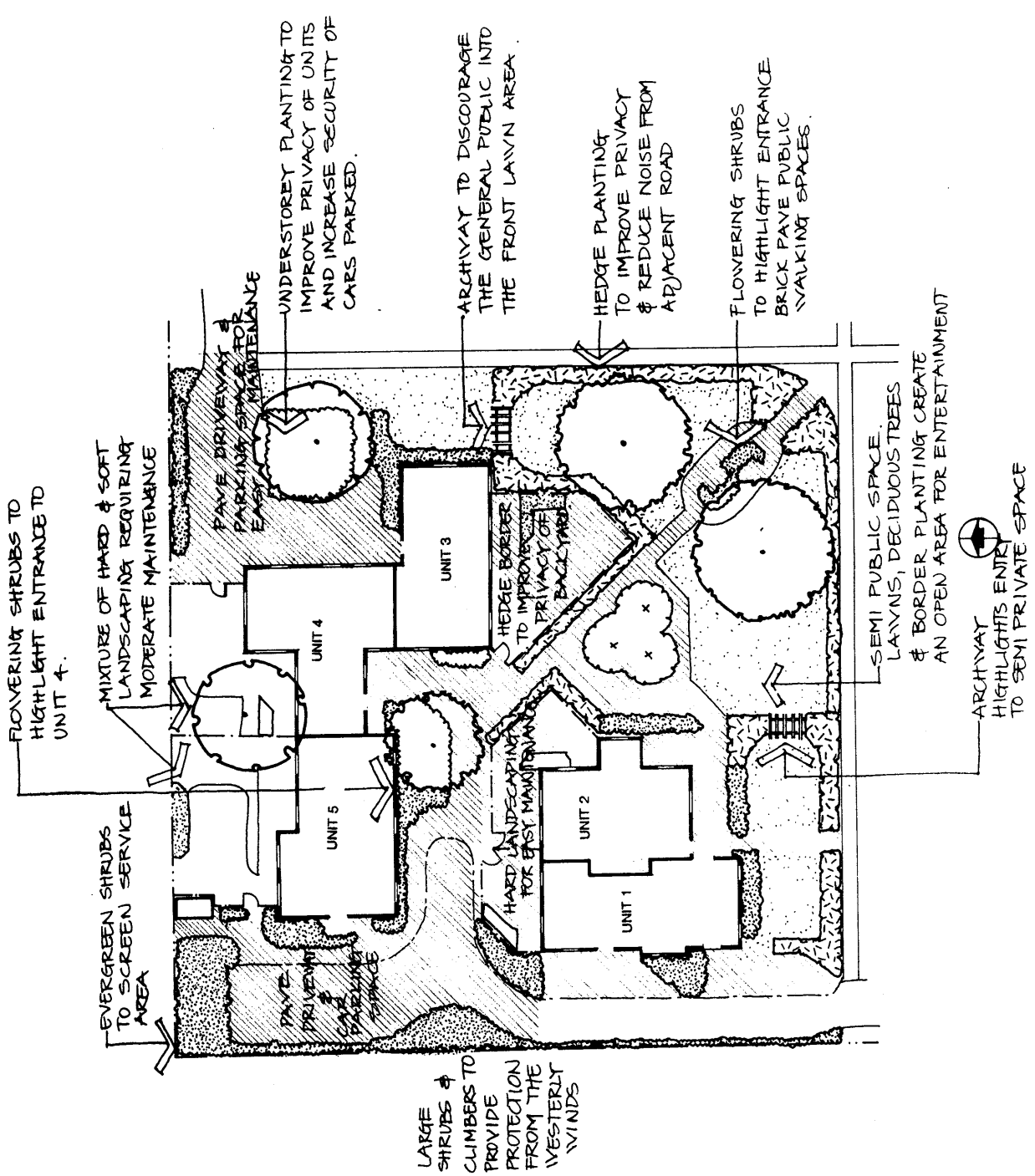


Principle 4

The proposal should create a pleasant environment within the development site. Factors which contribute to that include:

- The exploitation of good views.
- The orientation of buildings and courtyards to take advantage of a northerly aspect.
- Plant selection that provides shade, colour and interest.
- Outdoor furniture that is co-ordinated and integrated with the development in scale and appearance.

Example of a Preliminary Landscape Plan



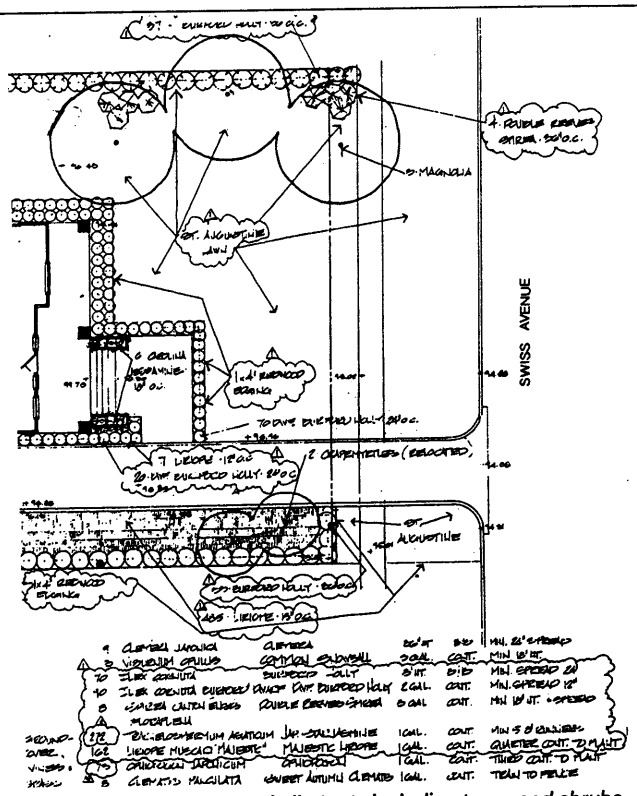
Detailed Landscape Design

Preparation of detailed landscape plans

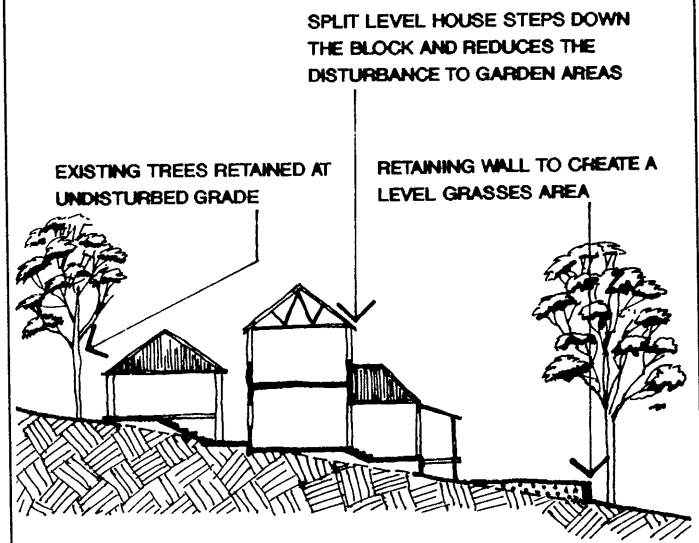
The next step is the preparation of detailed plans and specification for Design and Siting approval. These documents should fully explain both the building and site landscape design. All conditions attached to the Final Sketch Plans or arising out of discussions with ACT Landscape should be complied with in the preparation of detailed plans and specification.

Depending on each development, the detailed landscape plans should include:

- Detailed design of earth cuts and fills, mounding within landscaped areas, together with instructions for soil preparation.
- Layout and specification of all plants including trees, shrubs, and ground covers and existing trees to be retained:
- Layout and selection of outdoor furniture, lighting, signs etc.
- Detailed design of roads and parking areas and pedestrian paving, including edging and surface treatments.
- Construction details as necessary to facilitate the successful construction of the project.
- Tree protection measures.



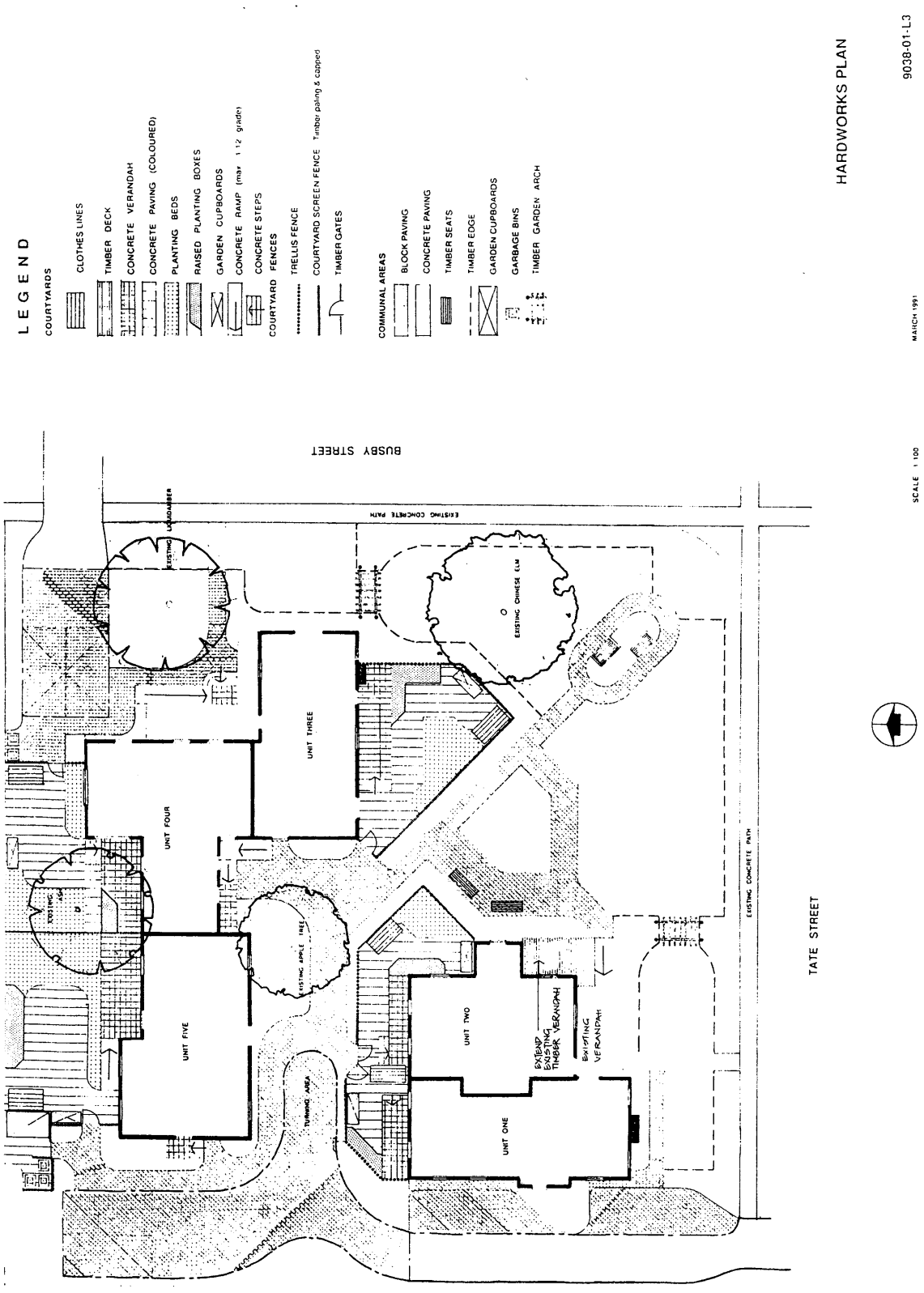
Layout and specification of all plants including trees and shrubs and existing trees to be retained.



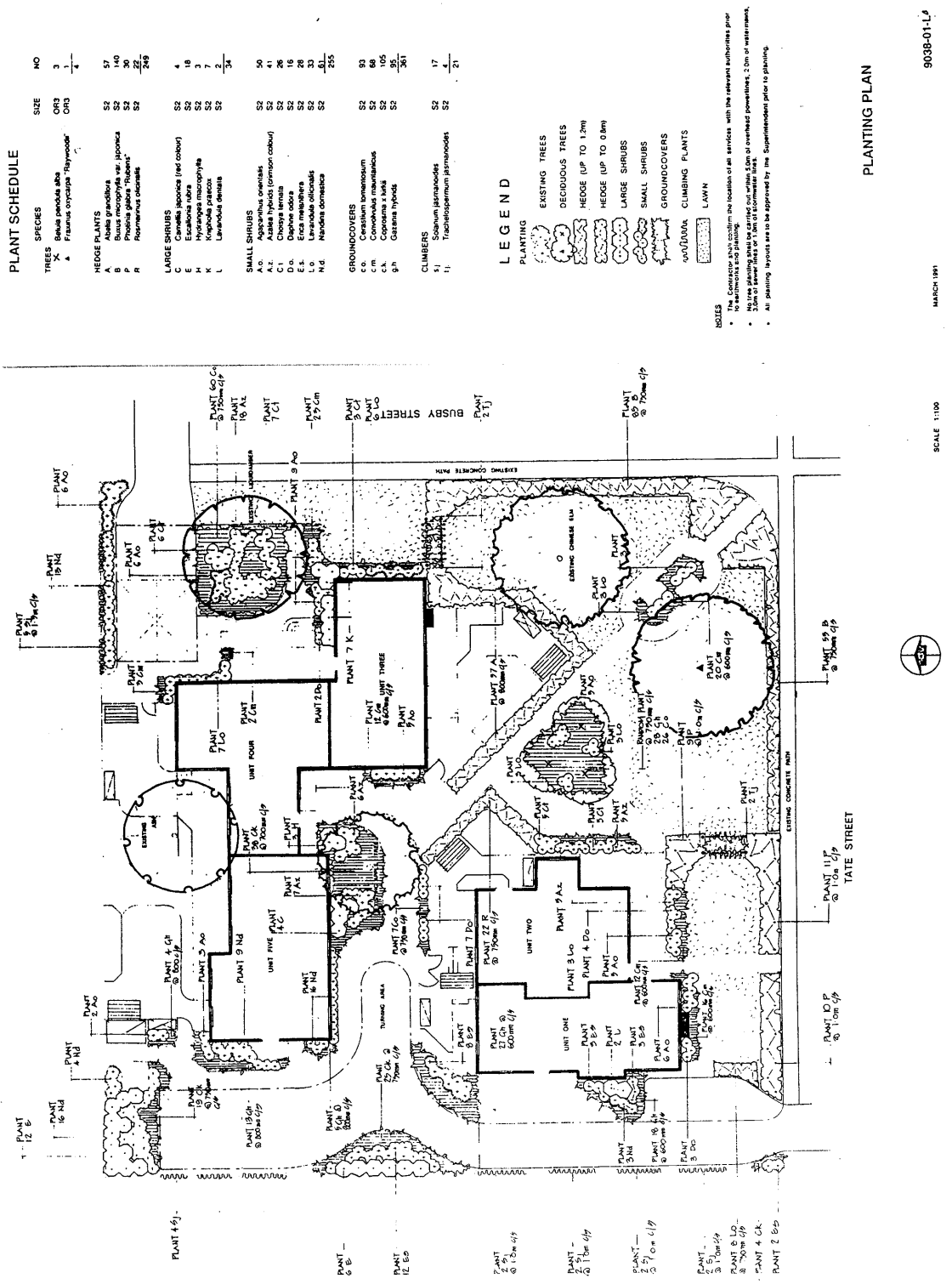
Sections through the site to indicate level changes.

Well designed and constructed landscapes add value to the development and enhance the wider environment.

Example of a Detailed Landscape Plan - Hardworks



Example of a Detailed Landscape Plan - Planting Plan



Trees and shrubs

Trees are the most fundamental element in the landscape. Because of their long life and high value, which increases with age, it is worth the time to give careful attention to their function and placement. Trees should be planted to solve various problems and fulfill several landscape objectives. No single tree species can perform all the functions necessary for a successful landscape development.

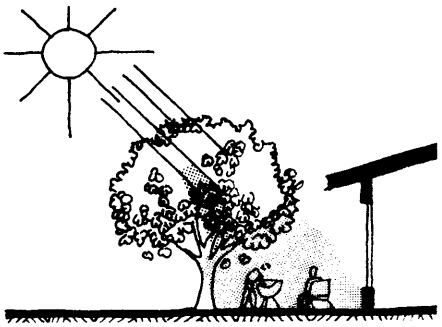
Shrubs provide many of the same design functions as trees - but at a different spatial scale. Essentially the shrub application lies between the overhead canopy and the ground plane.

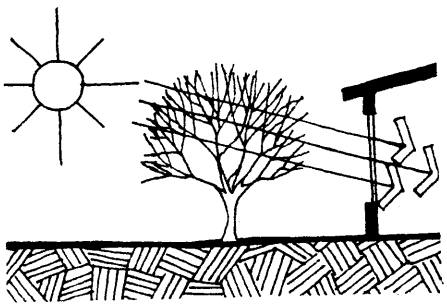
When selecting plants consider:

Shading

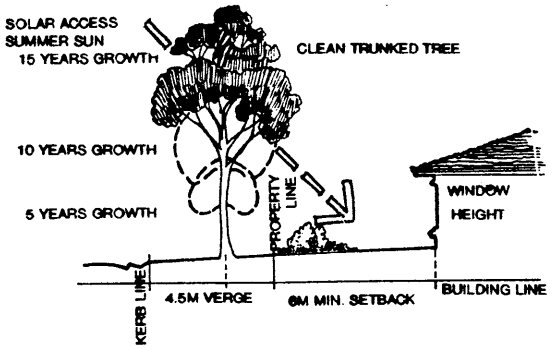
Well placed shade trees have a major impact on the amenity of both the outdoor spaces and the adjacent building. Deciduous species can also provide seasonal variety of summer shade and winter sun.

When evergreen species are used consider the mature height of trees and the more permanent shade effects on buildings.

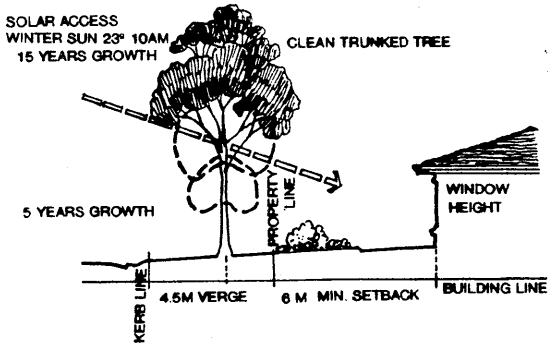




Clean trunked Eucalyptus species may also provide an opportunity for seasonal microclimate control by allowing the low angled winter sun to penetrate beneath the canopy.



High summer sun angle



Low winter sun angle

Enframement

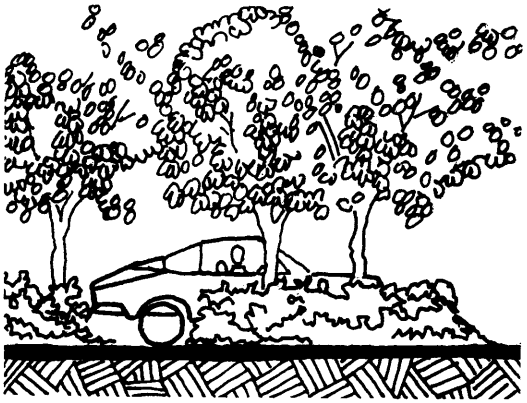
A facade or entry can be framed by planting to focus attention and present the development in a pleasing manner. Planting can also be used as a backdrop to a feature and isolate it from the overall view.

Detailed Landscape Design

Filtering

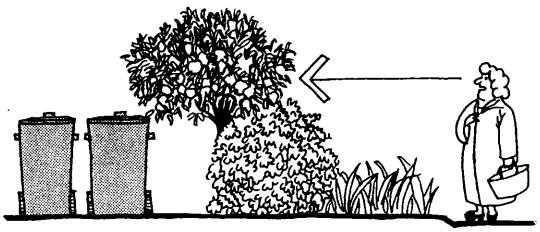
Plants can be used to filter views into and from the development.

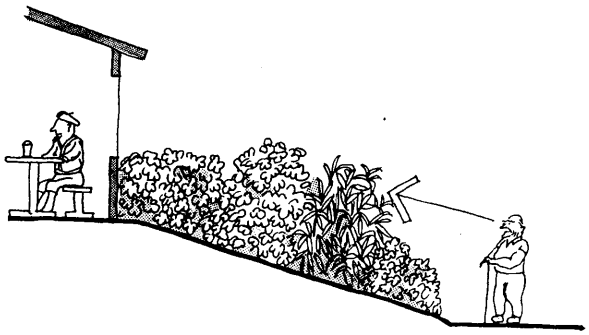
Filtering a view can help to break up the visual mass of an object or reduce the overall impact, while still allowing glimpses of it.



Screening

Plants can be used to screen discordant elements within a development or block out unwanted views that invade privacy within the development.



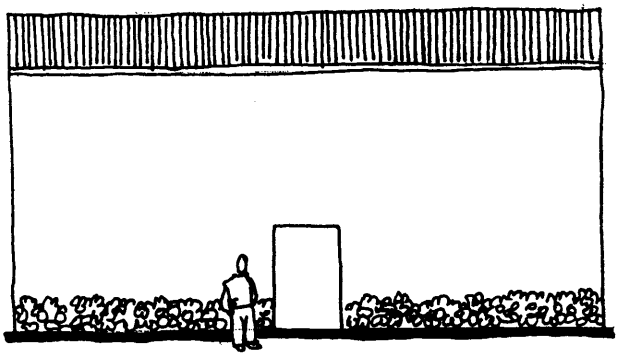


Scale and size

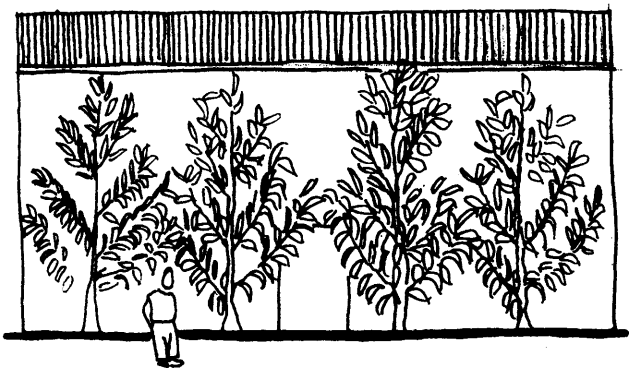
The size of the development, its open space areas and its buildings will suggest a suitable size or 'scale' for the selection of plants. For example, large open areas suggest simple broadscale treatments using a massing of large plants.

Small, personal areas suggest detailed treatments using a complex range of plants that are relatively smaller in size.

Carefully consider the mature form and size of plants before the final layout is set to reduce potential conflict between plants, structures and services.

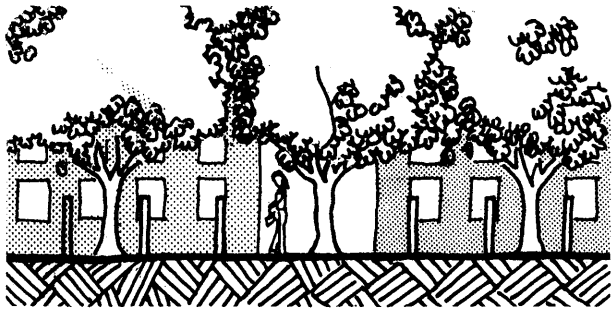


Planting adjacent to large structures can provide an intermediate element which makes the structure appear less imposing to the viewer.



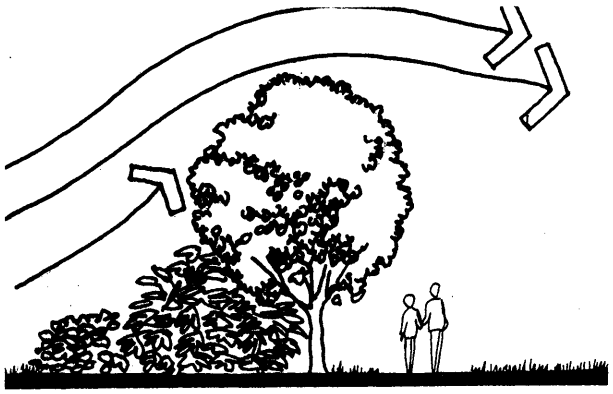
Softening and unifying

Trees provide a visual link between different structures and buildings, creating a 'softer' more human scale.



Windbreaks

The influences of prevailing winds can be ameliorated by buffers of planting that lift the wind effect over the area to be protected.

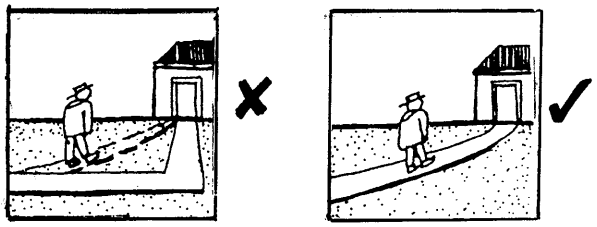


Detailed Landscape Design

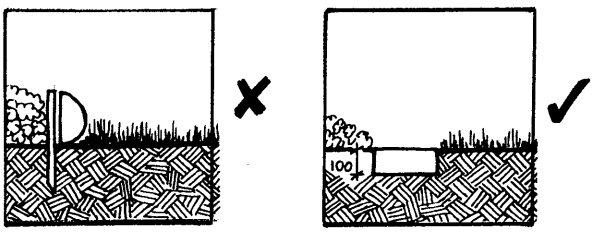
Design to reduce maintenance

There is no such thing as a maintenance free garden, however, proper planning can keep maintenance to a minimum. Things to remember include:

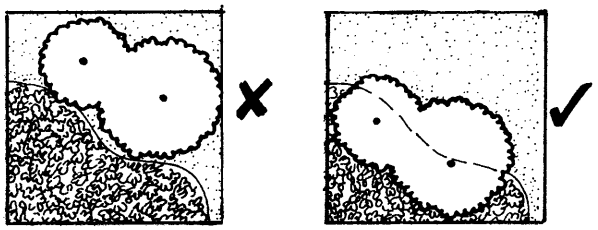
- Keep lawns to large areas and provide space to manoeuvre self propelled mowing equipment.
- Make sure trees in lawn areas are placed so that mowing around them is not impeded.
- Ensure that a mowing strip is constructed against walls and planting beds to avoid hand clipping. Finish edges flush with adjacent lawn areas.
- Plant trees and shrubs in beds with a minimum 100mm depth of mulch.
- Plant trees and shrubs in masses.
- Provide more plants than may be required at maturity so that when still young they grow together quickly, thereby restricting light for weed growth. As plants mature they can be thinned out.
- Choose plants that are long lived, hardy and require little maintenance.
- Design paths and paving for where people want to walk so that they do not need to take short cuts across soft landscaping.
- Adequately prepare the ground for planting and grassing.



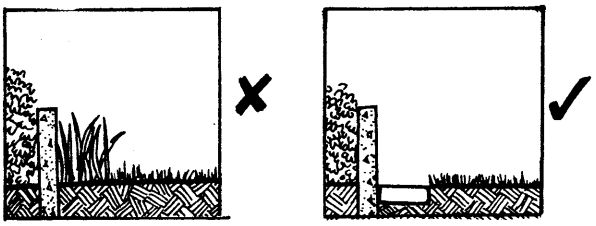
Locate paths where people are likely to walk.



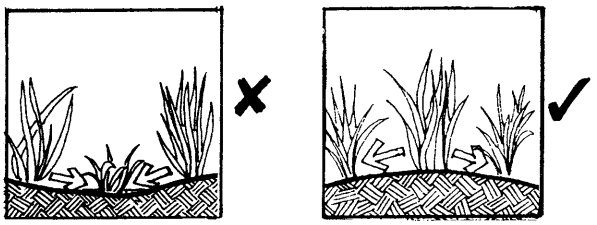
Provide a mowing edge finishing flush with adjoining lawn. Finish the base of the mulched bed 100mm below the top of the edge.



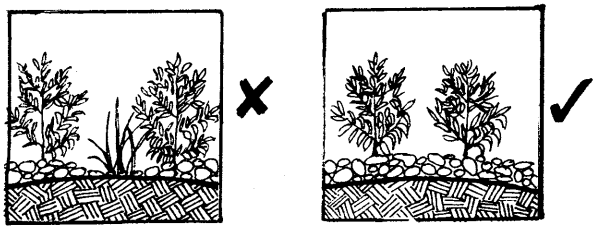
Where possible include trees and shrubs in mulched beds.



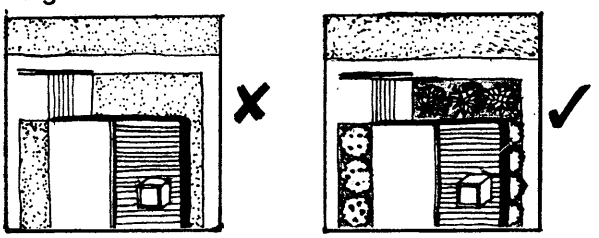
Always provide a mowing strip against a vertical obstruction.



Prepare planting beds to a minimum depth of 300mm. Slight mounding improves drainage.



Provide a uniform minimum 75mm depth of organic mulch.



Avoid small areas of grass that are difficult to water and mow. Provide hard paving where necessary.

Detailed Landscape Design

Sheet 1 of 2 | Design around existing vegetation | LG A2.4

Survey of existing vegetation

Early in design established trees should be surveyed: noting species type, size (height, canopy and trunk diameter), location and general condition.

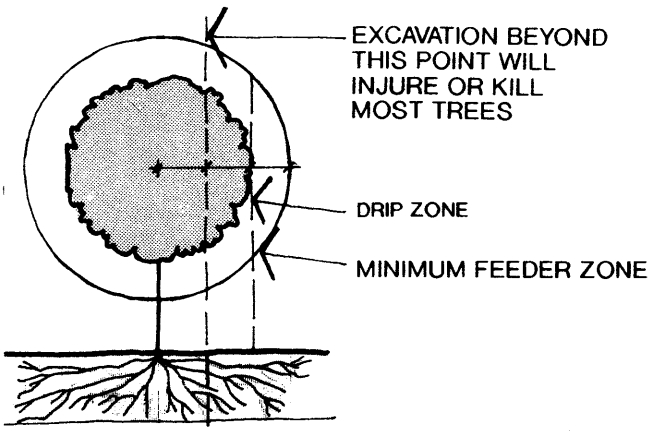
The retention of groups of young trees is often preferable to the retention of single mature specimens which may be less tolerant to disturbance.

The decision to retain, prune or remove the tree must be made in the initial design phase and appropriate allowances made in the design to ensure the survival of the tree.

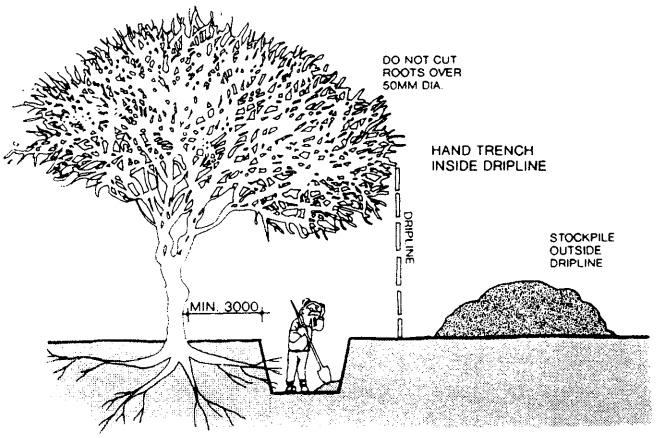
Retention of mature trees

The retention of good quality trees can contribute a great deal to the integration of a new development into the streetscape, and to the market appeal of the development. However, the design of the development must observe that the value and longevity of trees can be greatly reduced by construction activity. Tolerance of different species to root disturbance varies, and professional advice should be obtained about individual trees. As a general guide however the following principles should be applied when designing around existing trees.

- Excavation occurring on one side of a tree, halfway from the dripline to the trunk will eliminate about 30% of feeder roots. Most healthy trees, apart from some species (predominantly eucalypts) should be able to recover from this with proper after care.
- Don't excavate within the feeder zone of mature Eucalyptus except where work is restricted to only one side of the tree and outside the drip zone.
- Roots over 50mm dia should not be severed. Hand dig a tunnel beneath the larger roots.
- Backfill trenches as soon as possible to aviod drying out of the roots.



Don't excavate within the feeder zone of Eucalyptus species. When restricted to only one side of the trunk most healthy trees of other species may withstand disturbance no closer than 3m to the trunk or halfway between the dripline and the trunk, whichever is the greater.



Within the dripline roots over 50mm dia should not be severed. Tunnel beneath the roots and backfill trenches as soon as possible to avoid roots drying out.

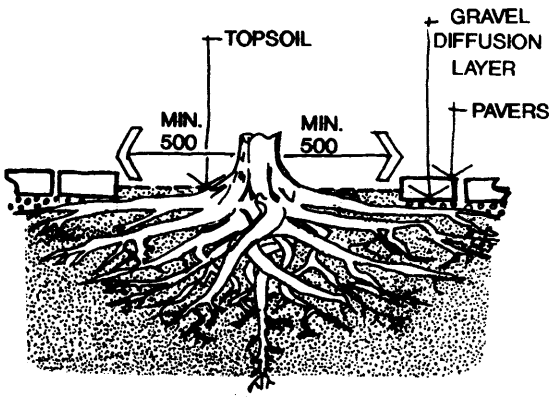
Detailed Landscape Design

LG A2.4 | Design around existing vegetation | Sheet 2 of 2

Trees and paving

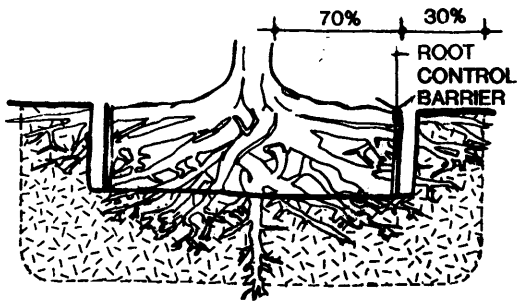
Hard paving surfaces create an impermeable layer preventing air and water from reaching tree roots. In addition, feeder roots are often removed or damaged in order to achieve adequate sub-base preparation for paving.

In order to reduce the impact of hard surfacing, stop paving at least 500mm from trunk of tree and provide a gravel diffusion layer under the pavement.



Root barriers

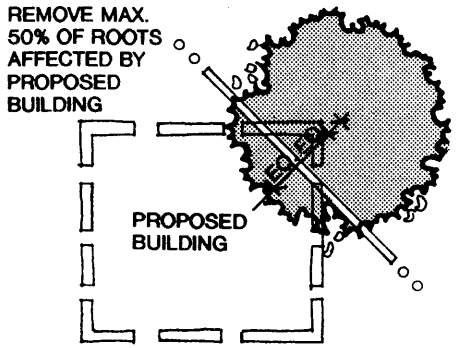
Properly installed root barriers can protect pavement, footings and gutters from cracking and lifting caused by certain tree species. The installation of barriers involves the severing of roots within the feeder zone. A total of no more than 30% of feeder roots should be affected.



Advance preparation

When changes in level around a tree are known well in advance preparatory work to reduce the impact can be taken.

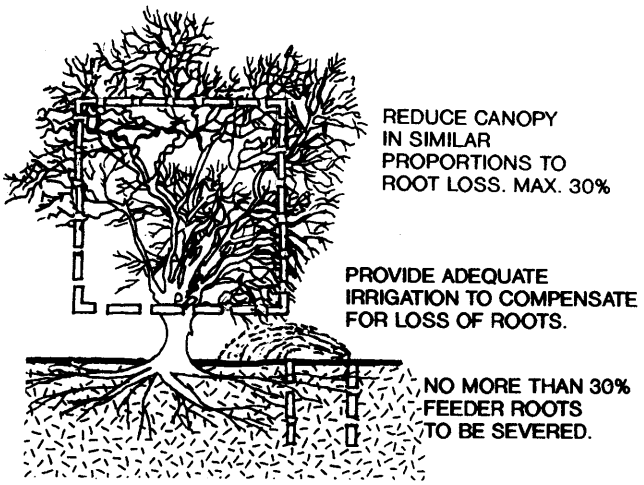
A percentage of the roots (less than 50%) that will be affected by the project can be severed and new growth encouraged within the area that will not be disturbed. The greater the lead time, the more gradual the impact on the tree.



Follow up maintenance

The need for remedial pruning or maintenance, and provision of adequate irrigation to compensate for loss of roots should be considered at the design stage.

Maintenance access to trees should also be addressed as it may be necessary to use a travel tower for subsequent maintenance.



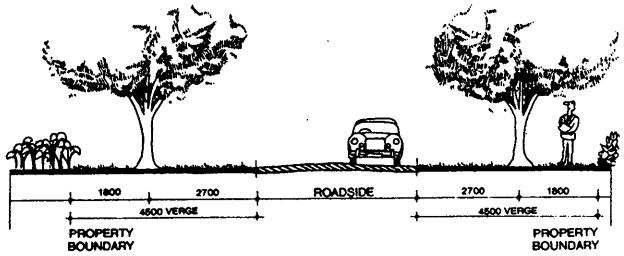
Detailed Landscape Design

Sheet 1 of 1 | Street tree planting | LG A2.5

Street tree themes

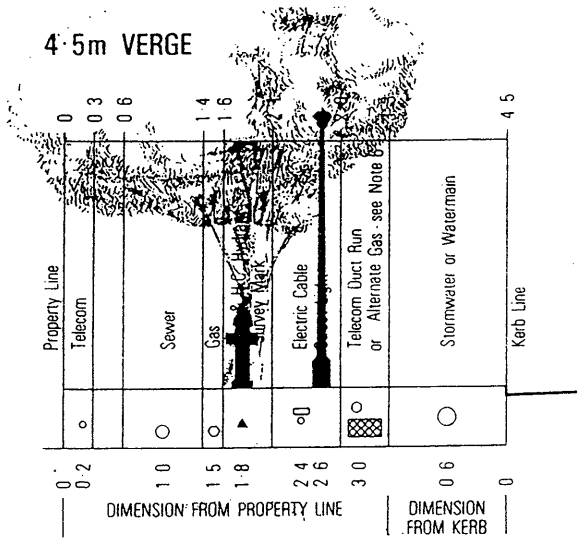
Street trees provide a visual link between different structures and buildings in the street and are the predominant element in the landscape of the established areas of Canberra.

The policy of the ACT Government is to continue the practice of ensuring that street trees are provided within the verge of new residential areas so that in time a greater sense of unity and identity will be created.



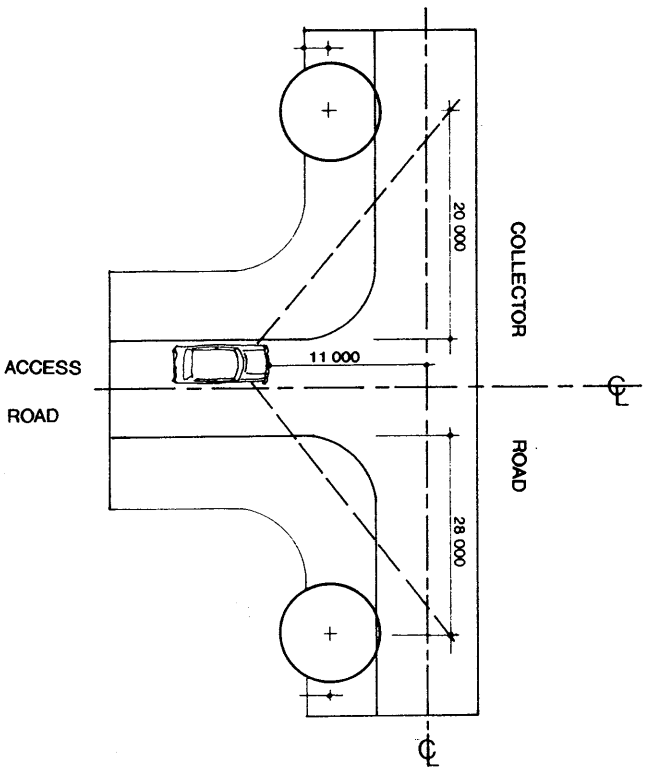
Services

Tree placement must observe the standard alignments and reservations for public utilities and services. These may vary according to the width of the verge and these are fully described in '*Guidelines on Engineering and Environmental Practices - Hydraulics*'. Reservations within a 4.5m verge are shown below but clearances must still be obtained from service authorities.



Sightlines

Design proposals should ensure that vehicle sightlines are maintained by careful placement and the selection of tree species that will not screen sightlines. On the common street tree alignment 2.7m from the kerb, the setback from the intersection shall be a minimum of 28m to the right and 20m to the left. The further the tree is from the road edge the closer the tree can be to the intersection. For example, 4.0m from the kerb may permit tree planting 9.0m to the right and 8.0m to the left.



Detailed Landscape Design

Landform and mounding

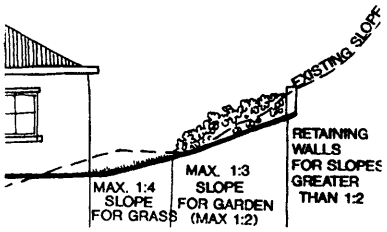
Landform

Landform can be used to great effect in the landscape development. Landform created during the landscape development appears less artificial if designed to reflect the existing site.

Mounds should have variety in slope and width that provide an impression of natural landform. Mounds with constant width and slope immediately look imposed and artificial on the site. Construct the mound rounded at the apex and the foot of the slope.

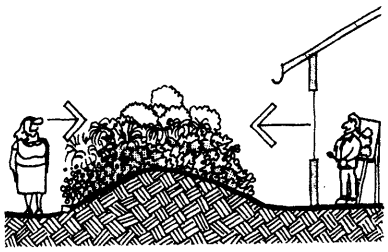
Maximum slope for grass - 1:4
Maximum slope for garden area - 1:2 although no steeper than 1:3 is recommended.

For slopes steeper than 1:2 retaining walls and terracing will need to be considered.



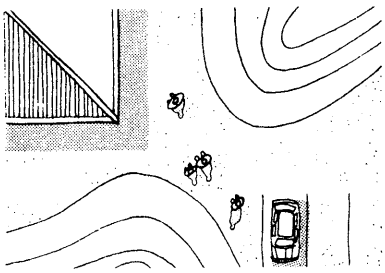
Screening

Mounding can raise the level of planting to improve its ability to screen views while reducing the size of the plant necessary to provide the screen.



Direct pedestrian flow

Landform can direct pedestrian movement across the site and inhibit straying into service and storage areas.

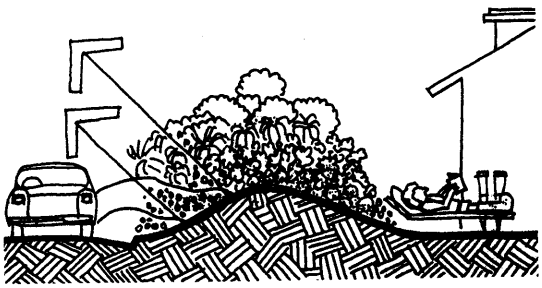


Focus attention

Combined with planting, landform can strongly emphasize an entry or frame a view of the development.

Reducing noise

The only effective method of reducing noise is with solid barriers. Landform is possibly the most effective sound barrier and should be used wherever possible. Mounds used for this purpose should be carefully designed and constructed to reduce their visual uniformity. Planting can improve the appearance of the mound and link it to the adjacent landscape.

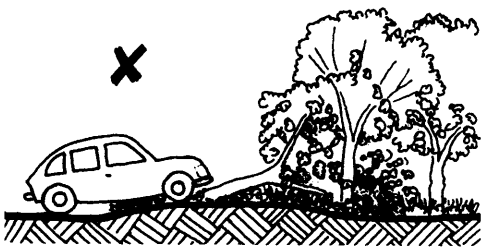


Detailed Landscape Design

LG A2.6 | Landform and mounding | Sheet 2 of 2

Block access

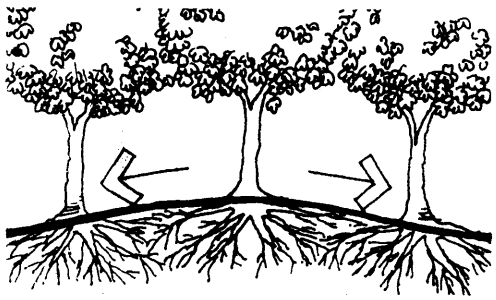
Mounding can be combined with channels to provide barriers to vehicular access without the use of fences or structural barriers.

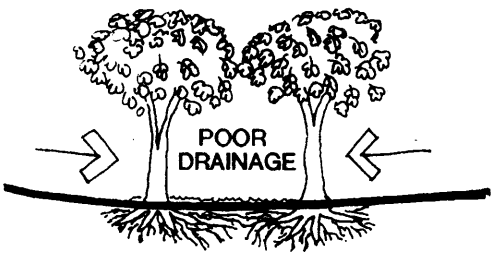


Difficult soil conditions

Where drainage is impeded or the soil is difficult to cultivate, mounding is a useful way to form areas for garden planting.

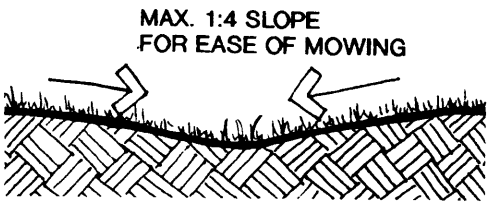
Ensure that the mound construction does not impede positive drainage over the site or cause drainage problems on an adjacent site.





Control runoff

At the top of steep slopes and adjacent to buildings, channels may be excavated to trap and divert runoff. Such channels can be grassed, planted with strap leaf groundcovers or treated with river pebbles. They should fall to a field inlet or larger stormwater system. The slope of the drain should not be greater than 1:12 and the side slopes should not exceed 1:4 for ease of mowing.



Detailed Landscape Design

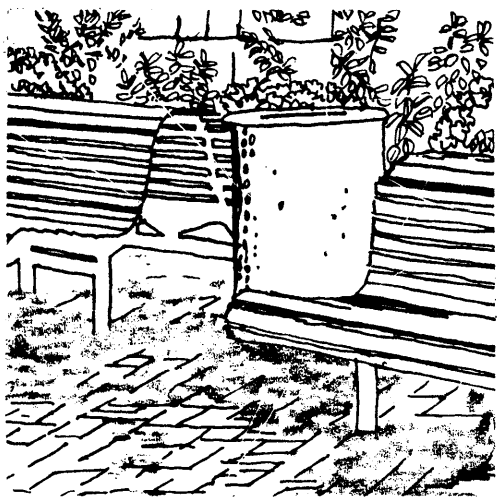
Street furniture

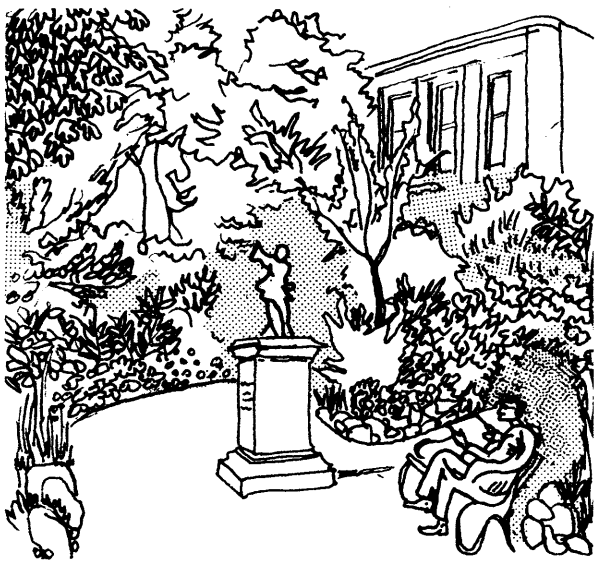
Street furniture is a term used to describe all the peripheral functional objects that are required throughout pedestrian areas. These include:

- seating and tables
- rubbish bins
- lighting
- pergolas and awnings
- planting boxes
- handrails
- stairs
- tree grates and guards
- bicycle racks
- sculpture
- community art.

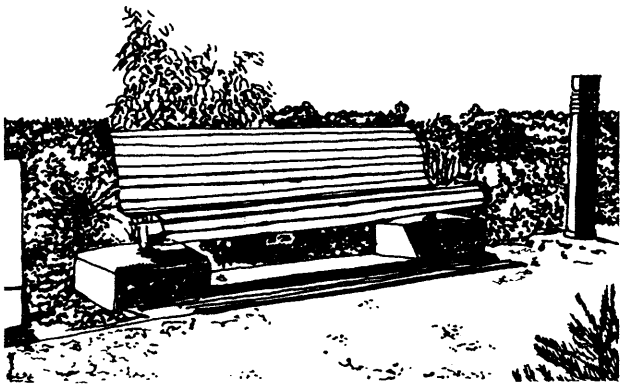
As these items are secondary to the principal functions of open spaces they tend to be chosen with too little effort. Consequently, street furniture elements are often unco-ordinated, either with each other or with their surroundings or haphazardly placed within the development.

The provision of better quality outdoor facilities can make an outdoor space more than just a pedestrian thoroughfare; a footpath should provide the opportunity to sit, to be protected from the elements, to enjoy a view or to find information.





Secluded courtyard with a sculpture as the focus.



Seats, bins bollards and lights are combined in a co ordinated design.

Paving

Garden surfaces consist of a combination of hard and soft treatments.

Hard paving is required to provide opportunities for outdoor entertaining and to create durable areas for other outdoor functions such as clothes drying areas, driveways and car parking.

Whatever type of hard paving is used it should, if possible, link up with materials used either in the building or in the edging to planting areas. Higher cost materials such as brick may limit the extent of paving in which case the bricks can be used as a linking material in the form of banding or edging, and a cheaper infill material, such as broom finished concrete, used to provide the bulk of the paved area.

A wide range of paving materials are available. They include:

- Brick
- Concrete block
- Pre cast concrete slabs
- Broom finished in situ concrete
- Exposed aggregate concrete
- Patterned concrete such as "Bomanite"
- Bitumen
- Decomposed granite gravel

All paving should be laid with a slight fall across its surface, away from the building for adjacent paving. A fall of between 1 and 3 percent is sufficient.

When paving is being laid adjoining a building, it should only butt the wall below the damp proof course.

Sub grade preparation and sub base construction should comply with standard engineering practices to ensure that a sound pavement is provided.

Detailed Landscape Design

Car parks

Design aspects

In terms of area and visual impact, car parking is an important element in a design.

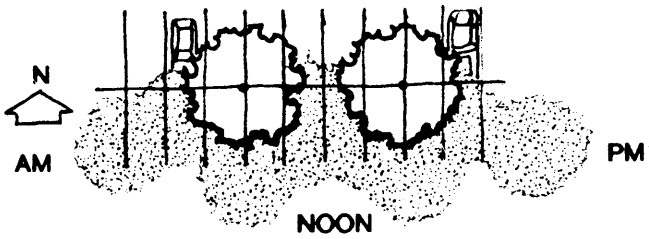
Landscape treatments that focus on providing shade, screening and integration with other landscape and building elements can be carried out relatively easily and with little reduction in car parking space.

Orientation

The orientation of car parks should first of all be functional. Where two or more aisles are provided the orientation should be perpendicular to the entry of the building so that pedestrians can move freely down the aisle rather than meander through parked cars.

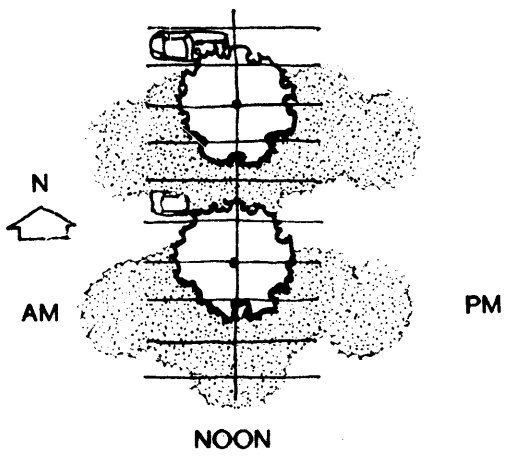
Car park aisles East-West.

- Typical shadow for summer.
- For long stay parking, arrival and departure affected by sun glare.



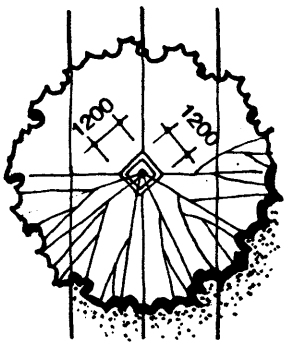
Car park aisles North-South

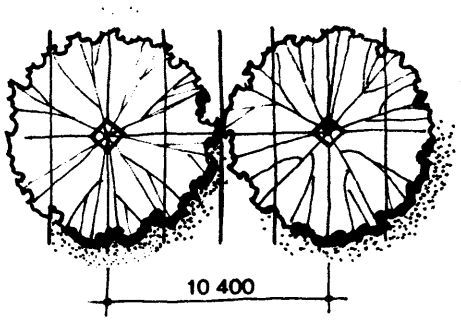
- Increased shadow coverage.
- Long stay arrival and departure times not affected by sunglare.



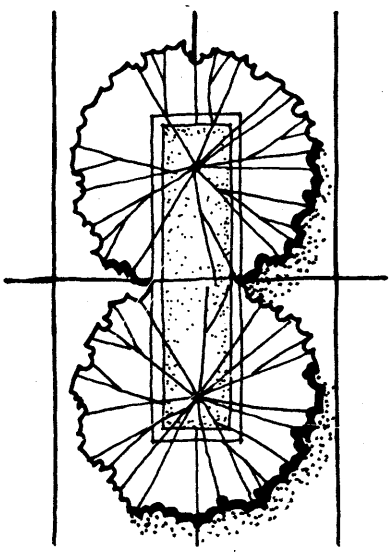
Tree spacing - restricted space

For good shade pattern, plant trees at every fourth or fifth bay. At planting, trees should be advanced size and staked with two 50×50×1800mm long H.W stakes which should be so positioned as to protect the tree from vehicle damage.





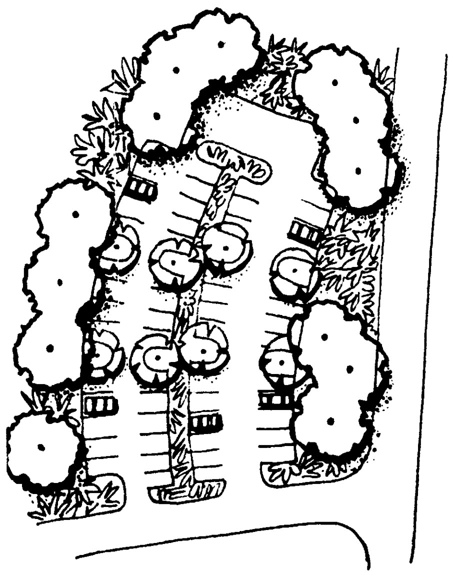
No loss of parking spaces



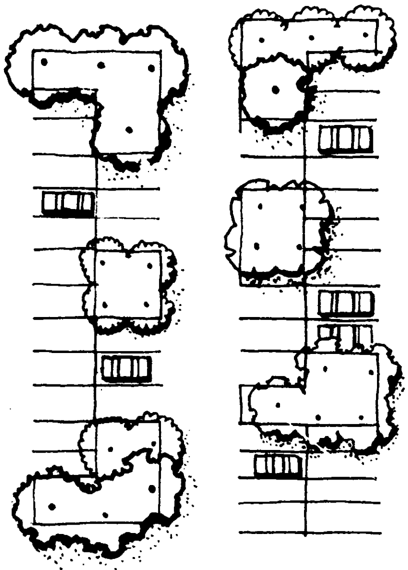
Loss of two parking spaces

Tree spacing - less restricted

Where the number of parking spaces is not the major consideration trees and shrubs can be placed in larger groups to create a less formal parking arrangement.

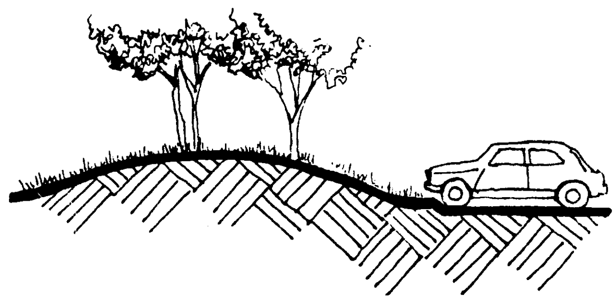


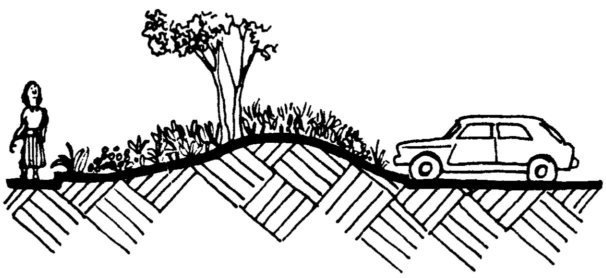
Where space allows, views of large car parks can be broken by screen planting of the medians and by curving the alignment of the aisles.



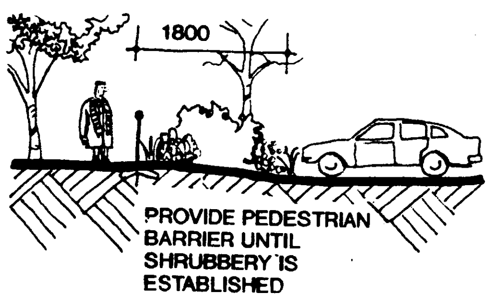
Screening

Where sufficient space is available grass mounding with tree planting or tree and shrub planting forms an effective screen.





Where space is limited, to say an 1800mm wide strip, tree and shrub planting in a mulched bed will form a screen. Provide a pedestrian barrier for the first three or four years to allow plants to establish.



Detailed Landscape Design

Landscape design checklist

General

This checklist is a guide to the Developer for the preparation and assessment of the landscape aspects of Design and Siting applications. While the site survey and analysis are helpful they are not mandatory in the plan approval process.

Site survey and investigation

	Yes	No	NA
• Character of the site *Urban, suburban, village*			
• Site boundaries			
• Geology and soils			
• Microclimate			
• Landform *Contour plan*			
• Drainage *Natural and man made*			
• Existing vegetation			
• Existing land uses *Within and adjacent to site*			
• Wildlife			
• Historic features			
• Circulation and access *Pedestrian, vehicular Public transport*			
• Services *Above and below ground*			
• Pollution control plan			
• Views *Into and out of the site*			

Site analysis

Analysis of the site survey and investigation data forms the basis of the design. Drawings at 1:500 or 1:200 should be submitted, and should logically determine the following:

	Yes	No	NA
• Area suitable for building, suitable road access and circulation			
• Trees or groups of trees which are to be retained			
• Prominent visual elements which are to be retained in a natural state			
• Opportunities to exclude undesirable external influences such as noise, prevailing weather and screening unpleasant views			
• Staged construction proposals			
• Other ecological and siting considerations			

Detailed Landscape Design

Landscape design checklist

Site Plan and Preliminary Landscape Proposals

The site plan proposals should be illustrated at 1:200 or 1:100 and should record in outline the following information:

	Yes	No	NA
Site works and protection of trees to be retained			
Features to be retained			
Location of buildings (Types, materials, colour)			
Landscape structure planting			
Surfaces (Hard, soft, other)			
Road network			
Open space network			
Pedestrian path network			
Contours and levels			
Services (existing and proposed)			
Overland drainage			
Boundary information			
Tree survey			

Detailed Proposals

The detailed proposals should be illustrated at 1:200 or 1:100 and should record the following additional information:

	Yes	No	NA
Planting details			
• Location and spacing			
• Species and supply size			
• Ground preparation			
Landscape structures			
• Walls			
• Fences			
• Gates			
• Seating and furniture			
• Play equipment			
• Steps and ramps			
Levels and drainage			
• Falls			
• Mounding cross sections			
• Lighting			
• Signage			
• Other site features			
Services			
• Routing			
• Levels			
• Type			
• Substations			
• Telephone boxes			

Management Plan

For complex landscapes it may be necessary to prepare a management plan that will ensure that the intent of the design is realised as the landscape matures. The plan should include:

	Yes	No	NA
Responsibility			
• Public			
• Private			
Maintenance prescription			
• Grass areas			
• Ornamental planting			
• Native planting			
• Water features			
• Play equipment			
• Furniture			
• Other elements			

Landscape Construction

Sheet 1 of 1 | Site clearing and earthworks | LG A3.1

Extent of clearing

Limit disturbance to areas where site works will occur and retain as much natural vegetation as possible throughout construction.

Erosion control

The Water Pollution Act 1984 requires the discharge of soil, clay, mud etc. into any water course or stormwater system to be licensed. The Act is administered by the Environment Protection Section and comprehensive guidelines on pollution control requirements should be obtained from them.

Staging of site clearing and recycling

Examine the areas to be excavated or filled for the depth of topsoil and locate any surface rock or gravel that might be reused in the landscape development. Prior to excavation clear the site of rubbish and hard materials and remove to the tip. If possible chip the branches and foliage and stockpile for reuse as mulch.

Large stumps should be grubbed and removed from the site. Slash the lower shrubs and ground cover. Scrape the slashed material to a depth of 25mm and stockpile for reuse as regeneration seedbed.

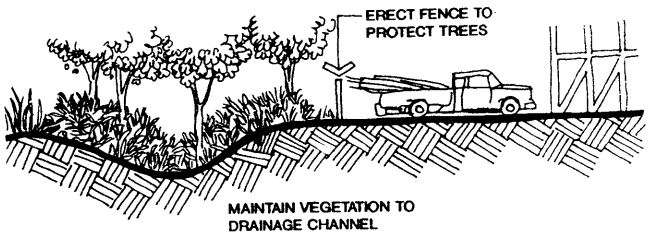
Scrape the topsoil and stockpile in an area to be developed but not under the canopy of trees to be retained. Stockpiles should be formed no higher than 1000mm and not compacted. If soil stockpiles are to remain for longer than four weeks they could be sown with a temporary grass cover such as cereal rye.

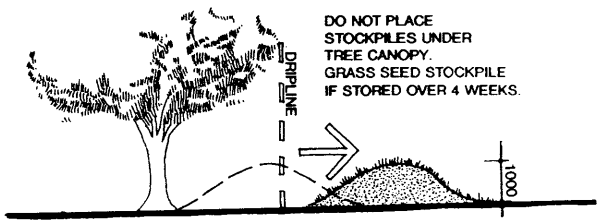
Topsoil should be placed into its final location as soon as possible after site works are located.

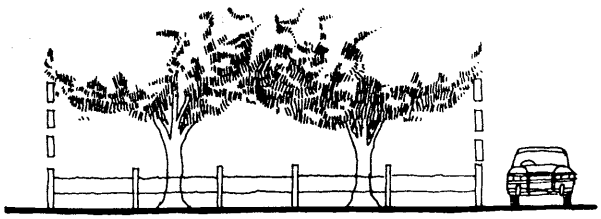
Placement of stockpiles

Stockpiles of materials should be stored outside the dripline of the trees to be retained. Cover cement dust and other materials that are easily wind-blown.

Cars and other vehicles constantly parked under the trees will cause the compaction of soil and will contribute to plant death if allowed to continue. If this occurs coring can loosen the soil but it is much better if the trees are protected by temporary fencing for the duration of construction.







1.0 General requirements

Shared or common trenching for non gravity services offers a number of economic and environmental benefits which include:

- Reduced charges from Service Authorities;
- Reduced time delays for servicing of sites;
- Reduced costs associated with damage to other underground services;
- Reduced costs by minimising damage to adjacent landscaped areas;
- Minimising delays by avoiding conflict between a number of different contractors.

The Natural Gas Company and Telecom Australia have an agreement to reticulate their respective services in a developer-supplied shared trench in all Canberra development sites, whether they are subdivisions, medium density, industrial or single residential sites.

ACTEW are currently assessing the inclusion of electricity in shared trenches in several test cases. A policy to include electricity and water in a shared trench for medium density developments has been put in place but for other forms of development ACTEW requirements must be established.

A proposed common trench for medium density developments that includes electricity and water is illustrated below.

The contents of this guideline should always be checked with the various service authorities to ensure that the information remains current.

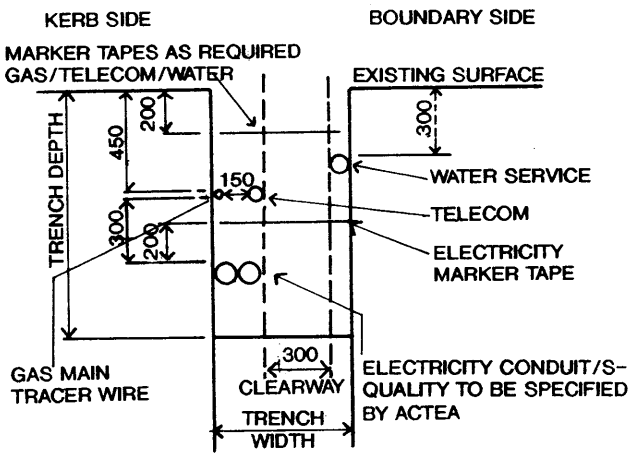


Figure 1. Proposed shared trench detail for medium density sites within private property.

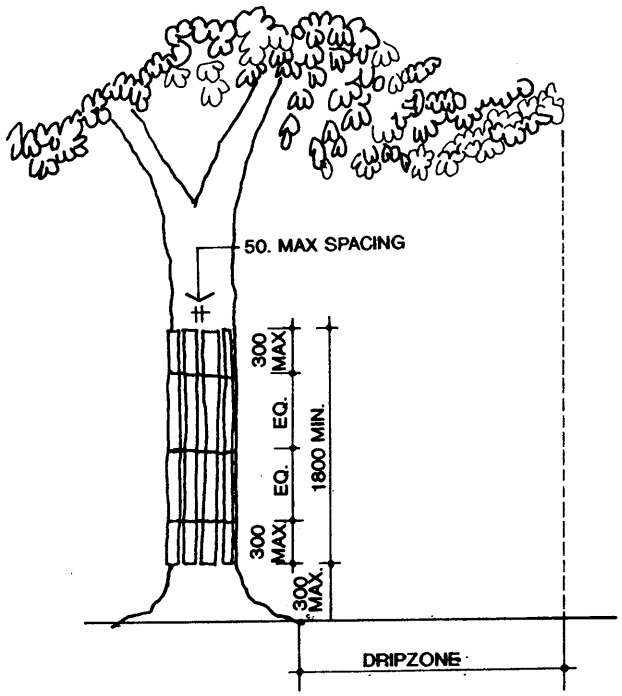
Landscape Construction

Sheet 1 of 1 | Protection and pruning of existing trees | LG A3.3

Tree protection

Once plants to be retained have been identified then an early effort should be made to provide adequate protection. This protection consists of:

- Not placing site sheds, building materials or vehicles within the root zone (drip zone + 2m).
- Protective fencing around groups of trees.
- Lashing timber battens around the trunks of trees where plant operation in close proximity is unavoidable.
- Excavating by hand within the drip line of trees.
- No excavation for services or footings within 3m of the tree trunk.

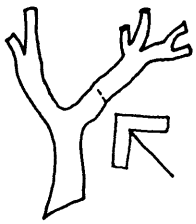


Protective battens around trees. No vehicle parking, site sheds or materials storage within the root zone (drip zone +2m)

Pruning tree branches

Pruning branches needs care to prevent unnecessary damage to the bark.

First, cut under the branch to prevent bark tear. Second, cut through the branch completely from the top. Third, cut the branch stump back within 50mm of the trunk.



1. CUT UNDERNEATH TO PREVENT BARK TEAR

2. CUT THROUGH BRANCH FROM TOP

3. REMOVE THE STUBS AND AVOID CUTTING OR WOUNDING THE BRANCH COLLAR AND BARK RIDGE

Landscape Construction

Sub-grade preparation and topsoiling

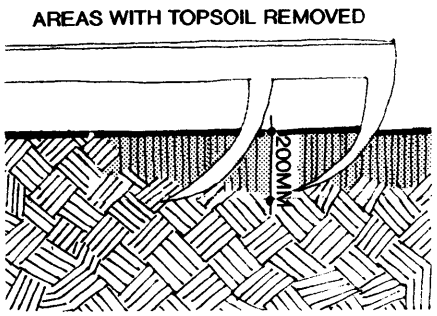
General

Ground must be prepared in order to:

- Improve soil texture and enable new roots to find water and nutrients easily.
- Enable soil to drain in winter.

Depth of cultivation

Areas to be planted must be cultivated; areas with topsoil removed, to a depth of 200mm; and natural soil areas, to a depth of 300mm.

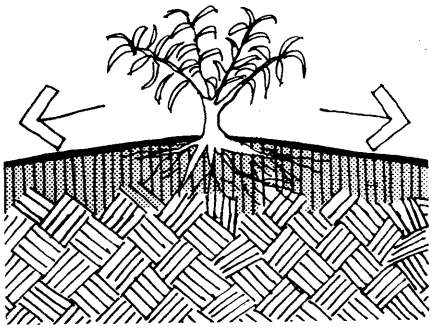


Soil additives

The generally heavy clay soils in Canberra can be improved for planting by the application of gypsum at the rate of 250gms per sq.m. and the addition of compost.

Improve drainage

Waterlogging of soils in winter is probably a greater cause of plant losses than drying out in summer. This can be reduced by slightly crowning planting beds to provide positive drainage. Where boggy conditions cannot be avoided suitable plant species should be selected.



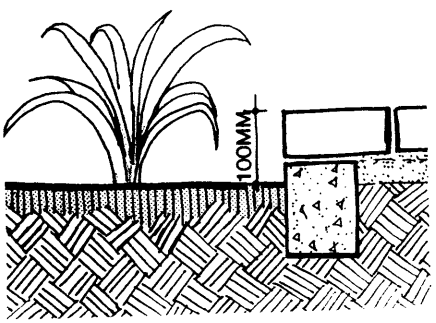
Topsoil placement

Where stockpiled site topsoil is inadequate, due to poor quality or insufficient quantity, imported topsoil will be required.

Minimum topsoil depths:

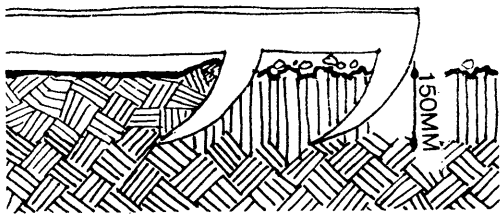
- Garden and massed planting beds 300mm.
- Grassed areas 100mm.

In planting beds finish topsoil 75mm below adjacent paving levels to allow for mulch placement. In areas to be grassed, level topsoil to finish grass flush with adjacent surfaces. Break up clods and and rake surface free of sticks, stones, weeds or rubbish.



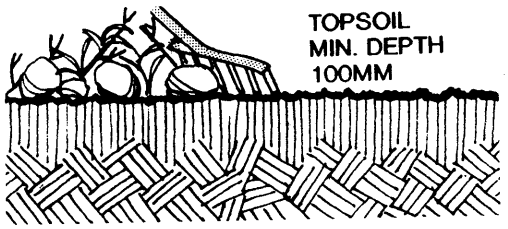
Cultivation

Deep cultivation or ripping of the subsoil will give lasting benefits in moisture retention and improved grass growth. This should be done to a depth of 150mm before the spreading of topsoil.



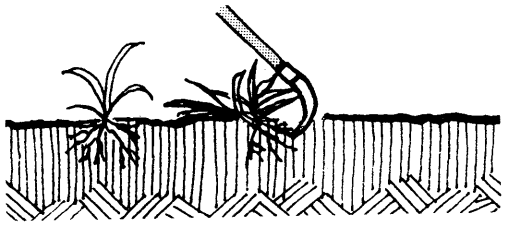
Topsoiling

The texture of topsoil shall be light and friable; lacking cohesion so that it will fall apart easily when dry. It is to be free of stones, clods and other rubbish and provided to a minimum depth of 100mm. Often such material cannot be obtained from the site and imported topsoil will be required. Topsoil must be levelled to avoid 'scalping' high spots when mowing and water collecting in depressions during rain.



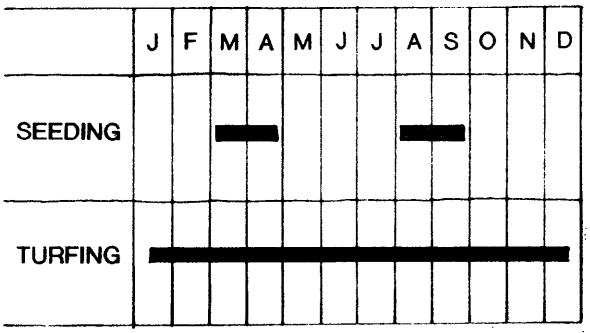
Weed control

Leave the prepared topsoil for as long as possible before seeding to allow time for weeds to germinate. Control the emerging weeds by light hoeing or the use of non-residual herbicides such as 'Glyphosate'.



Time for grassing

Preparation for seeding should be timed to the growing season of the grass. In Canberra grass can be established from seed between August and May; the soil temperatures in winter being too cold to allow germination. Spring and early Autumn are the best times as summer months will require almost constant watering. Preparation for turfing can occur at any time of the year.

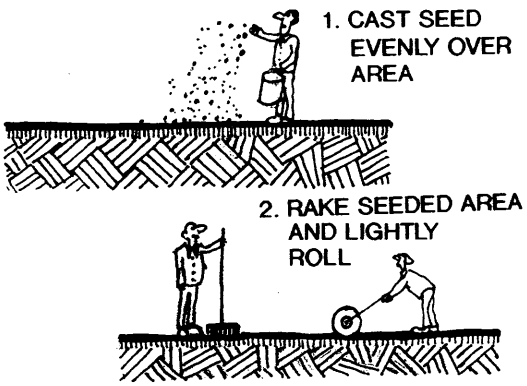


Seeding

Prepare the surface to be seeded as late as possible before seeding. If the surface is compacted before the seed is cast scarify with a rake.

Cast seed to spread a light even scatter over the area. Apply a lawn starter fertiliser at the time of sowing.

Rake the seeded area and lightly roll. Immediately begin a light, even watering after seeding.



Grassing

Lawn seed mixtures

1. Irrigated areas

a. High maintenance lawns (by weight)

Fine Leaf Perennial Ryegrass	8 parts
Kentucky Bluegrass	2 parts
O'Connors Strawberry clover	1 part

b. Regularly maintained lawns

Tall Fescue	8 parts
Kentucky Bluegrass	2 parts
O'Connors Strawberry clover	1 part

2. Non-irrigated areas

Tall Fescue	8 parts
Perennial Ryegrass	2 parts
Chewings Fescue	2 parts
White clover	1 part

Rates of sowing

30 grams per square metre for sowing at the optimum times of spring or autumn. Out of season rates can be increased to 40 grams per square metre.

Lawn starter fertiliser should be applied at the time of sowing at a rate of 40-60 grams per square metre.

Grass establishment

Newly sown lawns must be kept moist during the germination period which may extend from 7-28 days. Regular light watering is essential, and this could mean 2 or 3 times a day in warm weather.

When the grass is 4-5cm in height, watering frequency can be reduced. About 10-12 weeks from sowing, one or two deep waterings each week is usually sufficient.

The first mowing should be carried out when the grass is 5-6cm high and the height of cut set to no less than 4cm.

Turfing

Areas to be turfed should be divided into sections that can be prepared and completed in a day. Prepare topsoil as described previously so that turf will finish level to adjacent paving areas.

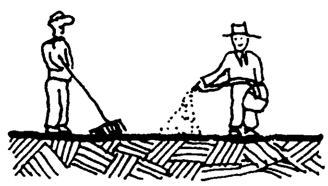
Before turf is laid spread fertiliser and rake into topsoil.

Lay turf as soon as possible after it is delivered to the site. If the delay is likely to be more than 6 hours then the turf should be laid upright on a flat surface and watered then rerolled when the area is prepared.

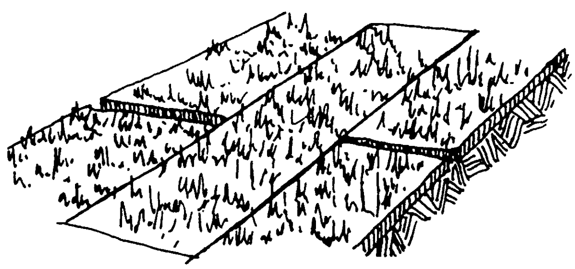
Lay turf with edges touching in an overlapping pattern across the fall of the slope.

Lightly roll turf after laying and fill open joints with topdressing. Water immediately to wet the soil to a depth of 150mm.

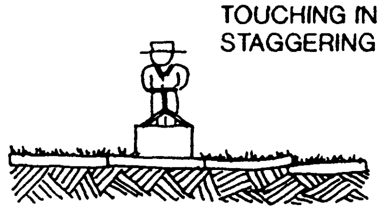
Turf can be laid at any time of the year but the growing season is September to April. Turf laid at other times should be carefully maintained until the effects of the growing season promote vigorous growth.



SPREAD FERTILIZER AND RAKE INTO TOPSOIL



LAY TURF WITH EDGES TOUCHING IN A STAGGERING PATTERN



LIGHTLY ROLL

Landscape Construction

Tree and shrub planting

Supply size of plants

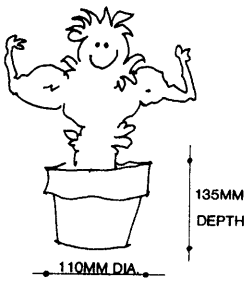
a. Shrubs, evergreen trees, ground covers and climbers should be well established, container grown specimens having a healthy top growth of satisfactory proportions to that expected of the species named.

   Mimimum container sizes should be 110mm diameter and 135mm deep.

b. Deciduous trees should have straight trunks to a height not less than 1.5m. Head and root growth should be strong and well formed without serious indication of root curl.

   Trees should be supplied as either open-rooted stock or container grown stock depending upon the time of year of planting. Any container grown deciduous trees should be supplied in Size 4 plastic bags or larger.

c. Plants must be supplied hardened off and in a condition suitable for planting in Canberra's climate.



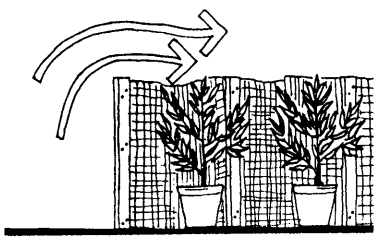
MINIMUM POT SIZE
FOR HEALTHY PLANTS

Plant storage

Minimise on site storage time for plants.

Store plants together in an area protected from strong prevailing winds and away from construction works. If necessary use a hessian fence to protect the plants from winds and dust.

Soak plants thoroughly once per day during storage, adjusting watering for rainfall.

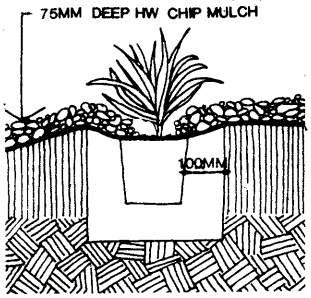


Excavating for plants

For spot planting prepare a hole that provides 100mm clearance to all sides of the rootball.

If the soil is dry fill the hole with water and allow it to drain away to break down water resistance of the soil.

For mass planting in mulched beds cultivate the sub grade over the full area to a depth of 300mm.



Planting

Carefully remove plants from containers. Rootballs should be sliced vertically with a sharp knife to sever circling roots. Place the plant into the hole so that the soil over the entire rootball will remain at natural ground level.

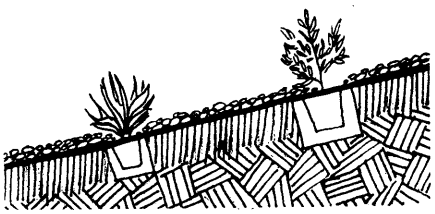
Backfill completely around the plant and tamp down around the rootball. Construct a basin around each plant to hold 20 litres of water.

Immediately water in the plants, even when raining, and make good any subsidence in the backfill.

Provide a surface application of multipurpose fertiliser after planting. For example, 70 grams of 'Multigro' per plant.

Planting on slopes

Prepare and plant as above, however orient the plant so that its stem is at 90° to the fall of the slope. The plant's stem will grow into an upright, vertical position.



Landscape Construction

LG A3.6

Tree and shrub planting

Staking

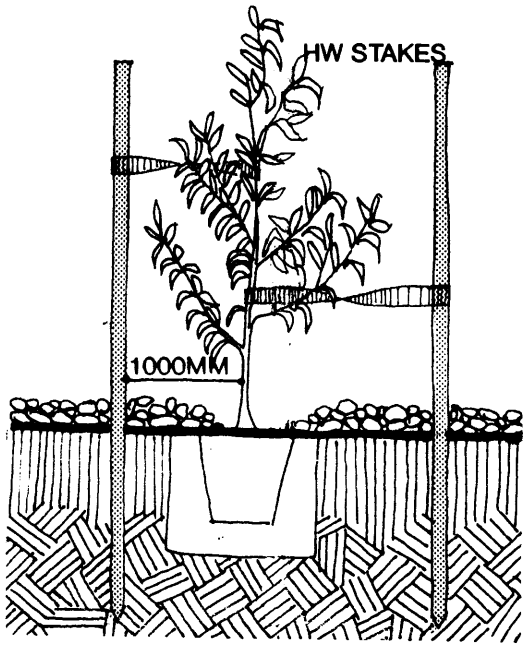
Evergreen trees in grass should have a single marker stake 25×25×1200mm with a white dipped top.

Drive the stake 600mm into the backfill, outside the rootball. Do not tie plants to these marker stakes.

For shrubs and trees in planting beds drive one stake 600mm into the backfill on the windward side of the plant.

Small deciduous tree (less than 2.5m high) should be tied to two stakes 50×50×1800mm and driven 600mm into the ground. Space ties about 300mm apart, bracing the tree against excessive movement in the wind.

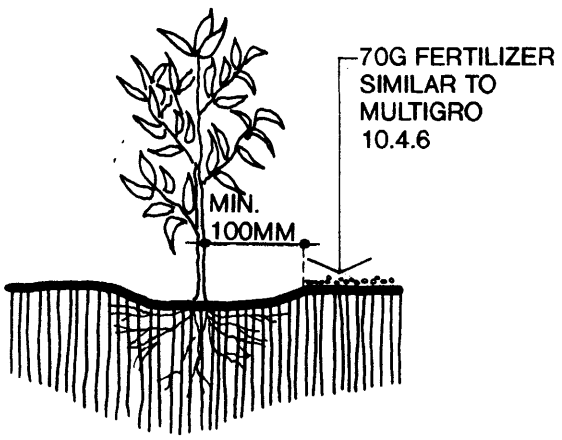
Ties should be broad flat webbing or double strands of 2.5mm wire run through 2 ply reinforced rubber hose.



Staking deciduous trees less than 2.5m high

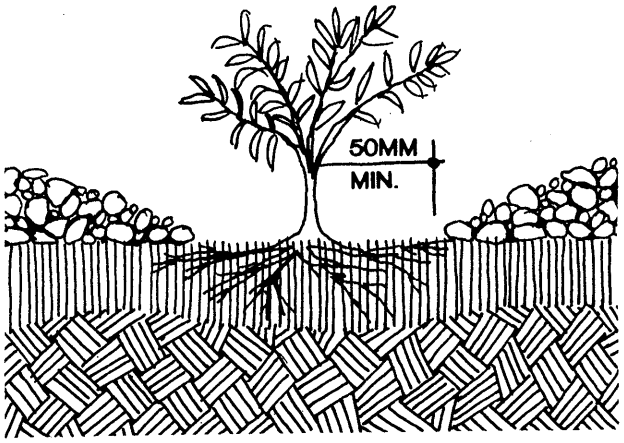
Fertilising

Following planting, fertiliser similar to 'Multigro' (10:4:6) should be added to the surface of the soil at the rate of 70g per plant. The fertiliser should be spread evenly around the plant no closer than 100mm to the trunk. The fertiliser must not be placed in the planting hole as this can burn the roots.



Mulching

Mulch will inhibit the growth of weeds in planted areas and retain soil moisture. It will also reduce scour and compaction by rain and surface runoff and reduce dust blow. Place mulch immediately after the sub grade has been cultivated, rocks and builders rubble removed and topsoil spread.

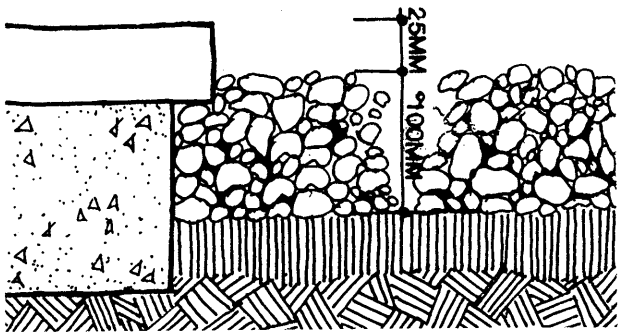


Organic mulch

Place the mulch to a settled depth of 75mm. Finish mulch 25mm below adjacent paving areas and clean mulch off paving.

Organic mulch can include Eucalyptus chip, pine bark, pine flake or pine chip, chopped shrub clippings and rotted leaf litter.

Do not place plastic sheeting beneath the mulch as this will inhibit plant growth.



Planting in mulched beds

Generally planting is done after mulch is spread. Clear mulch away from the planting and avoid including mulch in the backfill around the rootball of plants. Replace mulch around the plant but ensure that a 50mm clearance is retained around the stem of each plant to avoid collar rot.

Design considerations

The appearance of an outdoor area can be enhanced or spoilt by the edge treatment to the various materials used in the landscape.

Edges are required in order to:

- Contain non rigid pavements such as decomposed granite gravel, brick, concrete block or bitumen; and
- To separate and contain soft landscape elements such as lawn and mulched planting beds.

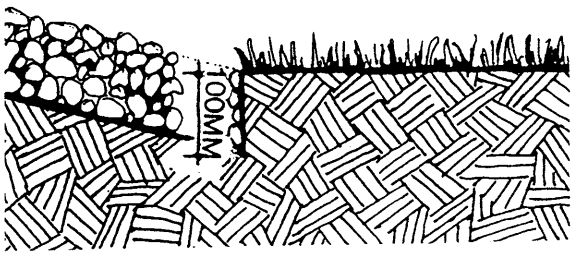
Where edging is required it should be planned as part of the total design so that the effect is harmonious.

For lawn and paving the edging must finish flush so that mowing obstacles and dangerous trip points are avoided.

The choice of edging material depends on its intended purpose, required appearance and durability. Some examples of suitable edging include:

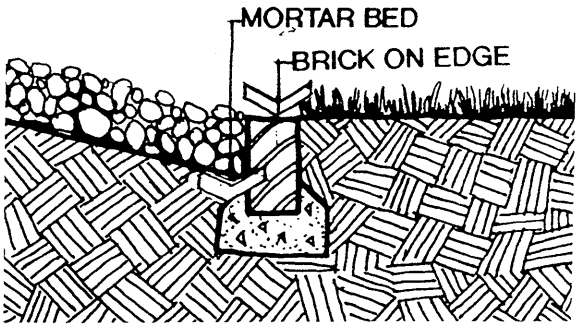
Spade edge

Used to separate lawn from planting beds but is only suitable for low wear, high maintenance gardens where hand-trimming and regular reconstruction of the edge is assured.



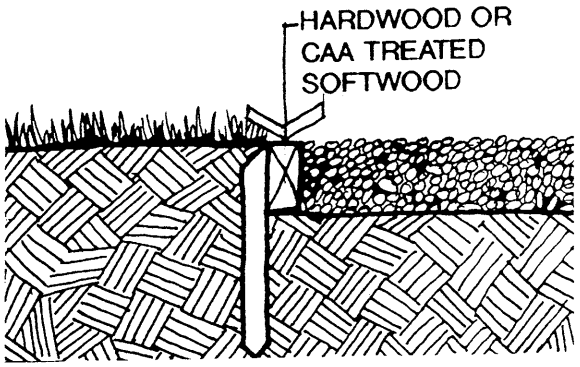
Brick edge

Brick, either on edge or on its flat face, forms an attractive edge, particularly for curving designs, or as a continuation of the hard paving material into the soft landscape.



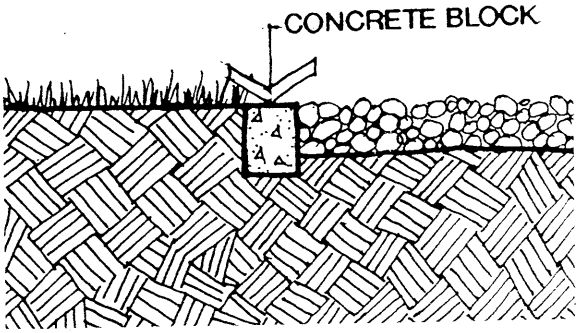
Timber/'syntal' edge

Suitable timbers are durability class 1 hardwood or CCA treated softwood. The minimum size should be 75×100mm, nailed to 50×50mm pegs at 600mm centres driven 450mm into the ground. 'Syntal' or similar recycled plastic rectangular sections also appear suitable for this application.



Concrete edge

Concrete is durable and easy to install but without proper thought can result in a harsh effect. Black oxide or other colouring may reduce the visual impact.



Landscape Construction

Sheet 1 of 2 | Landscape maintenance | LG A3.9

Essential maintenance

There is no such thing as a maintenance free garden and without adequate care much of the cost of establishing a landscape can be wasted. Even after acceptance of the landscape at the final inspection the developer shall remain responsible for landscape maintenance until such time as the Body Corporate or other management body have in place alternative arrangements.

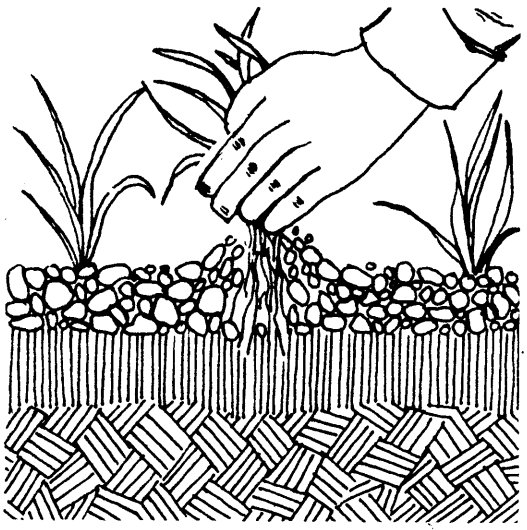
Planning maintenance

The typical range of maintenance tasks required over a 12 month period is summarised in the table below. Any information provided in the table must be assessed in the light of the weather and general site conditions. For example, watering frequency depends on the soil drainage and the rainfall; fertiliser type and frequency needs to be adjusted to suit the plant requirements and the soil fertility and pH.

MAINTENANCE TASK	FREQUENCY											
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
GRASS												
Mowing lawn		WEEKLY			AS REQUIRED					WEEKLY		
Slashing dryland grass										FORTNIGHTLY		
Watering lawn	TWICE WEEKLY					AS REQUIRED				TWICE WEEKLY		
Watering dryland grass			IF RESEEDING									
Fertilising lawn												
Fertilising dryland grass												
Weed control												
Topdressing												
Aerating				PRIOR TO RESEEDING								
Reseeding												
TREES AND SHRUBS												
Watering		WEEKLY				AS REQUIRED					WEEKLY	
Fertilising												
Pruning												
Mulching												
Weed control												
Thinning												
Insect and disease control												
SITE ELEMENTS												
Paving					MONTHLY INSPECTION							
Furniture					MONTHLY INSPECTION							
Play equipment					FORTNIGHTLY INSPECTION							
Fences and vehicle barriers					MONTHLY INSPECTION							
Lighting					FORTNIGHTLY INSPECTION							

Mulch

Mulch will need to be topped up periodically to maintain a minimum depth of 100mm. Mulch should be kept at least 50mm away from plant stems to reduce the risk of collar rot.



Weeds

Weeds in mulched beds will need to be controlled by hand pulling or by the use of non residual herbicides such as 'glyphosate'. When using herbicides be very careful to avoid spray drifting onto valuable plants. The smallest contact with the chemicals can cause damage.

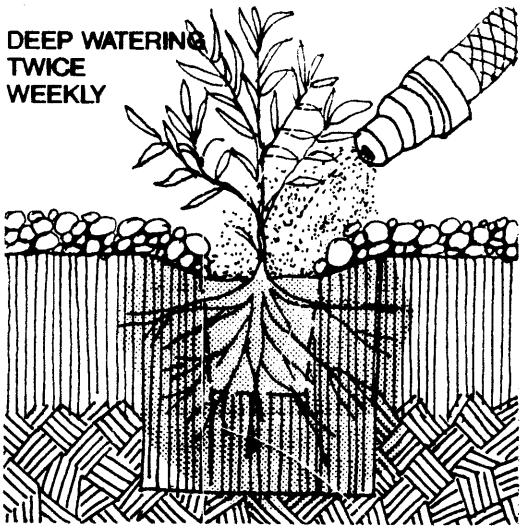
Plant maintenance

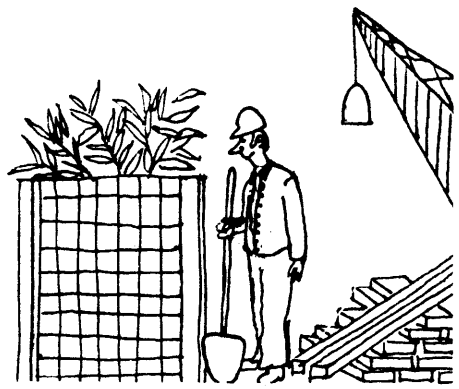
Deep watering once or twice a week is more beneficial to plants than frequent light watering. Frequent watering will produce shallow roots and make the plant less stable and susceptible to drought. Maintain moisture to the bottom of the rootball for the first 3 months.

To help safeguard plants remove labels immediately after planting.

Where plants are susceptible to damage by vehicles or pedestrians, maintain protective fences until plants are well established.

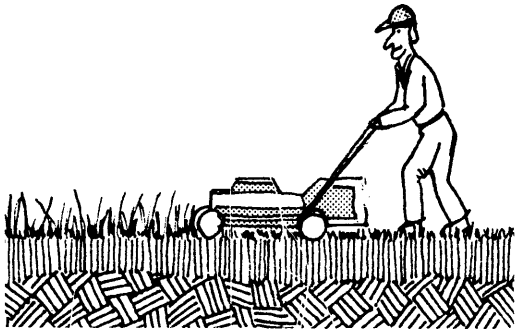
Replace dead plants fortnightly until such time as alternative maintenance procedures are in place.





Lawn maintenance

Once lawn has been established (refer to LG.A3.5) carry out watering and fertilising as suggested in the typical maintenance programme. In summer, thorough watering, two or three times each week will encourage roots to go deeper in search of water. Mow grass as required to maintain an even tidy appearance.



Landscape inspection procedures

Requirements

An approved landscape plan is a formal requirement for the issue of a Certificate of Compliance and checks are made against lease development conditions as well as the quality of the landscaping work itself. Because of these requirements, the Plan should indicate all works to be undertaken by the lessee/developer, including offsite areas.

It is recognised however that it may not always be appropriate to delay the issue of the Certificate of Compliance until such time as the landscape is properly consolidated. In some cases, a bond can be entered into by the lessee/developer should a Certificate of Compliance be issued prior to the satisfactory completion of landscaping works.

In order therefore to avoid delays in the issue of the Certificate of Compliance the lessee/developer may request a landscape inspection provided that the landscape works are physically completed, but not fully established. That is to say that the lawn areas are properly prepared and seeded, but not necessarily germinated. However, paving, fencing, edges, planting, mulching and other landscape construction is all to be completed.

If a bond is set the developer remains responsible for the ongoing maintenance of the whole of the landscape works until such time as the final landscape inspection. In the case of staged unit developments, the developer should remain responsible for the common property until ACT Landscape is satisfied that all works are complete. The basic horticultural needs of the new landscape, such as weeding, watering, fertilising, mowing and replacing dead plants must be carried out on a regular basis as described in the landscape maintenance schedule in LGA3.9.

Inspection Procedure

A landscape inspection should not be arranged unless the landscape works are physically complete. However, pre-construction inspections may be required, for example, to check if tree protection measures have been carried out.

Inspections both final and interim are carried out against the comprehensive checklist described in LGA3.11.

A copy of the inspection report is referred to the Lease Administration Branch who may require the lessee/developer to rectify any defects and maintain the landscape until permanent maintenance arrangements are in place.

Inspections are administered by ACT Landscape on behalf of the Lease Administration Branch of the Department of the Environment, Land and Planning. Any requests for inspections or queries about the inspection report should be directed through the Lease Administration Branch.

Landscape Construction

Sheet 1 of 2 | Final landscape inspection checklist | LG A3.11

BLOCK	SECTION	DIVISION	DATE	VISIT NO.

Considerations	Compliance			Value
	N/A	Yes	No	
Site Design				
1. Are landscape works set out in accordance with the approved plan?				
2. Do the materials used correspond with those specified?				
3. Have covenants to retain trees been observed?				
4. Are landscape areas drained to avoid nuisance to residents and provide adequate drainage for plant survival?				
5. Are earthworks finished at original grade at, or within the property boundary?				
6. Have areas outside of the property boundary been cleared of builders rubbish and reinstated to a mowable condition?				
7. Are overland drains on adjoining public land free of recent disturbance and adequately stabilised?				
8. Have off site works been inspected by City Parks?				
9. Is existing vegetation on adjoining land undamaged?				
10. Are existing footpaths, driveways or gutters on adjoining land undamaged?				
Planting				
11. Are mulched planting beds free of rocks, builders rubble and other rubbish and is topsoil provided to a depth of 300mm?				
12. Do mulched beds have a minimum depth of 75mm of mulch?				
13. Are plant species in accordance with the approved plan?				
14. Are tree and shrub species of appropriate size and in such locations as to avoid:				
- Growing into powerlines?				
- Obstructing pedestrian and vehicle flow along paths and roads?				
- Obstructing sight lines at driveways?				
15. Are plants nursery grown and are they in a healthy and vigorous condition?				
16. Are street trees planted in the proper verge reservation as described in GEEP Hydraulics and do the species correspond with the ACT Landscape master plan?				
17. Is mulch adequately retained and at appropriate grades so as not to spill over hard paved areas?				

Landscape Construction

Sheet 2 of 2 | Final landscape inspection checklist | LG A3.11

Considerations	Compliance			Value
	N/A	Yes	No	
18. Are large trees adequately staked?				
19. Has topsoil been placed to the depth shown on the approved plan or as described in the guidelines?				
Grassing				
20. Is topsoil for grassing light and friable, and free of clay material, rocks and rubbish larger than 20mm in any direction?				
21. Is topsoil provided to a minimum depth of 100mm?				
22. Has a dense sward of grass been established?				
23. Has grass been mown and is there a uniform and free draining surface?				
24. Are steeply sloping and difficult to maintain grassed areas avoided?				
Miscellaneous				
25. Is edging well secured and finished flush with lawn and paving?				
26. With regard to stormwater runoff and surface slope, is decomposed granite gravel stable?				

Other Comments

Landscape acceptable Yes No Estimated value of outstanding work $

Inspected by: Date