Fire protection

See figures 14,15,16

Where buildings are constructed on sloping land facing the bushland, they should be built-in cut benches rather than elevated or above fill.

Non combustible materials such as concrete, pavers etc. should be used for floors and outdoor terraces.

Garages

Garages are not to dominate the streetscape, hence they should be located behind the building line or their openings well recessed (minimum 30cm). Alternatively, avoid garage doors facing the street.

Landscaping for Shade and Cooling

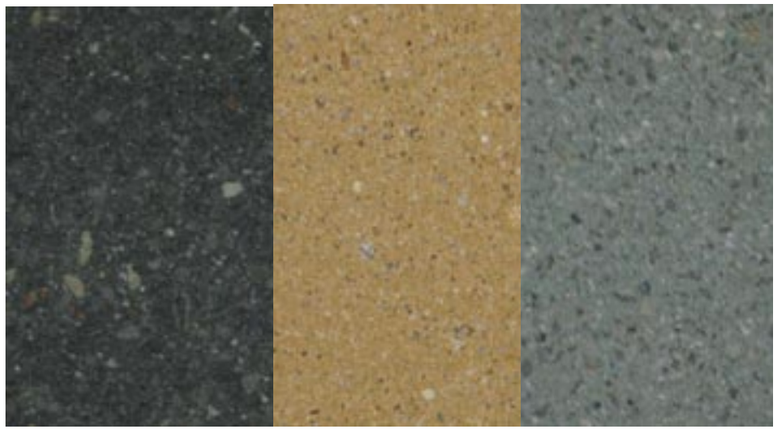
While solar access is important, consideration should be given to planting to the west of the building to provide cooling during summer months.

Fencing

Fences should be built out of non-combustible materials and fences with an open character are encouraged for lots along the perimeter of the bushland to create visually a stronger integration between built form and the bushland.

Materials & Finishes

Examples of appropriate materials, textures and colors for use on paving, walls and fencing are shown below.



Palette of materials and colours illustrated to compliment the character of the setting.

Sympathetic design in a Bushland Setting.

3.03 Bush Fire Management

The main constraint to the development of the site is bushfire risk. The requirements of bushfire management work against the principles and ideologies of “living in the bush.” This Draft Subdivision Concept Plan respects the need for bush fire management and integrates the requirements in a sympathetic way that responds to the site constraints as well as opportunities.

A preliminary meeting with NSW Rural Bush Fire Service was held in 2003. The site’s high bushfire risk was noted and necessary controls discussed. The Draft Subdivision Concept Plan complies complies with the then adopted standards (these have been recently reviewed and requirements now are generally less stringent) and provides for a four metre wide multi purpose fire trail/recreational trail around all areas of risk (properties directly facing the bushland). Otherwise loop roads provide for this function.

The APZs are nominated on Figure 8. Key elements include:

Development of a multi-purpose fire trail/recreational track within a zone of possible Community Title Open space.

This zone varies in width from 6 metres to 35 metres wide and accommodates the fire trail, adjacent low fire risk landscaping and the rear buffers to the developments. The goal is to create an area that is sympathetic to the adjacent bushland setting and to create a multi-purpose trail that also offers recreational cycling/walking routes. It is also the intent to retain some of the existing trees in this area, and to manage leaf litter etc. as required (see figure 9).

To successfully manage this zone, it is proposed as Community Title. Close collaboration with NSW Rural Fire Service and Eurobodalla Council will be essential.

Consequently Asset Protection Zones (APZs) will be required between the development and the bushland areas. The Asset Protection Areas are determined by the type of vegetation and the steepness of the slopes surrounding the residences.

The cluster of residences towards the western side of the site will have no Asset Protection Zones as the adjacent land to the west will be developed.

Fire Egress

Two main exists/entrances connected by an internal road (bus route) have been provided for the site. A series of cul-de-sacs with a length under 200 metres comply with the egress regulations. Local streets in the form of loop roads provide for a safe exit for the remainder of the development.

A maintenance/fire trail is proposed for those properties directly facing the bushland to provide sufficient egress during a fire.

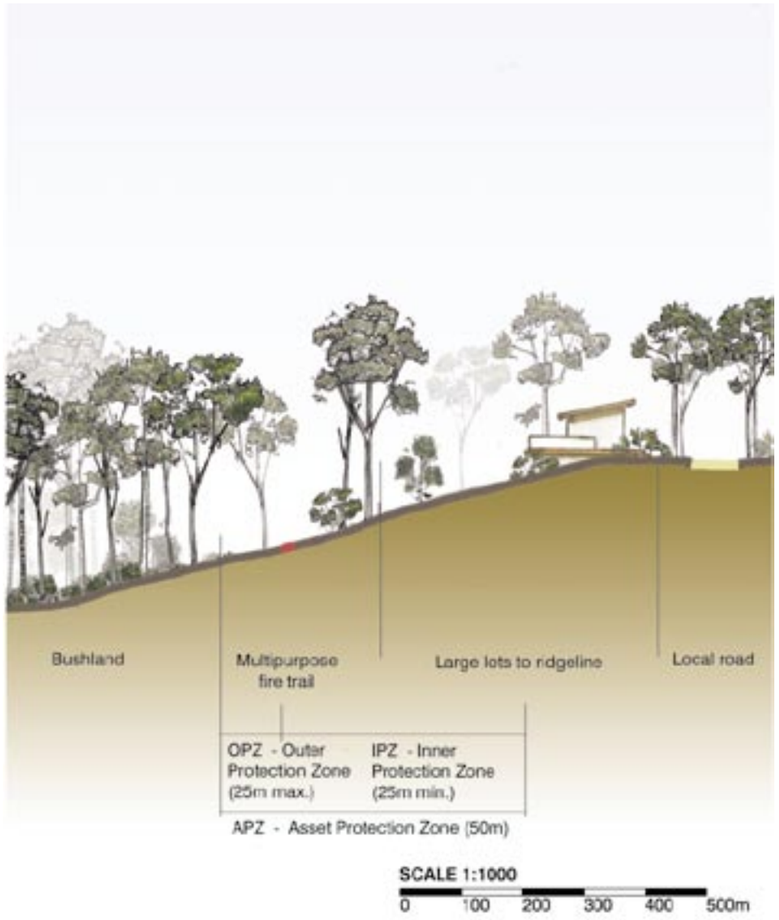


Figure 8: Principle Asset Protection Zone

LEGEND

BUILDING SETBACKS

- Building footprint (excluding side setbacks)
- 5.5 m setback
- 10m setback
- Property lots
- Open space
- Road

BUSHFIRE MANAGEMENT

- 40m APZ (Asset Protection Zone) setbacks
- APZ (Asset Protection Zone) beyond property line
- 20m APZ (Asset Protection Zone) for rural lots
- Multi-purpose fire / recreational trail

- Section lines
- Property boundary

SCALE 1:5000
0 50 100 150 200m

Figure 9: Bushfire Management

3.04 Landscape Design Principles And Objectives

Design a robust landscape scheme that reflects the surrounding bushland landscape and complies with necessary bush fire management.

The proposed Community Title Open space buffer has been designed to maximize retention of maintained bushland to the perimeter(ranging from 8-20 metres wide).

Maximise views from development areas to bushland setting

Blocks have been arranged to maximise the presence of the bushland setting.

Maximise retention of existing trees and vegetation

Once survey is received of major trees in the vicinity of building areas and all hollow trees of value have been surveyed, the road and block design will be amended to maximise retention of trees.

The goal will be to protect existing trees within road corridors and design around them where possible rather than designing a completely new planting scheme.

Promote biological diversity

The planting design will reinforce the natural plant ecologies and associations within the site.

Reinforce ecological patterns

The landscape design will reinforce the ecological vegetation associations of the area and create a sustainable, low water demand landscape.

Key elements include reinforcing natural associations where possible within the open space system and incorporating wetland filter planting around water quality control ponds .

Design for safety, sight lines, and headlight glare

The planting design will take into consideration views along the road, the need for headlight glare reduction at ends of roads, and sight line requirements.

Reflect environmental sustainability principles

The Landscape design integrates ecological principles into the design in the following areas:

- Planting design: the scheme reflects ecological diversity
- Sensitive water design
- Integrated wildlife corridors and wildlife management
- Sustainable soil management through salvaging specific areas and reusing all site soil in specific areas.
- Alternative weed management procedures.
- Retention of hollow trees where possible

Create Meeting Places

Designing open spaces that relate well to the built form elements and are conducive to social mixing. Most open spaces relate either directly to bushland areas or new built form spaces, or serve a multi purpose drainage function along the valleys.

Minimise earthworks

The road design and block layout aims to reduce impacts of cuts and fills on the landscape.

Design cohesive open space system that integrates with the drainage design

The integrated open space system provides a strong backdrop to the developed areas, and integrates necessary drainage elements- swales, water quality control ponds,detention areas etc

Key Elements

Sensitive Water Design

See figure 10

Key design elements incorporated in the design include:

- use of vegetated and rock mulched swales for storm water rather than pipes, to infiltrates and slow down stormwater flows;
- use of infiltration areas to clean storm water and reduce velocities;
- integrated water quality control ponds to suit hydraulic and site conditions to improve water quality and reduce velocities of storm water. Wetland filter areas will be provided to each pond, and the design will be suited to wet or dry conditions;
- minimal use of piped drainage and maximum use of above-ground drainage principles; and
- use of permeable pavements to promote infiltration and water cleaning.

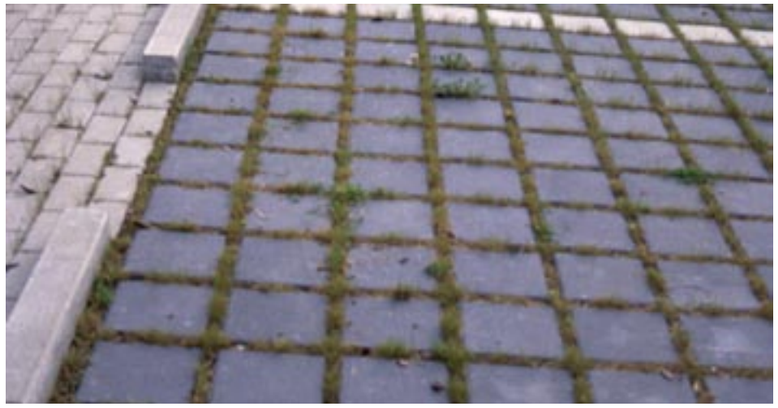
Rock Mulched Swale

Detention Area

Wetland Filter Planting Beside Pond

Wetland Filters Around Pond

Integrating Water Quality With Design

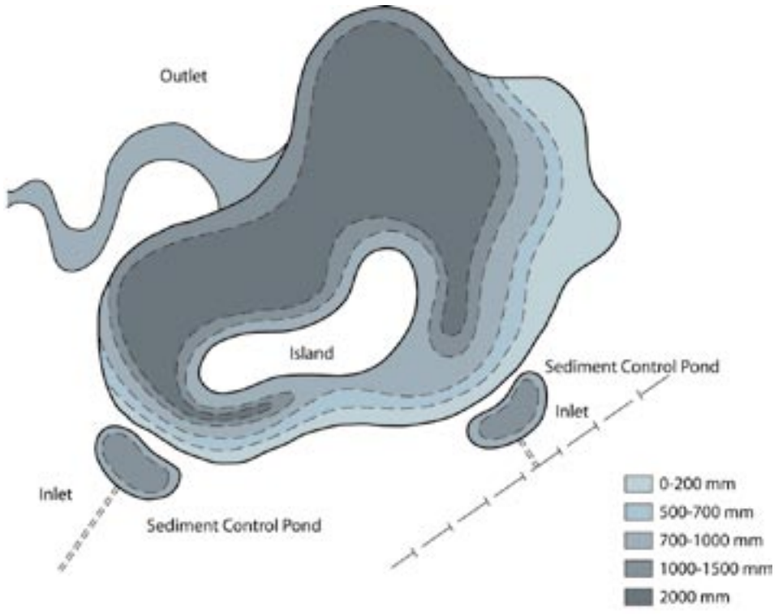


Permeable Pavement

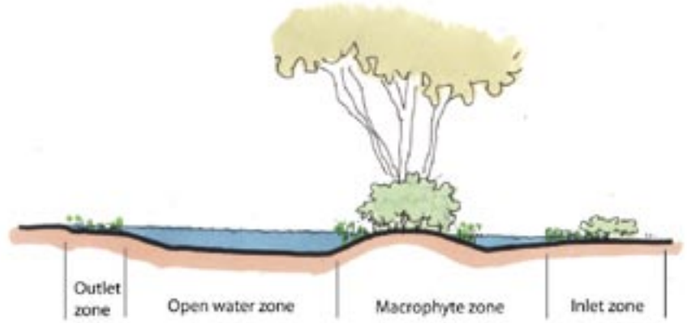
Water Quality Ponds

The images below show typical designs for ponds that have varying water depths to provide ideal fish and water plant habitats, and organic shapes to integrate with the adjoining topography. These principles will be applied to the design of the water quality control ponds.

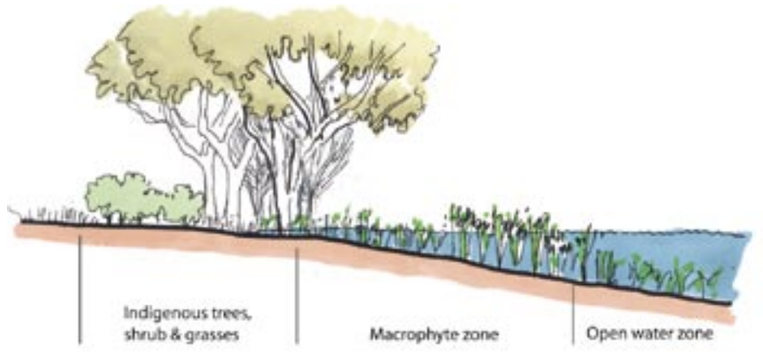
Proposed water quality control ponds will provide essential water supply that can be used in time of fire. There will not be reticulated water supply as the emphasis is on sustainable development; hence all dwellings will have water tanks provided.



Principles for Water Quality Control Pond Plan with varying water depths.



WATER EDGE SECTION WITH GRADATON OF WATER LEVELS AND SLOPES



ISLANDS PROVIDE HABITAT REFUGE

Principles for Water Quality Control Ponds :creation of varying water depths, slopes and wetland habitat.

LEGEND

DRAINAGE

- Existing creek
- Existing tributary
- 5 Year floodlevel
- 100 Year floodlevel
- Drainage covenant
- Water quality ponds
- Vegetated swale

OPEN SPACE

- Open space
- Possible community title open space (multi purpose trail within APZ)
- Road with road reserve
- Property boundary

SCALE 1:5000

0 50 100 150 200m

Figure 10 : Integrated Open Space and Drainage Network

Significant Trees & Reserve Buffers

See figures 5 and 10.

Significant trees for habitat, hollow trunks etc. are shown as an overlay. A more detailed description is within the PMA Consulting Report. Care will be taken to maximise retention of hollow trees within the subdivision, and road alignments will be amended to suit final survey results. The aim will be to create a character of gently winding roads within the overall road corridor to maximise tree retention.

Figure 11 illustrates the desirable minimum reserve buffers along the drainage lines.

Impact of clearing with solar access to existing vegetation in the creek/drainage lines requires careful consideration.

Drainage buffer should be more generous to the north side to reduce adverse impact due to sun exposure on existing vegetation. It is noted that in this preliminary assessment more generous drainage buffers of 30 metres in width are recommended compared to the category 2, 20 metre wide zones identified in the Eurobodalla Trategic Planning policies - Settlement Strategy - Sensitive Urban Lands Rosedale.

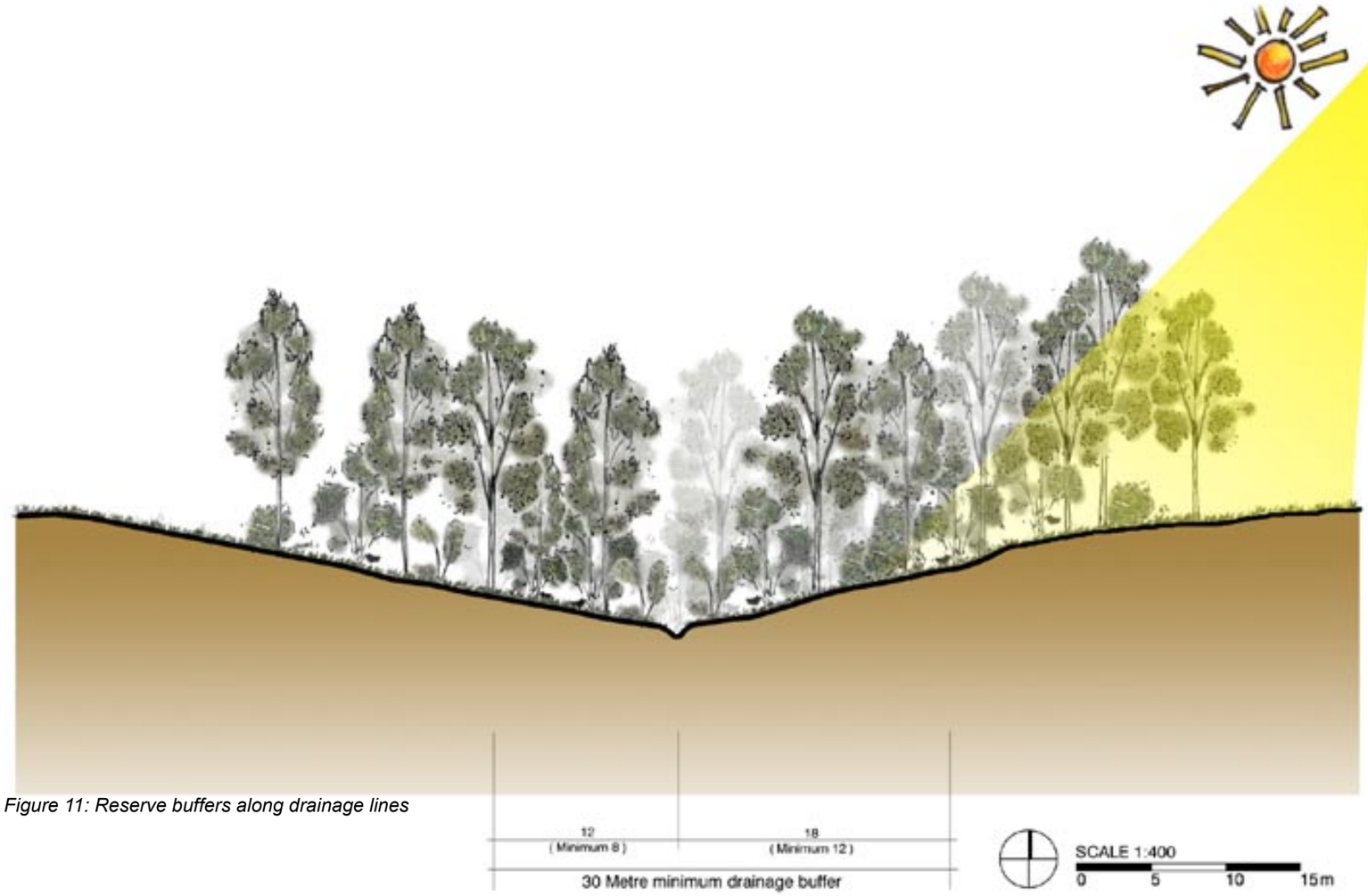


Figure 11: Reserve buffers along drainage lines

Flammability of Plant Material

n areas close to buildings, care will have to be taken to select low flammable species. At the development stage a more detailed list would be compiled for certain areas.

No plant is completely fire resistant and given the right conditions all plants will burn, but some plants are more flammable than others. Around the housing areas, there is a need to avoid planting species that accumulate large amounts of dead branches, needles, leaves or bark. It is for this reason that some Australian plants and conifers are unsuitable in firewise gardens.

Plants that are resistant to fire have:
Leaves broad, fleshy, low oil or resin content, salt in their foliage
Bark smooth
Growth Habit compact, dense foliage

Planting Design Principles

The planting design should reflect a modified version of the natural vegetation communities as shown in figure 9. The approach to planting design needs to balance the bushfire requirements, with the desire to maintain and reflect as much as possible the natural bush setting. Key vegetation groups will include:

- Spotted Gum – Ironbark Forest: along moist drainage lines and less exposed areas *Eucalyptus maculata,Eucalyptus paniculata, Eucalyptus pilularis* with understorey of *Macrozamia communis/Eucalyptus reticulatus* and *Pittosporum undulatum*. In drier areas, the understorey should be more open.

- Spotted Gum – Burrawang Forest: along ridgelines and higher slopes. *Eucalyptus maculata/Eucalyptus paniculata* as the most dominant trees with understorey of *Macrozamia communis and Eucalyptus globoidea/ Allocasuarina littoralis and Daviesia ulicifolia* and *Themeda australis*.

- Swamp Oak/Swamp Paperbark forest: *Melaleuca ericifolia/Casuarina glauca/Leptospermum polygalifolium* – to reinforce the eastern portion of Salt Water Creek where conditions are slightly saline. Planting on low lying areas with dominant species changing from west to east as moisture increases in the following order: *Leptospermum polygalifolium/Melaleuca ericifolia/Casuarina glauca.*

- Spotted Gum/Southern Mahogany Forest : to reinforce the western portion of Salt Water Creek and steep, south facing slopes in the vicinity: *Acmena smithii/Synoum glandulosum/Eupomatia laurina/Doryphora sassafras*.

- Areas around buildings:planting mixes should reflect fire retardant species as well as some appropriate indigenous species.e.g.*Banksia spinulosa,Grevillea species, Lomandra and Dianella species,Macrozamia, Callistemon and Melaleuca species.*

Plant species appropriate for landscape revegetation include:

Trees
Allocasuarina littoralis Black She Oak
Backhousia myrtifolia Ironwood
Casuarina glauca Swamp Oak
Corymbia maculata Spotted Gum
Elaeocarpus reticulatus Blueberry Ash
Eucalyptus botryoides Southern Mahogany
Eucalyptus fibrosa subsp. fibrosa Broad-leaved Ironbark
Eucalyptus globoidea White Stringybark
Eucalyptus muelleriana Yellow Stringybark
Eucalyptus paniculata Grey Ironbark
Eucalyptus pilularis Blackbutt
Eucalytpus saligna x botryoides Blue Gum
Eucalyptus scias Large Fruited Red Mahogany
Eucalyptus tereticornis Forest Red Gum
Exocarpus cupressiformis Cherry Ballart
Livistona australis Cabbage Tree Palm
Rapanea howittiana Brush Muttonwood

Shrubs
Acacia implexa Hickory Wattle
Acacia irrorata Green Wattle
Acacia longifolia Golden Wattle
Acacia longissima White Swallow WattleFamily Scientific Name Common Name
Acacia mearnsii Black Wattle
Acacia stricta Hop Wattle
Acacia terminalis Sunshine Wattle
Acmena smithii Lilly Pilly
Bidens pilosa Cobblers peg
Billarderia scandens Appleberry
Breynia oblongifolia Breynia
Bursaria spinosa Blackthorn
Cassine australis Red Fruited Olive Plum
Cassinia longifolia Cassinia
Cassinia trinerva Three Veined Cassinia
Commersonia fraseri Brush Kurrajong
Daviesia ulicifolia Gorse Bitter Pea
Exocarpus strictus Dwarf Currant
Ficus coronata Sandpaper Fig
Goodenia ovata Hop Goodenia
Hibbertia aspera Rough Guinea Flower
Hibbertia diffusa -
Hibbertia scandens Golden Guinea Flower
Indigofera australis Austral Indigo
Leptospermum polygalifolium Lemon-scented Teatree
Leucopogon juniperinus Juniper Beard Heath
Leucopogon lanceolatus Lance Beard Heath
Macrozamia communis Burrawang
Melaleuca ericifolia Swamp Paperbark
Persoonia linearis Narrow leaved Geebung
Pimela linifolia Rice Flower
Pittosporum revolutum Yellow Pittosporum
Pittosporum undulatum Sweet Pittosporum
Pomaderris discolor -
Pomaderris ferruginea Rusty Pomaderris
Pultenaea hispidula -
Pultenaea linophylla -
Seringia arborescens Seringia
Solanum aviculare Kangaroo Apple
Zieria smithii Sand Fly Zieria

Ferns,Wildflowers,
Adiantum aethiopicum Maidenhair Fern
Blechnum cartelagenium Gristle Fern
Calochlaena dubia False Bracken
Cyathea australis Rough Tree Fern
Doodia aspera Rasp Fern
Helichrysum leucopsideum Satin Everlasting
Lastreopsis sp Shield Fern
Ozothamnus diosmifolium Everlasting
Ozothamnus ferrugineus Everlasting
Pellaea falcata Sickle Fern
Pteridium esculentum Bracken

Climbers & Groundcovers
Cissus hypoglauca Water Vine
Clematis aristata Clematis
Glycine clandestina Twining Glycine
Glycine microphylla Twining Glycine
Hardenbergia violacea False Sarsparilla
Hibbertia dentata Twining Guinea Flower
Kennedia rubicunda Dusky Coral Pea
Marsdenia rostrata Common Milk Vine
Pandorea pandorana Wonga Wonga Vine
Parsonsia straminea Common Silkpod
Ranunculus sp Buttercups
Viola hederacea Ivy Leaf Violet

Grasses
Danthonia sp. Wallaby Grass
Dianella caerulea Paroo Lilly
Dianella longifolia Flax Lilly
Dichondra repens Kidney weed
Imperata cylindrica Bladey Grass
Lomandra longifolia Spiny Headed Mat Rush
Lomandra multiflora Many Flowered Mat Rush
Microleana stipoides Weeping Rice Grass
Pratia purpurascens White Root
Themeda australis Kangaroo Grass

Sedges
Carex sp. Sedge
Gahnia filum Chaffy Saw Sedge
Gahnia melanocarpa Black Fruit Saw Sedge
Gahnia sieberiana Red Fruit Saw Sedge
Geranium homeanum
Geranium solanderi Australian Cranesbil
Juncus sp. Rush
Lepidosperma filiforme Rapier Sedge
Lepidosperma laterale Sword Sedge
Oxylobium ilicifolium Native Holly
Plants to avoid (more likely to burn) have:
Leaves fine, hard, high oil or resin content
Bark sheds and hangs in ribbons or highly fissured
Growth Habit an open airy crown

Many plants are able to live through the intense heat and wind of fires and will recover after fire. Soil moisture is required for recovery ; many Australian plants are adapted to fire and are both flammable and will recover after fire, re-shooting even if they look ‘dead.’