

REDFERN PARK

Tree Management Plan

Final - Adopted 23 October 2006



EXECUTIVE SUMMARY

The Redfern Park Tree Management Plan (TMP) was prepared as part of a suite of Tree Management Plans for the City of Sydney's parks. The TMP forms part of the Redfern Park Plan of Management and informs the Masterplan.

A major focus of the TMP is to implement a program of tree removal and replacements that will reinforce the strategies recommended in the 2006 Masterplan.

The Tree Management Plan includes a survey of all of the existing trees within the Park (124 trees) and contains relevant heritage, environmental and arboricultural data relating to individual trees as well as distinct groups of trees such as the street tree planting around Redfern Oval.

A Safe Useful Life Expectancy (SULE) analysis of the tree population was prepared. From this assessment the following removal and replacement strategies were recommended:

- Staged removal and replacement of the boundary planting of Fig trees surrounding Redfern Park, over the next twenty years;
- Twenty seven (27) trees to be removed within the Park over the next five (5) years;
- Eleven (11) of these trees to be removed from within the Park during the Redfern Oval upgrade;
- Paperbarks in Elizabeth Street to be retained until a row of advanced Fig trees are planted within the boundary of Redfern Oval;
- Removal of the street trees in Chalmers Street during the Redfern Oval upgrade; and
- Removal of selected trees on Phillip Street during the Redfern Oval upgrade;

The Tree Management Plan recommends a series of improved techniques to ensure best practice tree monitoring and arboricultural maintenance.

Comprehensive management and maintenance requirements are to be incorporated into the Parks and Open Space contract specifications and include details relating to:

- Electronic databases;
- Disease monitoring;
- Pruning programmes;
- Soil improvements; and
- Nurturing of young trees

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I INTRODUCTION

The Redfern Park Tree Management Plan was prepared by the City of Sydney as part of a suite of Tree Management Plans for Sydney City's parks. The Tree Management Plan forms part of the Redfern Park Plan of Management and informs the Masterplan which provides key design directions for the upgrade of Redfern Park.

I.1 Purpose of the Redfern Park Tree Management Plan

The purpose of the Redfern Park Tree Management Plan is to develop proactive strategies for the effective management, maintenance and conservation of the Park's tree population and to determine any special requirements of the trees to be considered as part of the redevelopment and new Masterplan.

The aims are to:

- describe the special qualities of the Park's trees, their significance and the landscape character that they create;
- assess the health and condition of all existing trees;
- provide strategies for the long term removal/replacement of all of the Park's trees;
- to develop a consistent proactive management approach for the existing tree population; and
- to develop community awareness and acceptance of tree management issues including tree removal and replacement strategies and disease management.

I.2 Scope of the Plan

The Redfern Park Tree Management Plan (TMP) focuses on the trees in Redfern Park and Redfern Oval. It includes a survey of all of the existing trees and contains relevant heritage, environmental and arboricultural data relating to individual trees as well as distinct groups of trees such as the street tree planting.

I.3 Project Background

The City of Sydney recognises the significance of the trees within its parks as a part of the City's commitment to tree management. The preparation of Tree Management Plans for key parks, including Redfern Park, is a key priority for the City.

2 METHODOLOGY

2.1 Study Process

Preparation of the Redfern Park Tree Management Plan involved the mapping of the existing tree population within the Park and the surrounding streets and comprehensive studies of the issues that affect these trees.

Council's Tree Management Team conducted visual assessments from the ground, of each and every tree. The results of this assessment were recorded and tabulated into a Tree Assessment Schedule (Attachment 1). Field notes, observations and photographs were recorded during the assessment period and a Safe Useful Life Expectancy (SULE) analysis of the tree population was prepared. The assessment was compared to a previous tree survey conducted by an independent arborist in 1994, to assess the rate of change of the mature trees.

A soil study of Redfern Park conducted in November 1993 by the NSW Department of Agriculture together with a soil analysis report conducted by Sydney Environmental Soil Laboratory in 2006 were considered as part of the study process to determine how the soil conditions relate to the growth and longevity of the existing trees and to provide strategies for future planting.

A design analysis of the Park identified significant vistas and planting patterns and the general landscape character of the Park.

An historical perspective on past plantings in relation to viewing corridors and vistas was considered. Significant trees were identified individually and in group plantings.

The current arboriculture practices and tree management methods used by the City's Parks and Open Space Service Providers were assessed to identify any opportunities to improve the existing techniques.

Specific tree issues, such as inappropriate tree plantings, hazardous trees, poor performance and over-mature trees were documented and recommendations provided for remedial treatments and tree replacement strategies.

3 THE PARK

3.1 Site Description

Redfern Park occupies an area of approx 4.5 hectares of land in Redfern, extending from Redfern Street in the north to Phillip Street in the south, between Elizabeth and Chalmers Streets. A dividing fence separates Redfern Park in the north from Redfern Oval in the south.



Figure 1 Site Plan

3.2 History

Redfern Park is over one hundred years old. An historical analysis prepared by Wendy Thorp in 1994 as part of the Redfern Park Plan of Management¹ indicated that the Park was designed and constructed during the 1880s as a typical Victorian pleasure ground that included ornamental gardens, cricket wickets, a bowling green and a bandstand. The park is a Crown Reserve and was dedicated for the purpose of public recreation in 1885.

3.3 Cultural Significance

Redfern Park has considerable cultural significance and aesthetic value and is representative of the Victorian era of landscape styles. As the manager of Redfern Park, it is Council's responsibility to ensure that the historic integrity and cultural significance of Redfern Park is retained.

3.4 Design Analysis

Redfern Park is one of Sydney's premier parks and is representative of a formal urban landscape.

The mature Figs (*Ficus* sp.) surrounding Redfern Park create a visually dominant design element and the central avenue of Date Palms (*Phoenix canariensis*) remains an historically significant vista. However the *ad hoc* planting of specimen trees in recent years has compromised the formality of the original design. The placement and species selection of the trees within the Park does not appear to have been guided by any well conceived design concept.

A major focus of the Tree Management Plan is to implement a program of tree removal and replacements that will reinforce the design strategies recommended in the 2006 Redfern Park Masterplan.

¹ Redfern Park Plan of Management - prepared by Clouston Associates, 1996.



Figure 2 2006 Redfern Park Masterplan

4 SOIL ASSESSMENTS

4.1 1993 Soil Study

In November 1993 Council of the City of South Sydney engaged the services of Mr Roy Lawrie, a soil chemist from the NSW Department of Agriculture, to analyse the soil conditions in Redfern Park and Redfern Oval and report on the constraints and opportunities in relation to the growth and longevity of the tree population.

The 1993 report indicated that Redfern Park was once a large swamp that had been subjected to considerable in-filling. The original soil profile was buried at least 1.5 metres below the surface with the thickest fill located beneath the spectator area of Redfern Oval.

Preliminary testing of the nutrient levels in the topsoil showed satisfactory conditions for plant growth, with limited compaction and satisfactory profile drainage. The surface soils were well supplied with phosphorous and potassium. Levels of organic matter (and hence nitrogen) were low, but adequate for the existing vegetation. The pH was low but not enough to affect plant growth.

4.2 2006 Testing and Analysis

As part of the tree management strategy, a chemical and physical analysis of the soil within the root zones of the established trees was undertaken by Sydney Environmental and Soil Laboratory in June 2006.

The 2006 soil report indicates that the topsoil was found to have a generally good physical structure and acceptable permeability with some evidence of hydrophobic condition in lawn areas.

Recommendations for specific treatments to rectify minor deficiencies have been included in SESL's Soil Report.

5 THE TREES

5.1 Tree Survey

In order to gain a clear picture of the condition of the trees in Redfern Park, an inventory was prepared (Attachment 1: Tree Assessment Schedule). All of the trees were inspected and their locations, tree number and species documented on a Tree Location Plan (Appendix 2) and Tree Location Schedule (Appendix 3).

Graphic representations were prepared, indicating the projected Safe Useful Life Expectancy of each tree (Figure 3: SULE Analysis)

5.2 Analysis of Results

The data collected for the Redfern Park Tree Management Plan provides a valuable tool to analyse the numbers, distribution, age and the overall health and condition of the current tree population in Redfern Park (Attachment 1: Tree Assessment Survey).

The inventory indicates that there is currently a total of one hundred and twenty four trees (124) trees, over three (3) metres tall, located in Redfern Park. The total includes 26 different species.

Another five (5) species are located in the adjacent streets with ten (10) street trees in Chalmers Street, six (6) street trees located in Phillip Street and twelve (12) Paperbarks located in Elizabeth Street.

The findings indicate that Canary Island Date Palms and Deciduous Figs, planted circa 1900, are by far the two dominant species in the Park accounting for 26.6% and 17.7% respectively.

5.3 SULE Analysis

SULE is an acronym for Safe Useful Life Expectancy (Appendix 6: Sule categories). It is a system that was developed by Jeremy Barrell³ in 1996, to assess tree life expectancy and how long trees can be expected to be retained safely and usefully near people.

In all situations safety has to be considered the absolute priority. Important secondary objectives are reasonable management costs and sustaining amenity. The priority when managing trees with a high hazard potential should be to reduce the risk to an acceptable level. This can be achieved by removing the tree, removing the targets or treating the tree.

A major role of trees in an urban environment is to provide visual amenity. Healthy trees have the potential to provide visual amenity in the future in a way that does not lead to injury/damage to people or property. Trees become less useful as maintenance costs become excessive and they begin to have a negative effect on amenity by interfering with better trees or inhibiting the establishment of new trees.

Mature and over-mature trees, particularly in stressful urban settings such as Redfern Park, have greatly reduced recuperative powers compared with younger trees. The SULE categories were estimated for each and every tree in Redfern Park (Figure 3).

Three (3) trees were assessed as having a Long SULE (ie. appeared retainable for more than 40 years). This represents 2.5% of the total population .

Eighty six (86) trees assessed as having a Medium SULE (ie. appeared retainable for up to 40 years). This represents 69% of the total population.

³ Jeremy Barrell is a consulting arborist from Hampshire in the United Kingdom. He developed the concept of SULE as a method of systematically assessing trees on proposed development sites. In essence trees with the longest SULE would be the ones most worthy of retention.

Eight (8) trees were assessed as having a Short SULE (ie. appeared retainable for up to 15 years). This represents 6.5% of the total population.

Twenty seven (27) trees were assessed as being due for removal within the next five (5) years. This represents 22% of the total population.

The SULE results indicate that **97.5% of the total tree population in Redfern Park will require removal/replacement within the next 40 years.** The various issues relating to extensive tree removals (eg. the public's sense of ownership of the park) will become critical with each passing decade.

The SULE categories for each of the trees in Redfern Park are included in the Tree Schedule (Attachment I).

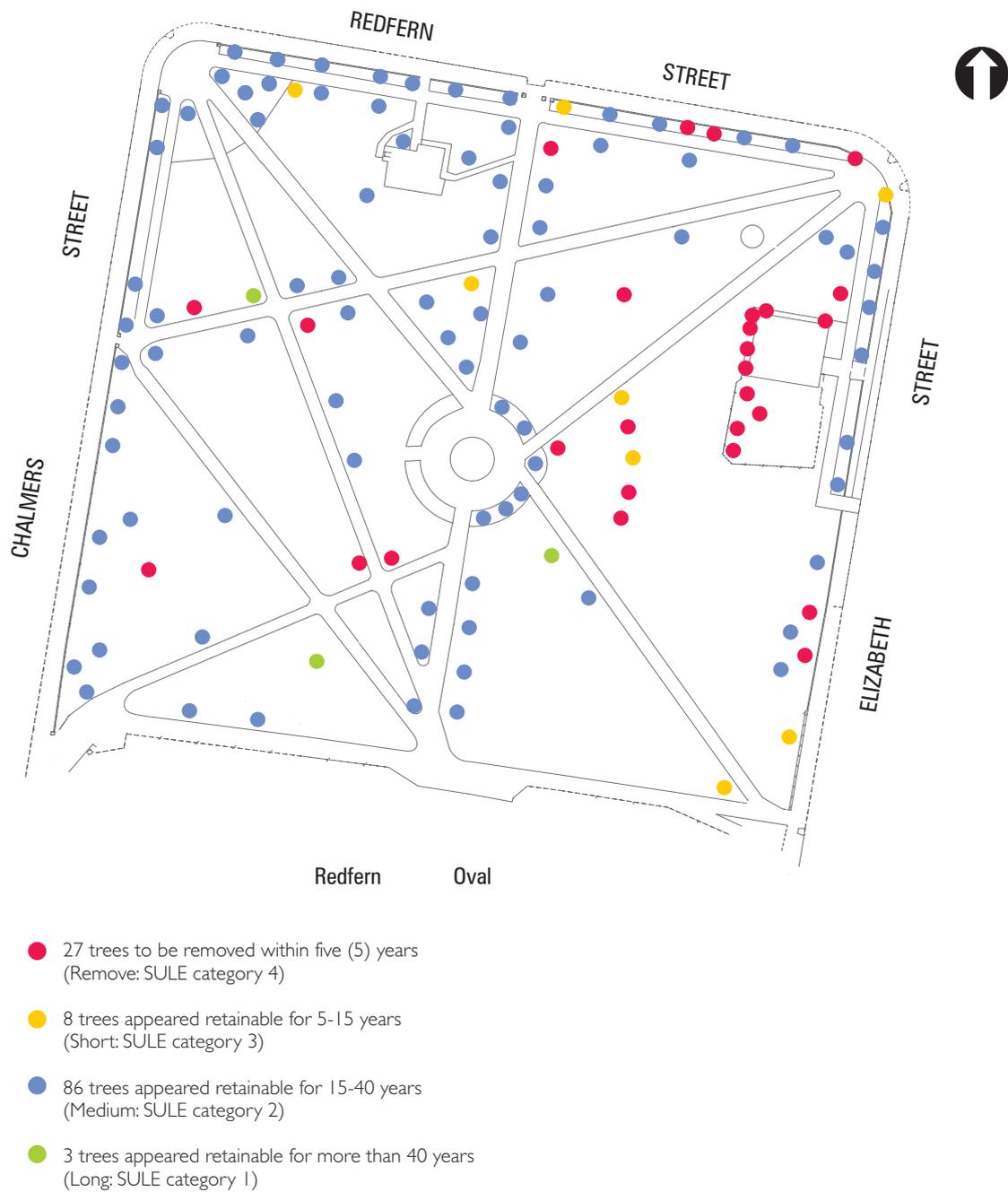


Figure 3 Safe Useful Life Expectancy (SULE) Analysis

5.4 Significant Trees

Most of the trees in Redfern Park were planted c1900. These trees have been listed in the City of Sydney's Register of Significant Trees and where possible shall be preserved and protected. Registering these specimens raises awareness of their historical value and improves the quality of their management and their prospect for a longer life (Appendix 5: Significant Tree Locations).

The tree planting in Redfern Park has particular significance because it is the only park in the City of Sydney LGA to be predominantly planted with Deciduous Figs (Figure 1, *Ficus superba* var. *henneana*). This species is relatively rare within all of the city's parkland and is generally restricted to individual specimens. The trees should be recognized for their historic significance.



Figure 4 Deciduous Fig (*Ficus superba* var. *henneana*)

6 TREE MANAGEMENT STRATEGIES

Redfern Park has an aging but culturally significant tree population that requires periodic monitoring as part of a programme of responsible tree management.

Tree management includes more than just tree maintenance. In addition to the usual remediation operations such as mulching, fertilizing and the pruning of dead limbs, it also includes strategies for the removal/replacement of dead trees, species selection of new/replacement planting, regular inspection of trees for disease and/or damage and selective removal of trees planted at very close spacing.

It is essential that tree management is integrated into the overall landscape planning, design and management framework for Redfern Park and that Council's various disciplines work together and coordinate their activities. In addition to landscape managers and arborists, it is imperative that landscape architects are involved in the process so that the aesthetic dimension of tree management is adequately presented and future planting designs are formulated to provide a coherent future landscape.

A detailed planting plan shall be prepared following the completion of the Redfern Park Masterplan. This plan shall be used to indicate the locations of all existing trees and to effectively guide the selection and placement of any future planting.

As the tree planting strategies for Redfern Park and Redfern Oval will have an enormous impact on the landscape for the next 100 years it is essential that the Redfern Park Tree Management Plan is ratified by Council and becomes an integral part of Council's Tree Management Policy, rather than the views of the then current landscape management officers.

Future tree management strategies must include a proactive maintenance program that includes a detailed monitoring and record-keeping system. As part of this record keeping system, the Tree Location Plan and Tree Assessment Schedule should be amended (on an annual basis or as required) to reflect any tree removals or replacements.

6.1 Health and Condition of the Existing Trees

Generally the health and vigour of the mature trees in Redfern Park appears to be good.

Many of the figs growing along the boundaries have had large branches removed. This remedial type of pruning has created epicormic shoots (weakly attached branches) along the remaining primary branches. Some of these trees may be structurally compromised before the determined useful life expectancy because the poorly attached epicormic branches may fail. Management of these trees requires pruning works to maintain their branch architecture in a safe manner while allowing the epicormic shoots to form part of the canopy.

A number of the existing trees growing in lawn areas have suffered basal injuries caused by heavy mowers and weed whippers. This type of damage which is evident on the thick-barked buttresses of many mature specimens, can allow the entry and development of decay fungi.

Trees 10-11 and 30-31

All four (4) of the Moreton Bay Figs (*Ficus macrophylla*) have been infested by Fig Psyllid in the past (Redfern Park Tree Survey 1994, Garry Clubley) although none appeared to be severely affected at the time of this assessment.

Trees 28-29

Two (2) of the Deciduous Figs (*Ficus superba* var *Henneana*) on the Elizabeth Street boundary have been suppressed by adjacent tree plantings. This has resulted in poor structure and canopy development. They are unlikely to develop into well formed trees.



Aerial root from tree No.31 growing around the trunk of tree No.28.
 Canopy has been suppressed and will never develop acceptable form.
 Remove in the short term.

Figure 6 Tree 28 in foreground with aerial root from tree 31 growing around trunk.

6.2 Management of the Existing Trees

Comprehensive requirements detailing improved techniques to ensure best practice tree monitoring and arboricultural maintenance are to be incorporated into the Parks and Open Space Contract Specifications.

Management of the mature trees within Redfern Park requires an initial mulching strategy to improve soil structure and reduce compaction and pruning works to reduce hazards (refer to Attachment I: Tree Assessment Schedule). This should then be followed by a proactive monitoring and maintenance regime.

Twenty seven (27) trees are recommended for removal within five (5) years based on their poor form, declining vigour, inappropriate location or suppression by other trees (SULE Analysis, Figure 3). None of the trees were identified as being so hazardous that they required immediate removal however approximately 22 trees were identified as requiring further detailed arboricultural assessment, including aerial inspections (Attachment I: Tree Assessment Schedule).

Tree Monitoring

A qualified arborist shall inspect all mature trees on an annual basis and after any major storm event. Arborists undertaking the inspections to have a minimum AQF level 5 qualification in Arboriculture or a minimum of five (5) years arboricultural experience in assessing trees of a similar condition as approved by the City.

The site inspections shall include detailed monitoring of any pests and diseases including termite infestations. All relevant observations, data (including dated photographs) and recommendations shall be recorded and made available to the City's Tree Management Team.

The Tree Management Team shall use the information to update the Tree Assessment Schedule (Attachment I) and the Tree Location Plan (Appendix 2) to reflect any tree removals and/or amendments.

The City's Tree Management Team shall be consulted prior to any excavation for hardworks or services within the root zones of any trees within Redfern Park.

The City's Tree Management Team shall undertake periodic audits of the tree maintenance practices undertaken by the City's Service Providers to ensure that the trees are being managed in accordance with this Plan.

Tree Pruning

Deadwood of 25mm or greater in diameter shall be removed from the crowns of all trees. All pruning work shall be carried out by a qualified arborist who has the appropriate qualification of Australian Qualification Framework (AQF) in Arboriculture level 3 and five (5) years industry experience as approved by the City.

Pruning methods and techniques shall be in accordance with the Australian Standard AS4373 1996 *Pruning of Amenity Trees*. A copy of this document must be available and held on site by the Contract Supervisor.

All pruning work shall be undertaken in accordance with the NSW Workcover Code of Practice for the Amenity Tree Industry (1998).

Mulching

A 50-80mm layer of organic mulch (15-40mm, with no fines) shall be placed around the base of all trees to a distance of one (1) radial metre (except in the case of large fig trees where the mulch may have to extend to a greater distance). The mulch must comply with AS4454 *Composts, Soil Conditioners and Mulches*.

Fertilising

An annual maintenance program of root plate remediation shall include aeration and soil improvement. Where trees show evidence of nutrient deficiency, a soil analysis and report shall be prepared by a soil scientist to identify the deficiency and provide the appropriate remedies.

Pests and Diseases

The monitoring and control of pests and diseases shall be undertaken continuously with inspections including the following actions;

- Identification
- Assessment of damage
- Immediate action undertaken (if required)
- Reporting details

All inspections shall be undertaken by a qualified arborist with minimum AQF level 5 qualification in Arboriculture or demonstrated equivalent industry experience.

Natural predators and parasites shall be encouraged by retaining the fallen leaves within the mulched area around the base of the trees. This is a particularly effective method to help alleviate Fig Psyllid infestations.

Chemical control of Fig Psyllid is not recommended in this busy pedestrian environment.

6.3 Tree Removal/Replacement Strategies

In order to maintain a viable tree population in Redfern Park it is vital to plant new trees and to replant declining trees in a planned and managed way with the support of the community.

Many of the trees in Redfern Park were planted c. 1900 and therefore are similar in size and maturity. It follows that a number of these trees may need to be replaced at around the same time. In some situations the trees have already ceased to contribute to the amenity of the Park and are compromising the amenity provided by trees of better health and condition (refer to SULE Analysis page 9).

An approximate time frame has been set for the removal/replacement of all of the trees in Redfern Park (Attachment 1: Tree Assessment Schedule). This will ensure that the visual loss is evenly distributed over time.

The development and implementation of tree removal and replacement strategies requires a consistent approach and commitment to planning. Long term planning is necessary when dealing with a landscape comprised of trees of a similar mature age, condition and heritage significance.

There are no pain-free approaches to tree removal and replacement. It is an emotive issue that may invoke community opposition and misunderstanding. Most people respond strongly to the removal of trees that are not dead and some groups in the community vehemently oppose tree removal whatever the justification (Hitchmough, 1989). However trees have a limited useful life and cannot be retained indefinitely. Many people will accept the need for tree replacement programs once they appreciate the issues involved.

The major factors that encourage the implementation of tree replacement programs in public open space include the concern for public safety and the maintenance of a high level of aesthetic return.

For the most part, tree removal in Redfern Park, will occur by natural attrition, except in situations where a tree or trees are posing a risk to public safety or compromise the amenity of other trees. However, it is inevitable that as the trees in Redfern Park become over-mature, they will need to be progressively removed and replaced. Sustained amenity can only be achieved by establishing a range of age classes (eg. young, semi-mature, mature and over-mature). This is a very important management tool that can be used effectively in Redfern Park if there is diligent record keeping relating to tree removals and replacements.

The City of Sydney has a duty, as the manager of Redfern Park, to ensure that the public are not exposed to unreasonable levels of risk from the mechanical failure of the trees within the Park. At the same time, there is an expectation to maintain the amenity provided by the existing tree population.

New and replacement planting shall be carried out in accordance with the design strategies included in the Draft Redfern Park Masterplan.

6.4 Removal and Replacement Strategy for the Park and Oval Trees

The current planting in Redfern Park consists predominantly of Fig trees along the street boundaries with an avenue planting of Palm trees lining the central N-S pathway and specimen trees spotted throughout the open space areas.

Many of the trees in the Park are approximately 80 – 100 years old and are in a state of decline. It is estimated that 97.5% of the trees will be removed within 40 years (SULE Analysis).

A number of trees growing inside the Park area have been identified with health or structural problems (Figure 3: SULE Analysis). Some of these trees will be removed during the proposed upgrade of Redfern Oval with others removed as required over the next five (5) years.

The evenly aged and spaced planting of the Fig trees around the street boundaries presents particular challenges when addressing methods of removal and replacement. There are three techniques that may be used:

- natural attrition - replace trees as they fail;
- selected removal - remove and replace every second or third tree or;
- block removal - remove blocks or sections of trees.

Natural Attrition

This option allows for the removal of individual trees gradually, as their condition becomes critical. However, replacement of individual trees within avenues must be carefully considered. Where there is adequate light and space, this type of tree replacement may be successful. However generally it is not recommended due to the probability that the tree will perform poorly. The intense competition for light, water and nutrients under the canopies of the existing mature trees, compromises the form of the young trees, often resulting in irredeemably misshapen or stunted trees.

Selected Removal

Selected removal is generally not successful for the same reasons as natural attrition. The gradual replacement of trees within avenues also creates problems of differential age and inconsistent canopy size.

Block Removal

Block removal and replacement requires the removal of a number of trees at the one time and is the only technique that can successfully achieve the uniform appearance typical of avenue planting. While dramatic, this is the only known and accepted approach to create growing conditions that allow for the uniform and consistent habit characteristic of avenues.

Whilst block removal creates loss of amenity, in the short term, it is the only method available to overcome the difficulties of suppression and root competition associated with establishing young trees next to mature trees.

The Fig trees planted around the boundaries in Redfern Park are slowly declining and will probably reach a stage in about 30 years time when they will need to be removed to ensure the safety of Park users. When they are eventually removed there will be a period of about 20 years when the effect of the present boundary planting will be lost, if no action is taken in the interim.

Staged block removal of small groups of these Fig trees is the preferred technique to replace the boundary planting. It is possible to plant another row of Figs deeper into the Park on the Chalmers and Redfern Street boundaries to reduce the impact of the inevitable removal of the existing row of trees. The scaffold branches of the existing trees will need to be pruned away from the newly planted trees and the structural stability of the trees managed diligently until it is time for the trees to be removed.

This scenario is not an option along the Elizabeth Street boundary because of the present location of the Baby Health Centre and two very large Moreton Bay Figs (Figure 7) which are located inside the outer row of Figs. If the Baby Health Centre is relocated in the future, then additional trees could also be planted along this boundary.

Redfern Park Masterplan Design Strategies

In accordance with the recommendations of the Redfern Park Masterplan seven (7) *Phoenix canariensis* (Date Palms) shall be transplanted from in and around the garden circling the Baptist Fountain to reinforce the central avenue.



Figure 7 Moreton Bay Fig (*Ficus macrophylla*) Elizabeth Street boundary.

Eleven (11) trees in poor condition surrounding the existing Early Childhood Health Centre shall also be removed during the Redfern Oval upgrade.

Replacement trees can be grown off site, to a height of approximately 5-6 metres enabling the planting of advanced trees when the existing trees are removed.

It is envisaged that the replacement trees will take approximately three (3) years to be 'grown on' off site. Therefore it is envisaged that the first stage of the replacement planting can start in the year 2010.

The proposed removal and replacement strategy can be flagged now to so that when the time comes, the tree removals have been largely understood and accepted.

The general tree population within the boundaries will be replaced by natural attrition. There are sufficient numbers of specimen trees and palm plantings within the Park to sustain the visual amenity during any removal and replacement transition period.

6.5 Removal and Replacement Strategy for the Street Trees

Elizabeth Street

There are twelve (12) Paperbarks growing in the grass verge close to the kerb, along Elizabeth Street, outside the Redfern Oval boundary. There are no overhead powerlines and there has been minimal damage to the pavement at this stage. The trees appear to be in good condition though they are already starting to displace the kerb and gutter.

As these trees are currently considered to be in reasonable health and condition, there is an option to retain these trees until a row of Fig trees is planted and established within the boundary of Redfern Oval. The replacement Figs shall be planted at a minimum of eight (8) metre centres.

Phillip Street

There are six (6) Paperbarks in the footpath in Phillip Street. These trees have been repeatedly lopped for power line clearance and their roots will continue to be a management problem causing damage to the pavement and kerb and gutter.

As the trees are in such poor condition, it is recommended that selected trees be removed during the Oval upgrade where affected by the construction works. The remaining trees shall be removed as soon as the replacement trees are planted within Redfern Oval. It is envisaged that the canopies of the proposed Fig tree planting within the Redfern Oval boundary will extend over the footpath eliminating the need for street tree replacement planting.

Chalmers Street

Most of the Liquidambar growing adjacent to the Oval in Chalmers Street have extensive root girdling and reduced vigour. Several of these trees have been subjected to root pruning and there is evidence of decay in the root crown. One of the trees is growing under powerlines and has been repeatedly lopped.

As this species has a characteristically shallow root system and the structural integrity of the trees has been compromised by root pruning and root girdling, these trees shall be removed as part of the landscape works associated with the proposed Redfern Oval upgrade.

The Draft Redfern Park Masterplan recommends the planting of Fig trees within the Chalmers Street boundary behind the grandstand. It is envisaged that the canopies of the Fig trees will extend over the footpath thus eliminating the need to replant street trees along this section of the footpath.

6.6 Selection Criteria for Replacement Trees

Plant selection for public open space is a strategic process that addresses the long term. (Hitchmough, 1989). Trees define spaces, regulate light, induce scale and are indicators of season changes.

Selecting the most appropriate species and variety of tree for a particular location and function profoundly influences the quality of a design. (Arnold, 1980)

The selection criteria, for the trees to be planted in Redfern Park, is as follows:

Biological / Environmental	Aesthetic / Design	Functional
Climatic suitability	Ultimate size of plant canopies	Acceptable leaf/fruit fall
Tolerance of atmospheric pollution	Form and texture of plant canopies	Long lived
Tolerance of soil compaction	Predictable growth characteristics	Not prone to major limb shear
Low susceptibility to pests and disease	Deciduous versus evergreen	Low capacity to lift paving
	Colour of plant foliage	Low risk of becoming an environmental weed

The overriding landscape character of Redfern Park is that of the nineteenth century. It is therefore desirable that the size and form of the canopies of the trees selected for replacement planting reinforces the character of this period (refer to Attachment 2: Planting Plans for species selection). The selected trees will hopefully survive for over 100 years therefore sufficient space must be provided to permit the increase in size that will occur in the long term.

Based on the conceptual design proposed in the 2006 Redfern Park Masterplan, a detailed planting plan will be prepared identifying replacement tree locations and indicative species selection.

6.7 Management of Replacement Trees

Stock Selection and Size

Plant quality is most critical with long lived, large growing woody plants. Selection of quality stock is imperative to ensure the best chance of survival and to reduce the potential for growth defects. Select all stock using the Natspec Guidelines for Specifying Trees (Clark, 1996).

Site Preparation and Planting

Planting of the nursery stock can be considered as the plant's final "potting on". Attention to planting detail is essential to maximize the chances of successful establishment of the new plant. (Appendix 7: Tree Planting Detail and Appendix 8: Tree Planting Specification). It is imperative that the diameter of the planting hole for all new or replacement trees shall be a minimum of 2-3 times the diameter of the root ball and no deeper than the root crown.

Regular Inspections

Newly planted trees require more intensive maintenance than trees that are well established. A qualified arborist shall inspect young trees every twelve months (minimum) to ensure that potential structural defects are detected early, in time for appropriate formative pruning. Lift all tree canopies as required, to allow head clearance for pedestrians.

Watering

Water all trees, as required, during the first two (2) years after planting. During dry summer conditions, new trees may need to be watered two to three times per week. At other times, watering might not be required for a month or longer. Provide temporary irrigation as required to maintain the trees in peak condition at all times by having the capacity to apply a summer weekly target application of 25mm of water (approximately 12 to 13 litres of water per square metre).

Tree Protection

Install ornamental tree guards around all newly planted trees during the establishment phase (approx 2 years). Tree guards provide protection from casual acts of vandalism as well as accidental damage. Periodically inspect all trees fitted with tree guards for signs of chafing or constriction so that adjustments or removal of the guards can be carried out if necessary.

Formative Pruning

Formative pruning is the selective pruning of a young tree to promote good form and branching structure. Formative pruning is most critical in the early stages of growth of a tree, in particular the first five to ten years. Limit pruning to the second or third year of growth, because newly planted trees need their leaves and shoot tips to provide food and substance to stimulate root production.

The goal in training young trees is to establish a strong trunk with sturdy well-spaced branches. Lateral branches contribute to the development of a sturdy well tapered trunk. These branches, known as temporary branches, help to protect the trunk from sun and mechanical injury while aiding with the tree's photosynthesis. Temporary branches should be kept short enough not to be an obstruction or compete with permanent branches.

Pruning shall be carried out in accordance with Australian Standard No 4373-1996 *Pruning of Amenity Trees*, by a skilled and experienced arborist, with a minimum Australian Qualification Framework (AQF) level 3.

Mulching

Mulching is an alternative to turf around trees and its use eliminates the potential for mechanical damage caused by mowers and whipper snippers®, that may lead to the development of decay and cracking.

Mulching improves tree health and vigour and reduces competition between tree roots and turf. The presence of mulch around the base of trees aids in integrated pest management strategies (eg Fig Psyllid).

A 50-80mm layer of organic mulch shall be placed around the base of all newly planted trees to a distance of one (1) radial metre from the trunk in a concentric circle.

The mulch must comply with AS4454 - *Composts, Soil Conditioners and Mulches*.

7 IMPLEMENTATION, MONITORING AND REVIEW

7.1 Implementation

It is expected that the Redfern Park Tree Management Plan will be implemented over several decades, as the longevity of the existing trees is unknown. The Plan provides a framework by which tree removals and replacements may be guided and controlled.

The Tree Management Plan also provides operational guidance and detailed ground maintenance specifications. It is to be used as a dynamic and responsive document that may change when circumstances require it.

Any proposed changes to the Tree Management Plan should be assessed before they are implemented, to ensure that they are sympathetic with the overall objectives and do not have an adverse affect on the character of Redfern Park.

7.2 Monitoring and Review

The success of the Redfern Park Tree Management Plan will require effective communication. Different disciplines such as engineering, landscape design, planning and landscape management will need to coordinate their activities.

Regular inter-departmental reviews should be conducted between those officers responsible for the programming, coordination and implementation of any works in Redfern Park. This includes those parties responsible for security, lighting, building maintenance, service installations, landscape maintenance or improvements and any new project work. All proposed works shall be related to the Tree Management Plan.

The Tree Planting Plan and the Tree Assessment Schedule shall be reviewed and/or amended on an annual basis to ensure that any changes are documented and any history relating to tree failures is monitored and recorded.

The Tree Management Plan shall be reviewed for its effectiveness on a regular basis.

REFERENCES

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APPENDIX I: Glossary of Terms

The following is a list of definitions relating to the terms and abbreviations that have been used in this report:

Age Classes

- (I) Immature refers to a well established but juvenile tree
- (S) Semi mature refers to a tree at growth stages between immaturity and full size.
- (M) Mature refers to a full sized tree. Trees can have a Mature Age Class for > 90% of their life span.
- (O) Over mature refers to a tree showing symptoms of irreversible decline.

Condition

Refers to the general form and structure of the scaffold (ie. trunk and major branches) It includes structural defects such as cavities, crooked trunks or weak trunk/branch unions and canopy skewness. Generally described as Good (G), Fair (F) or Poor (P).

Critical Root Zone (CRZ)

Refers to a radial offset of five (5) times the trunk DBH measured from the centre of the trunk. Excavation within this area may seriously destabilize the tree. Fully elevated construction within this area is possible with specific root zone assessment.

Diameter at Breast Height (DBH)

Refers to the tree trunk diameter at breast height (1.4 metres above ground level).

Epicormic Shoots

Arise from adventitious or latent buds. These shoots often have a weak point of attachment. They are generally produced in response to stress in the tree.

Hazard

Refers to anything with the potential to cause harm/damage to life or property.

Health

Refers to a tree's vigour as exhibited by the crown density, leaf colour; presence of epicormic shoots, ability to withstand disease and the extent of dieback.

Included/Inclusion-Stem/Bark

Refers to a genetic fault and potentially a weak point of attachment.

Primary Root Zone (PRZ)

Refers to a radial offset of ten (10) times the trunk DBH measured from the centre of the trunk. Excavation is possible within one offset only within this area and subject to specific rootzone assessment.

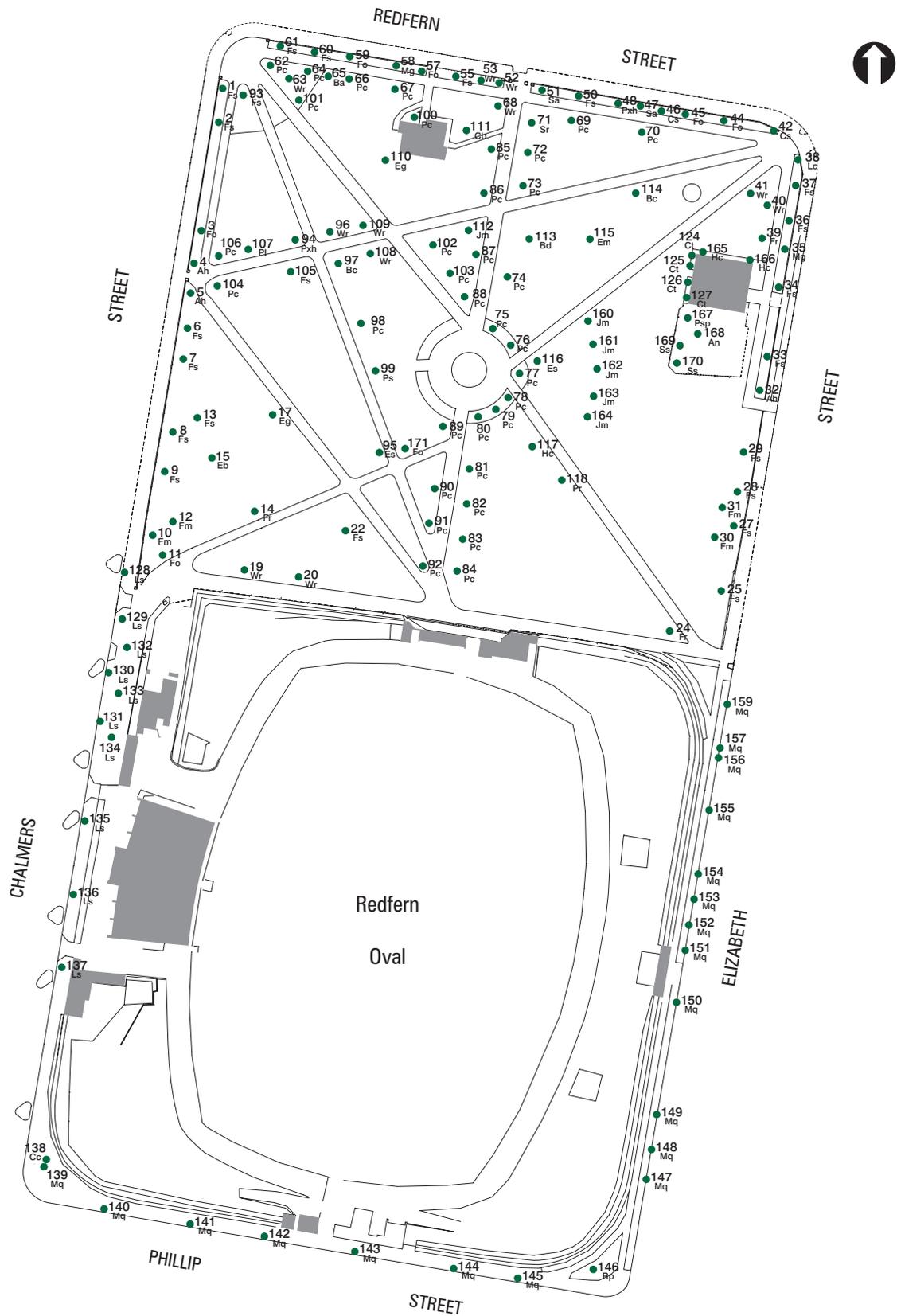
Scaffold Branch

Is a primary structural branch of the crown.

Senescence

Is the process of aging and death of trees.

APPENDIX 2: Tree Location Plan



APPENDIX 3: Redfern Park Tree Location Schedule

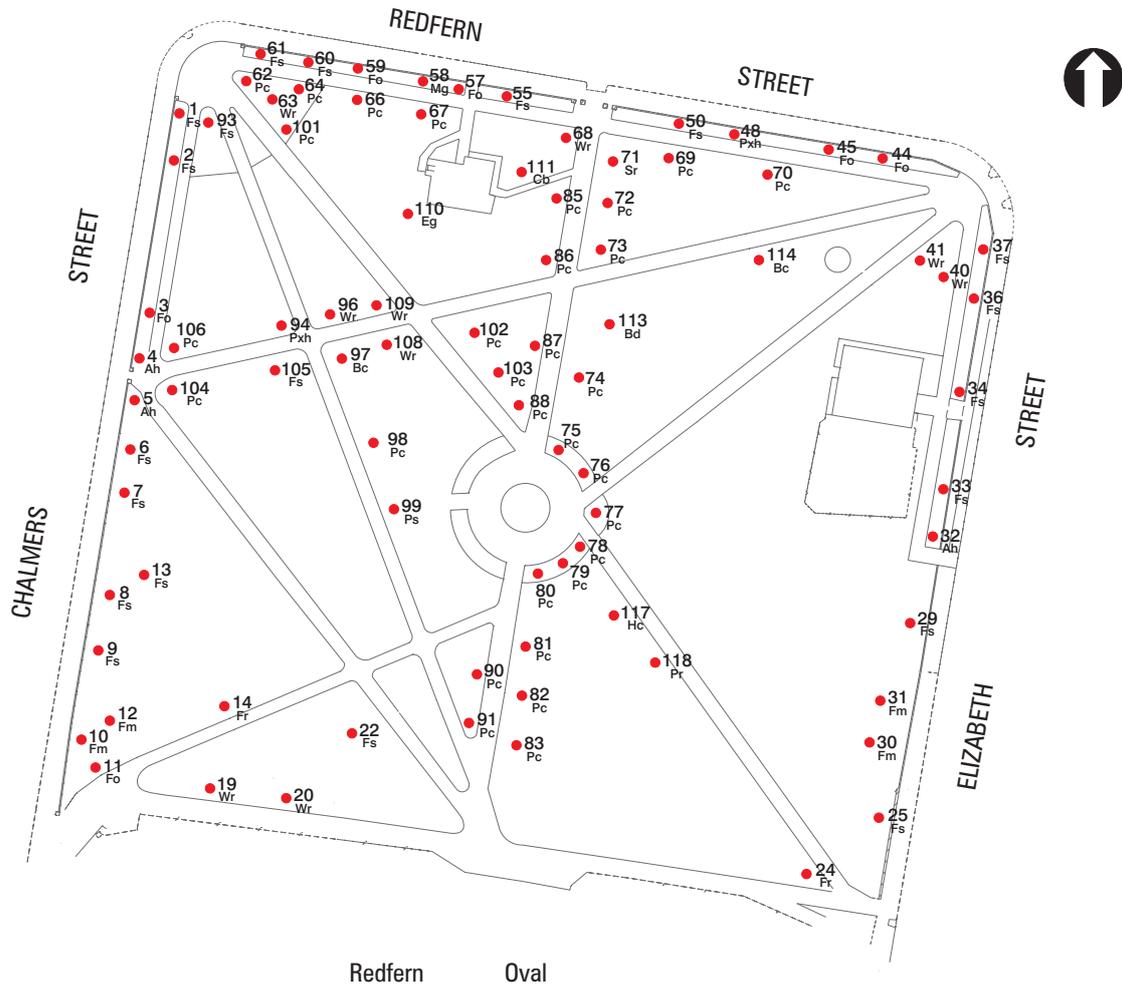
No.	Sym.	Botanical Name	Common Name
1	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
2	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
3	Fo	<i>Ficus obliqua</i>	Small Leafed Fig
4	Ah	<i>Araucaria heterophylla</i>	Norfolk Island Pine
5	Ah	<i>Araucaria heterophylla</i>	Norfolk Island Pine
6	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
7	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
8	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
9	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
10	Fm	<i>Ficus macrophylla</i>	Moreton Bay Fig
11	Fo	<i>Ficus obliqua</i>	Small Leafed Fig
12	Fm	<i>Ficus macrophylla</i>	Moreton Bay Fig
13	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
14	Fr	<i>Ficus rubiginosa</i>	Port Jackson Fig
15	Eb	<i>Eucalyptus botryoides</i>	Bangalay
17	Eg	<i>Eucalyptus globulus</i> ssp. <i>maidenii</i>	Maiden's Gum
19	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
20	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
22	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
24	Fr	<i>Ficus rubiginosa</i>	Port Jackson Fig
25	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
27	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
28	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
29	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
30	Fm	<i>Ficus macrophylla</i>	Moreton Bay Fig
31	Fm	<i>Ficus macrophylla</i>	Moreton Bay Fig
32	Ah	<i>Araucaria heterophylla</i>	Norfolk Island Pine
33	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
34	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
35	Mg	<i>Magnolia grandiflora</i>	Bull Bay Magnolia
36	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
37	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
38	Lc	<i>Lophostemon confertus</i> 'Variegata'	Brush Box (variegated)
39	Fr	<i>Ficus rubiginosa</i>	Port Jackson Fig
40	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
41	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
42	Cs	<i>Celtis sinensis</i>	Chinese Nettle Tree
44	Fo	<i>Ficus obliqua</i>	Small Leafed Fig
45	Fo	<i>Ficus obliqua</i>	Small Leafed Fig
46	Cs	<i>Celtis sinensis</i>	Chinese Nettle Tree
47	Sa	<i>Shinus areira</i>	Peppercorn Tree
48	Pxh	<i>Platanus x hybrida</i>	London Plane Tree
50	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
51	Sa	<i>Shinus areira</i>	Peppercorn Tree
52	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
53	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
55	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
57	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
58	Mg	<i>Magnolia grandiflora</i>	Bull Bay Magnolia
59	Fo	<i>Ficus obliqua</i>	Small Leafed Fig
60	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
61	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
62	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
63	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
64	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
65	Ba	<i>Brachychiton acerifolius</i>	Illawarra Flame Tree
66	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
67	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
68	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
69	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
70	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
71	Sr	<i>Syagrus romanzoffianum</i>	Queen Palm
72	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm

No	Sym	Botanical Name	Common Name
73	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
74	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
75	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
76	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
77	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
78	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
79	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
80	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
81	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
82	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
83	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
84	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
85	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
86	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
87	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
88	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
89	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
90	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
91	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
92	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
93	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
94	Pxh	<i>Platanus x hybrida</i>	London Plane Tree
95	Exs	<i>Erythrina x sykesii</i>	Coral Tree
96	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
97	Bc	<i>Butia capitata</i>	Jelly Wine Palm
98	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
99	Ps	<i>Phoenix sylvestris</i>	Indian Wild Date
100	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
101	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
102	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
103	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
104	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
105	Fs	<i>Ficus superba</i> var. <i>henneana</i>	Deciduous Fig
106	Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
107	Pl	<i>Prunus laurocerasus</i>	Cherry Laurel
108	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
109	Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm
110	Eg	<i>Eucalyptus globulus</i> ssp. <i>bicostata</i>	Southern Blue Gum
111	Cb	<i>Catalpa bignonioides</i>	Indian Bean Tree
112	Jm	<i>Jacaranda mimosifolia</i>	Jacaranda
113	Bd	<i>Brachychiton discolor</i>	Qld Lacebark
114	Bc	<i>Butia capitata</i>	Jelly Wine Palm
115	Em	<i>Eucalyptus microcorys</i>	Tallowwood
116	Exs	<i>Erythrina x sykesii</i>	Coral Tree
117	Hc	<i>Harpephyllum caffrum</i>	Kaffir Plum
118	Pr	<i>Phoenix rupicola</i>	Cliff Date
124	Ct	<i>Cupressus torulosa</i>	Bhutan Cypress
125	Ct	<i>Cupressus torulosa</i>	Bhutan Cypress
126	Ct	<i>Cupressus torulosa</i>	Bhutan Cypress
127	Ct	<i>Cupressus torulosa</i>	Bhutan Cypress
160	Jm	<i>Jacaranda mimosifolia</i>	Jacaranda
161	Jm	<i>Jacaranda mimosifolia</i>	Jacaranda
162	Jm	<i>Jacaranda mimosifolia</i>	Jacaranda
163	Jm	<i>Jacaranda mimosifolia</i>	Jacaranda
164	Jm	<i>Jacaranda mimosifolia</i>	Jacaranda
165	Hc	<i>Harpephyllum caffrum</i>	Kaffir Plum
166	Hc	<i>Harpephyllum caffrum</i>	Kaffir Plum
167	Psp.	<i>Pyrus</i> sp.	Ornamental Pear
168	An	<i>Acer negundo</i>	Box Elder
169	Ss	<i>Sapium sebiferum</i>	Chinese Tallowwood
170	Ss	<i>Sapium sebiferum</i>	Chinese Tallowwood
171	Fo	<i>Ficus obliqua</i>	Small Leafed Fig

APPENDIX 4: Summary of Redfern Park Tree Population

Botanical Name	Common Name	Number
<i>Acer negundo</i>	Box Elder	1
<i>Araucaria heterophylla</i>	Norfolk Island Pine	3
<i>Brachychiton acerifolius</i>	Illawarra Flame Tree	1
<i>Brachychiton discolor</i>	Qld Lacebark	1
<i>Butia capitata</i>	Jelly Wine Palm	2
<i>Catalpa bignonioides</i>	Indian Bean Tree	1
<i>Celtis sinensis</i>	Chinese Nettle Tree	2
<i>Cupressus torulosa</i>	Bhutan Cypress	4
<i>Erythrina x sykesii</i>	Coral Tree	2
<i>Eucalyptus botryoides</i>	Bangalay	1
<i>Eucalyptus globulus ssp. maidenii</i>	Maiden's Gum	1
<i>Eucalyptus globulus ssp. bicostata</i>	Southern Blue Gum	1
<i>Eucalyptus microcorys</i>	Tallowwood	1
<i>Ficus obliqua</i>	Small Leafed Fig	6
<i>Ficus macrophylla</i>	Moreton Bay Fig	4
<i>Ficus rubiginosa</i>	Port Jackson Fig	3
<i>Ficus superba var. henneana</i>	Deciduous Fig	22
<i>Harpephyllum caffrum</i>	Kaffir Plum	3
<i>Jacaranda mimosifolia</i>	Jacaranda	6
<i>Lophostemon confertus 'Variegata'</i>	Brush Box (variegated)	1
<i>Magnolia grandiflora</i>	Bull Bay Magnolia	2
<i>Phoenix canariensis</i>	Canary Island Date Palm	33
<i>Phoenix rupicola</i>	Cliff Date	1
<i>Phoenix sylvestris</i>	Indian Wild Date	1
<i>Platanus x hybrida</i>	London Plane Tree	2
<i>Prunus laurocerasus</i>	Cherry Laurel	1
<i>Sapium sebiferum</i>	Chinese Tallowwood	2
<i>Syagrus romanzoffianum</i>	Queen Palm	1
<i>Shinus areira</i>	Peppercorn Tree	2
<i>Washingtonia robusta</i>	Mexican Cotton Palm	13
Total		124

APPENDIX 5: Significant Tree Locations



Symbol	Botanical Name	Common Name
Ah	<i>Araucaria heterophylla</i>	Norfolk Island Pine
Bc	<i>Butia capitata</i>	Jelly Wine Palm
Bd	<i>Brachychiton discolor</i>	Qld Lacebark Tree
Cb	<i>Catalpa bignonioides</i>	Indian Bean Tree
Eg	<i>Eucalyptus globulus ssp. bicostata</i>	Southern Blue Gum
Eg	<i>Eucalyptus globulus ssp. maidenii</i>	Maiden's Gum
Fm	<i>Ficus macrophylla</i>	Moreton Bay Fig
Fo	<i>Ficus obliqua</i>	Small Leafed Fig
Fr	<i>Ficus rubiginosa</i>	Port Jackson Fig
Fs	<i>Ficus superba var henneana</i>	Deciduous Fig
Hc	<i>Harpephyllum caffrum</i>	Kaffir Plum
Mg	<i>Magnolia grandiflora</i>	Bull Bay Magnolia
Pc	<i>Phoenix canariensis</i>	Canary Island Date Palm
Pr	<i>Phoenix rupicola</i>	Cliff Date
Ph	<i>Platanus x hybrida</i>	London Plane Tree
Wr	<i>Washingtonia robusta</i>	Mexican Cotton Palm

APPENDIX 6: SULE Categories

(After Barrell 1996, updated 01.04.2001)

The five categories and their sub-groups are as follows:

1. **Long SULE:** Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk, assuming reasonable maintenance.
 - (a) Structurally sound trees located in positions that can accommodate future growth.
 - (b) Trees that could be made suitable for retention in the long term by remedial tree care.
 - (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.

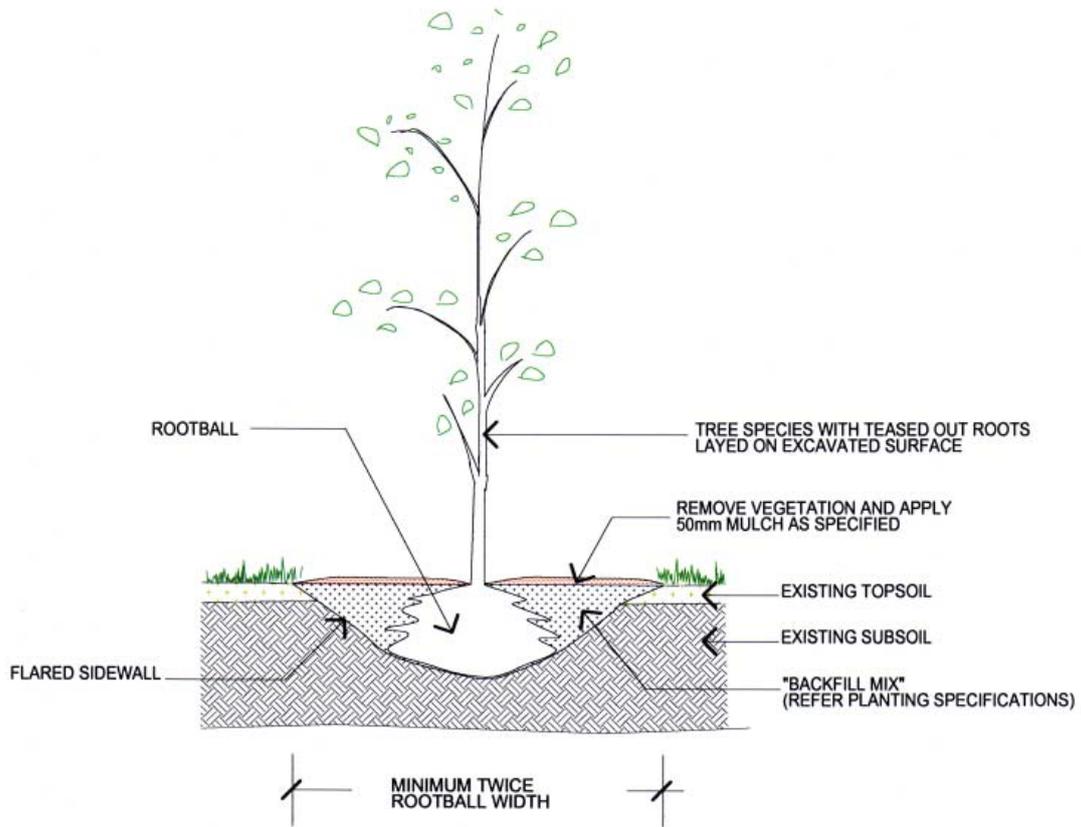
2. **Medium SULE:** Trees that appeared to be retainable at the time of assessment for 15 - 40 years with an acceptable level of risk.
 - (a) Trees that may only live between 15 and 40 more years.
 - (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.
 - (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - (d) Trees that could be made suitable for retention in the medium term by remedial tree care.

3. **Short SULE:** Trees that appeared to be retainable at the time of assessment for 5 - 15 years with an acceptable level of risk.
 - (a) Trees that may only live between 5 and 15 more years.
 - (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
 - (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.

4. **Remove:** Trees that should be removed within the next 5 years.
 - (a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
 - (b) Dangerous trees because of instability or recent loss of adjacent trees.
 - (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
 - (d) Damaged trees that are clearly not safe to retain.
 - (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - (f) Trees that are damaging or may cause damage to existing structures within 5 years.
 - (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
 - (h) Trees in categories (a) to (g) that have a high wildlife habitat value that with appropriate treatment, could be retained subject to regular review.

5. **Small, young or regularly pruned:** Trees that can be reliably moved or replaced.
 - (a) Small trees less than 5m in height.
 - (b) Young trees less than 15 years old but over 5m in height. Formal hedges and trees.
 - (c) Intended for regular pruning to artificially control growth.

APPENDIX 7: Tree Planting Detail



TREE PLANTING IN GRASS NTS

APPENDIX 8: Tree Planting Specifications

Services

- Establish the location of all service lines before excavation
- Service lids, vents and hydrants to be left uncovered.

Tree Planting

- Avoid planting in unsuitable weather conditions such as extreme heat, cold wind or rain. During hot weather ensure that the planting site is at field capacity.
- Thoroughly water rootballs before planting and immediately after planting. Prevent the rootballs from drying out during the planting phase.
- Remove topsoil.
- Remove subsoil to the depth of the rootball and two to three times the diameter of the rootball.
- Remove stones over 50mm diameter and heavy clay lumps.
- Remove tree from the container; lightly tease out the roots and use a sharp knife to prune the roots at the outside edge of the rootball. Place the tree into the planting making sure the root crown is at natural soil level.
- Backfill using "Backfill Mix" as specified and tamp gently. Do not cover the rootball.
- Water in thoroughly applying water directly to the rootball.
- Lay mulch to a nominal 50mm depth around the base of the tree. Mulch must comply with AS4454 Composts, Soil Conditioners and Mulches. Feather mulch away from the trunk at the root crown.
- Plants to be planted in locations indicated on the Planting Plan.

Backfill Mix

- Sandy well drained mix to provide aeration at depth and nutritional as well as water holding capacity
- Some soil must be present to obtain the chemical properties required as sands do not have sufficient cation exchange capacity.
- Particle Size Distribution:

Size Fraction	% by Weight
>2mm	<5%
1-2mm	<10%
0.5-1mm	20-40%
0.25-0.5mm	30-50%
0.1-0.25mm	20-30%
<0.1mm	<10%
pH	5.5-6.8
EC 1:2	<1.0
Hydraulic Conductivity	20-50cm/hr
Exchangeable Na%	<5
Exchangeable K%	5-15
Exchangeable Ca%	65-75
Exchangeable Mg%	15-25
Organic matter	2-5% (nominally 10-20% by volume subject to testing)

ATTACHMENT I: Tree Assessment Schedule

ATTACHMENT 2: 2006 Soil Report