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# Arboricultural Impact Appraisal and Method Statement

(Revision A)

19-25 Balfour Street
Lindfield, NSW

Prepared for
Balfour Group Pty Ltd

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9 April 2025

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## Summary

The proposed development is to demolish the existing residential dwellings and replace them with a block of apartments. I have inspected all the trees that could be affected and list their details in Appendix 2. Based on this information, I provided guidance to project architect on the constraints these trees impose on the use of the site.

Three high category trees and thirty-eight low category trees will require removal to accommodate this proposal. However, twelve of the low category trees are exempt from Ku-ring-gai Council's Tree Preservation Order and a comprehensive landscaping scheme to mitigate these losses is proposed that will include the planting of new trees.

The proposed changes may adversely affect a further eighteen high category trees and four low category trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the development proposal is expected to have a moderate impact on the contribution of trees to local amenity or character.

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# 1. INTRODUCTION

1.1 **Instruction:** I am instructed by JK Project Group to inspect the tree population at 19-25 Balfour Street, Lindfield and to provide an arboricultural report to accompany a development application. This report investigates the impact of the proposed development on trees and provides the following guidelines for appropriate tree management and protective measures:

- a schedule of the relevant trees to include basic data and a condition assessment;
- an appraisal of the impact of the proposal on trees and any resulting impact that has on local character and amenity;
- a preliminary arboricultural method statement setting out appropriate protective measures and management for trees to be retained

1.2 **Purpose of this report**: This report provides an analysis of the impact of the development proposal on trees with additional guidance on appropriate management and protective measures. Its primary purpose is for the council to review the tree information in support of the planning submission and use as the basis for issuing a planning consent or engaging in further discussions towards that end. Within this planning process, it will be available for inspection by people other than tree experts, so the information is presented to be helpful to those without a detailed knowledge of the subject.

1.3 **Qualifications and experience:** I have based this report on my site observations and the provided information, and I have come to conclusions in the light of my experience. I have experience and qualifications in arboriculture and include a summary in Appendix 1.

1.4 **Documents and information provided:** JK Project Group provided me with copies of the following documents:

- Survey Plan, Dwg No. 15341-T1, by M. Y. XU & Co. dated 7 February 2025; and
- Architectural Drawings, Dwg No. DA200 to to DA213, by Giles Tribe dated 4 April 2025.

1.5 **Scope of this report:** This report is only concerned with sixty-three trees, thirty-nine located within the subject site and twenty-four adjacent to it, on public and private properties. It takes no account of other trees, shrubs or groundcovers within the site unless stated otherwise. It includes a preliminary assessment based on the site visit and the documents provided, listed in 1.4 above.

## 2. THE LAYOUT DESIGN

2.1 **Tree AZ method of tree assessment:** The TreeAZ assessment method determines the worthiness of trees in the planning process. TreeAZ is based on a systematic method of assessing whether individual trees are important and how much weight they should be given in management considerations. Simplistically, trees assessed as potentially important are categorised as '**A**' and those assessed as less important are categorised as '**Z**'. Further explanation of TreeAZ can be found in Appendix 3.

In the context of new development, all the Z trees are discounted as a material constraint in layout design. All the A trees are potentially important and they dictate the design constraints. This relatively simple constraints information is suitable for use by the architect to optimise the retention of the best trees in the context of other material considerations.

### 2.2 Site visit and collection of data

2.2.1 **Site visit:** I carried out an unaccompanied site visit on 28 January 2025 and 6 March 2025. All my observations were from ground level unless otherwise indicated. Aerial inspections, root or soil analysis, exploratory root trenching and internal diagnostic testing was not undertaken as part of this assessment. I did not have access to trees on other private properties and have confined observations of them to what was visible from within the property. The weather at the time of inspection was clear and dry with good visibility.

2.2.2 **Brief site description:** 19-25 Balfour Street is located in the residential suburb of Lindfield (refer figure 1). The site is on the western side of the road and surrounded by similar residential development. The property consists of four lots, each with a two-storey residence that is currently occupied and centrally set within each property. A variety of ornamental, coniferous and indigenous trees are scattered throughout the site and around the site boundaries.

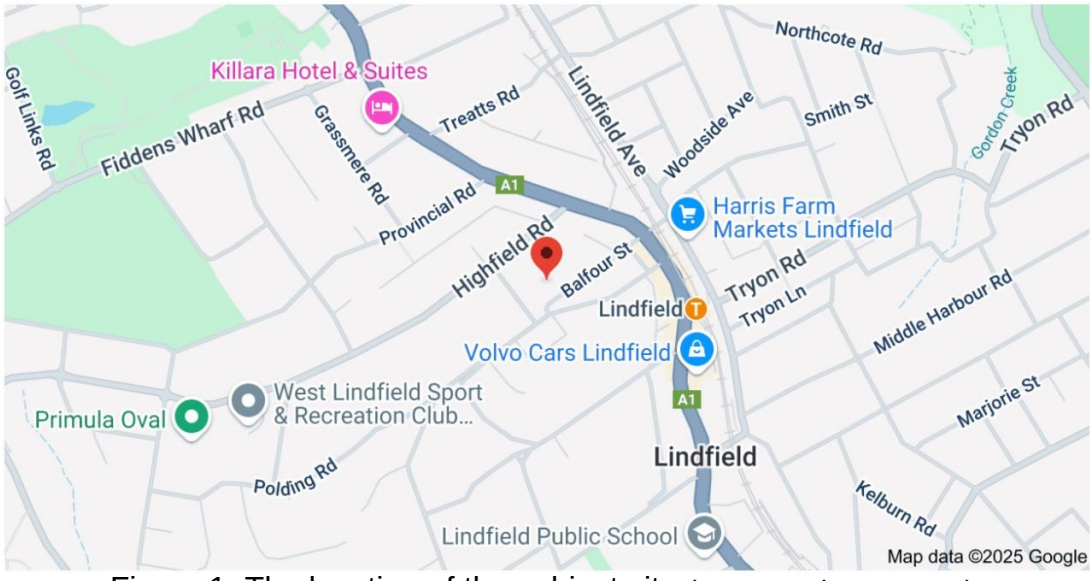



Figure 1: The location of the subject site (www.googlemaps.com).

2.2.3 **Collection of basic data:** I inspected each tree and have collected information on species, height, diameter, maturity and potential for contribution to amenity in a development context. I have recorded this information in the tree schedule included, with explanatory notes, in Appendix 2. Each tree was then allocated to one of four categories (**AA**, **A**, **Z** or **ZZ**), which reflected its suitability as a material constraint on development.

2.2.4 **Identification and location of the trees:** I have illustrated the locations of the significant trees on the Tree Management Plan (Plan TMP01) included as Appendix 9. This plan is for illustrative purposes only and it should not be used for directly scaling measurements.

2.2.5 **Advanced interpretation of data:** Australian Standard *Protection of trees on development sites* (AS4970-2009), recommends that the trunk diameter measurement for each tree is used to calculate the tree protection zone (TPZ), which can then be interpreted to identify the design constraints and, once a layout has been consented, the exclusion zone is to be protected by barriers.

2.3 **The use of the tree information in layout design:** Following my inspection of the trees, the information listed in Appendix 2 was used to provide constraints guidance based on the locations of all the A trees. All the Z trees were discounted because they were not considered worthy of being a material constraint. This guidance identified two zones of constraint based on the following considerations:

- **The tree protection zone** (TPZ) is an area where ground disturbance must be carefully controlled. The TPZ was established according to the recommendations set out in AS4970-2009 and is the radial offset distance of twelve (x12) times the trunk diameter. In principle, a maximum encroachment of 10% is acceptable within the TPZ and a high level of care is needed during any activities that are authorised within it if important trees are to be successfully retained.

- **The structural root zone** (SRZ) is a radial distance from the centre of a tree's trunk, where it is likely that structural, woody roots would be encountered. The distance is calculated on trunk flare diameter at ground level. The SRZ may also be influenced by natural or built structures, such as rocks and footings. The SRZ only needs to be calculated when major encroachment (>10%) into a TPZ is proposed.

## 3. ARBORICULTURAL IMPACT APPRAISAL

3.1 **Summary of the impact on trees:** I have assessed the impact of the proposal on trees by the extent of disturbance in TPZs and the encroachment of structures into the SRZ (as set out briefly in 2.3 above and more extensively in Appendix 2). All the trees that may be affected by the development proposal are listed in Table 1

**Table 1: Summary of existing trees and trees that may be affected by development**

| Impact | Reason | Important trees | | Unimportant trees | |
|---|---|---|---|---|---|
| | | AA | A | Z | ZZ |
| Retained trees that may be affected through disturbance to TPZs | Removal of existing surfacing/structures/ landscaping and/or installation of new surfacing/structures/ landscaping | 56 | 1, 2, 4, 5, 15, 16, 17, 23, 43, 44, 45, 46, 48, 60, 61, 62, 63 | 18, 19, 36 | 47, 59 |
| Trees to be removed | Building and driveway construction and/or level variations within TPZ | | 3, 39, 42 | 11, 12, 13, 14, 20, 22, 24, 25, 26, 27, 28, 29, 30, 33, 34, 35, 37, 38, 40, 41, 49, 50, 51, 52, 57 | 6, 7, 8, 9, 10, 21, 31, 32, 53, 54, 55, 58 |

3.2 **Detailed impact appraisal**

3.2.1 **Category A trees to be lost:** The proposed development will necessitate the removal of three high category trees (Trees 3, 39 and 42). These trees are considered moderate to high significance and display good health and condition. In order to compensate for loss of amenity, consideration should be given to replacement planting within the site.

3.2.2 **Category AA and A trees that could potentially be adversely affected through TPZ disturbance:** Eighteen category A and AA trees (Trees 1, 2, 4, 5, 15, 16, 17, 23, 43, 44, 45, 46, 48, 56, 60, 61, 62 and 63) could potentially be adversely affected through disturbance to their TPZs as follows:

- Trees 1, 2, 4, 5, 15, 23, 43, 44, 45, 46, 48, 60, 61 and 63: These are important trees with a high potential to contribute to amenity so any adverse impacts on them should be minimised. The proposed works remain largely outside the TPZ of these trees and therefore direct impacts are not expected. I have reviewed the situation carefully and my experience is that these trees could be successfully retained without any adverse effects if

appropriate protective measures are properly specified and controlled through a detailed arboricultural method statement.

- Trees 16, 17, 56 and 62: These are important trees with a high potential to contribute to amenity so any adverse impacts on them should be minimised. The proposed access routes and demolition works will impede within the TPZ of these trees by up to 10% and is in accordance with AS4970-2009 recommendations. These changes may cause harm if not carried out with care. I have reviewed the situation carefully and my experience is that these trees could be successfully retained without any adverse effects if appropriate protective measures are properly specified and controlled through a detailed arboricultural method statement.

3.2.3 **Low category trees to be retained:** Trees 18, 19, 36, and 47 could be successfully retained without any adverse effects if appropriate protective measures are properly specified and controlled through a detailed arboricultural method statement. Tree 59 on the adjacent site is dead.

3.2.4 **Low category trees to be removed:** The proposed development will necessitate the removal of thirty-eight trees of low and very low retention value. These include Trees 6, 7, 8, 9, 10, 11, 12, 13, 14, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 37, 38, 40, 41, 49, 50, 51, 52, 57, 58. None of these trees are considered significant or worthy of special measures to ensure their preservation.

It should be noted that Trees 6, 7, 8, 14, 24, 25, 27, 28, 29, 30, 31 and 57 are exempt from Ku-ring-gai Council's Tree Preservation Order. Tree 58 are dead and should be removed irrespective of the proposal.

## 3.3 Proposals to mitigate any impact

3.3.1 **Protection of retained trees:** The successful retention of trees within the site will depend on the quality of the protection and the administrative procedures to ensure protective measures remain in place throughout the development. An effective way of doing this is through an arboricultural method statement that can be specifically referred to in the planning condition. An arboricultural method statement for this site is set out in detail in Section 4.

3.3.2 **New planting:** In the context of the loss of trees, a comprehensive new landscaping scheme is proposed including semi-mature trees to be planted within available areas in prominent locations. The new trees should have the potential to reach a significant height without excessive inconvenience and be sustainable into the long term, significantly improving the potential of the site to contribute to local amenity and character.

3.3.3 **Summary of the impact on local amenity:** Three high category trees and thirty-eight low category trees will require removal to accommodate this proposal. However, twelve of the low category trees are exempt from Ku-ring-gai Council's Tree Preservation Order and a comprehensive landscaping

scheme to mitigate these losses is proposed that will include the planting of new trees.

The proposed changes may adversely affect a further eighteen high category trees and four low category trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the development proposal is expected to have a moderate impact on the contribution of trees to local amenity or character.

# 4. ARBORICULTURAL METHOD STATEMENT

## 4.1 Introduction

4.1.1 **Terms of reference:** The impact appraisal in Section 3 identified the potential impacts on trees caused by proposed development. Section 4 is an arboricultural method statement setting out management and protection details that must be implemented to secure successful tree retention. It has evolved from Australian Standard AS4970-2009 *Protection of trees on development sites*.

4.1.2 **Plan TMP01:** Plan TMP01 in Appendix 9 is illustrative and based entirely on provided information. This plan should only be used for dealing with the tree issues and all scaled measurements must be checked against the original submission documents. The precise location of all protective measures must be confirmed at the pre-commencement meeting before any demolition or construction activity starts. Its base is the existing land survey, which has the proposed layout superimposed so the two can be easily compared. It shows the existing trees numbered, with high categories (A) highlighted in green triangles and low categories (Z) highlighted in blue rectangles. It also shows the locations of the proposed protective measures.

## 4.2 Tree protection with fencing and ground protection

4.2.1 **Protection fencing:** Tree protection fencing must comply with AS4970 (section 4.3) recommendations. An illustrative guide is included as Appendix 4. The approximate location of the barriers and the TPZs is illustrated on plan TMP01. The precise location of the fencing must be agreed with the project Arborist before any development activity starts.

4.2.2 **Ground protection:** Any TPZs outside the protective fencing must be covered in ground protection based on AS4970 recommendations until there is no risk of damage from the demolition and construction activity. An illustrative specification for this ground protection is included as Appendix 5. On this site, it must be installed near Trees 5, 16, 17, 56 and 62 as illustrated on plan TMP01 before any demolition and construction starts.

4.3 **Precautions when working in TPZs:** Any work in TPZs must be done with care as set out in Appendix 7. On this site, special precautions must be taken near Trees 1, 2, 4, 5, 15, 16, 17, 23, 43, 44, 45, 46, 48, 56, 60, 61, 62 and 63 as illustrated on plan TMP01 and summarised below:

- **Removal of existing surfacing/structures and replacement with new surfacing/structures:** Trees 1, 2, 4, 5, 15, 16, 17, 23, 43, 44, 45, 46, 48, 56, 60, 61, 62 and 63 may be adversely affected by the demolition and construction works or the installation of a small area of new surfacing. Any adverse impact must be minimised by following the guidance set out in Appendix 7.

- **Installation of new soft landscaping:** All landscaping activity within TPZs has the potential to cause severe damage and any adverse impact must be minimised by following the guidance set out in Section 7 of Appendix 7.
- **Installation of new services or upgrading of existing services:** It is often difficult to clearly establish the detail of services until the construction is in progress. Where possible, it is proposed to use the existing services into the site and keep all new services outside TPZs. However, where existing services within TPZs require upgrading or new services have to be installed in TPZs, great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible, any excavation must be carried out by hand according to the guidelines set out in Section 6 of Appendix 7. If services do need to be installed within TPZs, consultation must be obtained from the project Arborist and/or council before any works are carried out.
- **Damage to street trees:** Any damage to street trees as a result of erection of hoardings, scaffolding or due to the loading/unloading of vehicles adjacent the site must be immediately reported to the Council's Street Tree Contract Coordinator, in order to determine the appropriate action for maintaining the health and structural integrity of any damaged street tree.

## 4.4 Other tree related works

4.4.1 **Site storage, cement mixing and washing points:** All site storage areas, cement mixing and washing points for equipment and vehicles must be outside TPZs unless otherwise agreed with the project Arborist and/or council. Where there is a risk of polluted water run off into TPZs, heavy-duty plastic sheeting and sandbags must be used to contain spillages and prevent contamination.

4.4.2 **Pruning:** Any pruning that is required to accommodate hoardings, scaffolding or to accommodate the unloading/loading of vehicles and has been approved by Council shall be carried out by a qualified Arborist (AQF3) and must be in accordance with AS4373 Australian Standards 'Pruning of Amenity Trees'.

## 4.5 Programme of tree protection and supervision

4.5.1 **Overview:** Tree protection cannot be reliably implemented without arboricultural input. The nature and extent of that input varies according to the complexity of the issues and the resources available on site. For this site, a summary of the level of arboricultural input that is likely to be required is set out in Appendix 8. The project arborist must be instructed to work within this framework to oversee the implementation of the protective measures and management proposals set out in this arboricultural method statement.

The framework in Appendix 8 must form the basis for the discharge of planning conditions through site visits by the project arborist. These supervisory actions must be confirmed by formal letters circulated to all relevant parties. These permanent records of each site visit will accumulate to provide the proof of compliance and allow conditions to be discharged as the development progresses. The developer must instruct the project arborist to comply with the supervision requirements set out in this document before any work begins on site.

4.5.2 **Phasing of arboricultural input:** Trees can only be properly budgeted for and factored into the developing work programmes if the overall project management takes full account of tree issues once consent is confirmed. The project arborist must be involved in the following phases of the project management:

1. **Administrative preparation before work starts on site:** It is normal for a development proposal to vary considerably from the expectations before consent as the detailed planning of implementation evolves. The early instruction of the project arborist ensures that tree issues are factored into the complexities of site management and can often help ease site pressures through creative approaches to tree protection. Pre-commencement discussions between the project arborist and the developer's team is an effective means of managing the tree issues with difficult constraints.

2. **Pre-commencement site meeting:** A pre-commencement meeting must be held on site before any of the demolition and construction work begins. This must be attended by the site manager and the project arborist. Any clarifications or modifications to the consented details must be recorded and circulated to all parties in writing. This meeting is where the details of the programme of tree protection will be agreed and finalised by all parties, which will then form the basis of any supervision arrangements between the project arborist and the developer.

3. **Site supervision:** Once the site is active, the project arborist must visit at an interval agreed at the pre-commencement site meeting. The supervision arrangement must be sufficiently flexible to allow the supervision of all sensitive works as they occur. The project arborist's initial role is to liaise with developer to ensure that appropriate protective measures are designed and in place before any works start on site. Once the site is working, that role will switch to monitoring compliance with arboricultural conditions and advising on any tree problems that arise or modifications that become necessary.

4.6 **Site management:** It is the developer's responsibility to ensure that the details of this arboricultural method statement and any agreed amendments are known and understood by all site personnel. Copies of the agreed documents must be kept on site at all times and the site manager must brief all personnel who could have an impact on trees on the specific tree protection requirements. This must be a part of the site induction procedures and written into appropriate site management documents.

## 5. HOW TO USE THIS REPORT

5.1 **Limitations:** It is common that the detail of logistical issues such as site storage and the build programme are not finalised until after consent is issued. As this report has been prepared in advance of consent, some of its content may need to be updated as more detailed information becomes available once the post-consent project management starts. Although this document will remain the primary reference in the event of any disputes, some of its content may be superseded by authorised post-consent amendments.

5.2 **Suggestions for the effective use of this report:** Section 4 of this report, including the relevant appendices, is designed as an enforcement reference. It is constructed so the council can directly reference the detail in a planning condition. Referencing the report by name and relating conditions to specific subsections is an effective means of reducing confusion and facilitating enforcement in the event of problems during implementation. More specifically, the following issues should be directly referenced in the conditions for this site:

| | | |
|---|---|---|
| 1. | Pre-commencement meeting | 4.5 |
| 2. | Protection fence | 4.2.1 and Appendix 4 |
| 3. | Ground protection | 4.2.2 and Appendix 5 |
| 4. | Removal of surfacing/structures | 4.3 and Appendix 7 (Section 4) |
| 5. | Installation of surfacing/structures | 4.3 and Appendices 6 (Section 5) |
| 6. | Services | 4.3 and Appendix 7 (Section 6) |
| 7. | Landscaping | 4.3 and Appendix 7 (Section 7) |
| 8. | Programming of tree protection | 4.5 and Appendix 8 |
| 9. | Arboricultural supervision | 4.5 and Appendix 8 |

Each of the above matters shall be supervised by the project arborist and the relevant conditions can only be discharged once that supervision has been confirmed in writing to the relevant parties. The last column of the table in Appendix 8 is to be used so that the various supervision issues can be recorded as they are confirmed by supervision letters. It is intended to act as a summary quick reference to help keep track of the progress of the supervision.

## 6. OTHER CONSIDERATIONS

6.1 **Trees subject to statutory controls:** The subject trees (excluding Trees 6, 7, 8, 14, 18, 19, 21, 24, 25, 27, 28, 29, 30, 31, 36, 57, 58 and 59) are legally protected under Ku-ring-gai Council's Tree Preservation Order, it will be necessary to consult the council before any pruning or removal works other than certain exemptions can be carried out. The works specified above are necessary for reasonable management and should be acceptable to the council. However, tree owners should appreciate that the council may take an alternative point of view and have the option to refuse consent.

6.2 **Trees outside the property:** Trees located in the adjacent properties effectively out of the control of the owners of 19-25 Balfour Street, Lindfield. It will not be possible to easily carry out the recommended works without the full co-operation of the tree owners. The implications of non-cooperation require legal interpretation and are beyond the scope of this report.

## 7. BIBLIOGRAPHY

7.1 **List of references:**


Australian Standard AS4373-2007 *Pruning of Amenity Trees*.
Standards Australia.

Australian Standard AS4970-2009 *Protection of trees on development sites*.
Standards Australia.

Barrell, J (2009) Draft for Practical Tree AZ version 9.02 A+NZ
Barrel Tree Consultancy, Bridge House, Ringwood BH24 1EX

Brooker, M. Kleinig, D (1999) Field guide to eucalypts – South eastern Aust.
Blooming Books, Hawthorn Vic.

Matheny, N.P. & Clark, J.R. (1998) Trees & Development: A Technical Guide to Preservation of Trees During Land Development
International Society ofArboriculture, Savoy, Illinois.

Mattheck, Dr. Claus R., Breloer, Helge (1995) The Body Language of Trees - A Handbook for Failure Analysis;
The Stationery Office, London. England.

Robinson, L (1994) Field Guide to the Native Plants of Sydney
Kangaroo Press, Kenthurst NSW

## 8. DISCLAIMER

### 8.1 Limitations on use of this report:

*This report is to be utilized in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, and directly attached to that submission, report or presentation.*

*ASSUMPTIONS*

*Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible: however, Naturally Trees can neither guarantee nor be responsible for the accuracy of information provided by others.*

*Unless stated otherwise:*

- *Information contained in this report covers only those trees that were examined and reflects the condition of those trees at time of inspection: and*
- *The inspection was limited to visual examination of the subject trees without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.*

Yours sincerely

Andrew Scales
Dip. Horticulture
Dip. Arboriculture AQF5

# APPENDIX 1

## Brief qualifications and experience of Andrew Scales

### 1. Qualifications:

| | | |
|---|---|---|
| Associate Diploma Horticulture | Northern Sydney Institute of TAFE | 1998 |
| Certificate in Tree Surgery | Northern Sydney Institute of TAFE | 1998 |
| Diploma of Horticulture (Arboriculture) | Northern Sydney Institute of TAFE | 2006 |
| Diploma of Arboriculture AQF5 | Northern Sydney Institute of TAFE | 2019 |

**2. Practical experience:** Being involved in the arboricultural/horticultural industry for in excess of 20 years, I have developed skills and expertise recognized in the industry. Involvement in the construction industry and tertiary studies has provided me with a good knowledge of tree requirements within construction sites.

As director of Naturally Trees, in this year alone I have undertaken hundreds of arboricultural consultancy projects and have been engaged by a range of clients to undertake tree assessments. I have gained a wide range of practical tree knowledge through tree removal and pruning works.

### 3. Continuing professional development:

| | | |
|---|---|---|
| Visual Tree Assessment (Prof. Dr. Claus Mattheck) | Northern Sydney Institute of TAFE | 2001 |
| Wood Decay in Trees (F.W.M.R.Schwarze) | Northern Sydney Institute of TAFE | 2004 |
| Visual Tree Assessment (Prof. Dr. Claus Mattheck) | Carlton Hotel, Parramatta NSW | 2004 |
| Tree A-Z / Report Writing (Jeremy Barrell) | Northern Sydney Institute of TAFE | 2006 |
| Up by Roots – Healthy Soils and Trees in the Built Environment (James Urban) | The Sebel Parramatta NSW | 2008 |
| Tree Injection for Insect Control (Statement of Attainment) | Northern Sydney Institute of TAFE | 2008 |
| Quantified Tree Risk Assessment (QTRA) Registered Licensee #1655 | South Western Sydney Institute TAFE | 2011 |
| Practitioners Guide to Visual Tree Assessment | South Western Sydney Institute TAFE | 2011 |
| Quantified Tree Risk Assessment (QTRA) Registered Licensee #1655 | Richmond College NSW TAFE | 2014 |
| VALID Approach to Likelihood of Failure (David Evans) | Centennial Park NSW | 2017 |
| An Irreverent Look at Tree Protection on Development Sites (Mark Hartley) | Dooleys Lidcombe Catholic Club NSW | 2023 |

# APPENDIX 2
## Tree schedule

NOTE: Colour annotation is AA & A trees with green background; Z & ZZ trees with blue background; trees to be removed in red text.

| No. | Genus species | Height | Spread | DBH | TPZ | Foliage % | Age class | Defects/Comment | Location | Services | Significance | Tree AZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Acer buergerianum* | 6 | 6 | 350 | **4.2** | 80% | M | Nil | Grass | Nil | M | **A1** |
| 2 | *Jacaranda mimosifolia* | 9 | 9 | 350 | **4.2** | 80% | M | Nil | Garden | Nil | M | **A1** |
| 3 | *Jacaranda mimosifolia* | 9 | 9 | 400 | **4.8** | 80% | M | Co-dominant | Garden | Nil | M | **A1** |
| 4 | *Jacaranda mimosifolia* | 9 | 8 | 300 | **3.6** | 70% | M | Nil | Garden | Nil | M | **A1** |
| 5 | *Acer buergerianum* | 6 | 6 | 350 | **4.2** | 80% | M | Nil | Grass | Nil | M | **A1** |
| 6 | *Syncarpia glomulifera* | 24 | 24 | 1400 | **15.0** | 0% | M | Dead tree | Garden | Building | H | **ZZ4** |
| 7 | *Ginkgo biloba* | 8 | 3 | 200 | **2.4** | 0% | O | Dead tree | Garden | Nil | L | **ZZ4** |
| 8 | *Pyrus calleryana* | 12 | 7 | 400 | **4.8** | 0% | O | Dead tree | Garden | Nil | M | **ZZ4** |
| 9 | *Cupressus sp.* | 6 | 1 | 100 | **2.0** | 30% | O | Dieback | Garden | Nil | L | **ZZ4** |
| 10 | *Cupressus sp.* | 6 | 1 | 100 | **2.0** | 30% | O | Dieback | Garden | Nil | L | **ZZ4** |
| 11 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 70% | M | Nil | Garden | Nil | L | **Z12** |
| 12 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 70% | M | Nil | Garden | Nil | L | **Z12** |
| 13 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 70% | M | Nil | Garden | Nil | L | **Z12** |
| 14 | *Rhapis excelsa* | 4 | 2 | 150 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z12** |
| 15 | *Macadamia indica* | 8 | 6 | 250 | **3.0** | 80% | M | Nil | Garden | Nil | M | **A1** |
| 16 | *Angophora costata* | 18 | 16 | 600 | **7.2** | 80% | M | Nil | Garden | Nil | H | **A1** |
| 17 | *Casuarina cunninghamiana* | 26 | 12 | 600 | **7.2** | 80% | M | Nil | Garden | Nil | H | **A1** |
| 18 | *Celtis sp.* | 12 | 8 | 300 | **3.6** | 80% | M | Nil | Garden | Nil | M | **Z3** |
| 19 | *Celtis sp.* | 8 | 6 | 250 | **3.0** | 80% | M | Nil | Garden | Nil | M | **Z3** |
| 20 | *Archontophoenix alexandrae* | 7 | 2 | 150 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z12** |
| 21 | *Acer negundo* | 5 | 4 | 100 | **2.0** | 80% | S | Nil | Grass | Nil | L | **ZZ3** |
| 22 | *Betula nigra* | 7 | 6 | 300 | **3.6** | 80% | M | Nil | Grass | Nil | M | **Z12** |
| 23 | *Acmena smithii* | 14 | 14 | 500 | **6.0** | 80% | M | Nil | Garden | Nil | H | **A1** |
| 24 | *Magnolia soulangiana* | 4 | 2 | 100 | **2.0** | 50% | O | Dieback | Grass | Nil | L | **Z4** |

| No. | Genus species | Height | Spread | DBH | TPZ | Foliage % | Age class | Defects/Comment | Location | Services | Significance | Tree AZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | *Eriobotrya japonica* | 4 | 3 | 100 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z3** |
| 26 | *Lagerstroemia indica* | 6 | 4 | 150 | **2.0** | 70% | M | Nil | Garden | Nil | L | **Z12** |
| 27 | *Strelitzia sp.* | 4 | 2 | 100 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z3** |
| 28 | *Strelitzia sp.* | 4 | 2 | 100 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z3** |
| 29 | *Rhapis excelsa* | 4 | 2 | 150 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z12** |
| 30 | *Syagrus romanzofianum* | 12 | 4 | 350 | **4.2** | 80% | M | Nil | Garden | Nil | M | **Z3** |
| 31 | *Melaleuca quinquenervia* | 16 | 12 | 600 | **7.2** | 0% | M | Dead tree | Garden | Nil | H | **ZZ4** |
| 32 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 10% | M | Dieback | Garden | Nil | I | **ZZ4** |
| 33 | *Archontophoenix alexandrae* | 12 | 4 | 250 | **3.0** | 80% | M | Nil | Garden | Nil | M | **Z12** |
| 34 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 70% | M | Nil | Garden | Nil | L | **Z12** |
| 35 | *Howea forsteriana* | 5 | 2 | 100 | **2.0** | 80% | S | Nil | Garden | Nil | L | **Z12** |
| 36 | *Celtis sp.* | 8 | 6 | 250 | **3.0** | 80% | M | Nil | Garden | Nil | M | **Z3** |
| 37 | *Howea forsteriana* | 7 | 2 | 100 | **2.0** | 80% | S | Nil | Garden | Nil | L | **Z12** |
| 38 | *Howea forsteriana* | 5 | 2 | 100 | **2.0** | 80% | S | Nil | Garden | Nil | L | **Z12** |
| 39 | *Gordonia axillaris* | 5 | 4 | 250 | **3.0** | 80% | M | Nil | Garden | Nil | L | **A1** |
| 40 | *Camellia sp.* | 5 | 2 | 100 | **2.0** | 60% | M | Nil | Garden | Building | L | **Z2** |
| 41 | *Eucalyptus punctata* | 14 | 12 | 500 | **6.0** | 50% | M | Cavity \|Dieback | Garden | Nil | M | **Z9** |
| 42 | *Pyrus calleryana* | 9 | 6 | 300 | **3.6** | 80% | M | Nil | Garden | Nil | M | **A1** |
| 43 | *Alphitonia excelsa* | 10 | 9 | 350 | **4.2** | 80% | M | Nil | Garden | Nil | M | **A1** |
| 44 | *Alphitonia excelsa* | 9 | 5 | 300 | **3.6** | 70% | M | Nil | Garden | Nil | M | **A1** |
| 45 | *Jacaranda mimosifolia* | 10 | 9 | 400 | **4.8** | 80% | M | Nil | Garden | Nil | M | **A1** |
| 46 | *Jacaranda mimosifolia* | 12 | 10 | 450 | **5.4** | 80% | M | Co-dominant | Garden | Nil | M | **A1** |
| 47 | *Jacaranda mimosifolia* | 7 | 4 | 100 | **2.0** | 30% | M | Epicormic growth only | Garden | Nil | L | **ZZ5** |
| 48 | *Quercus robur* | 16 | 14 | 600 | **7.2** | 80% | M | Nil | Garden | Structure | H | **A1** |
| 49 | *Camellia sp.* | 5 | 4 | 200 | **2.4** | 80% | M | Nil | Garden | Nil | L | **Z12** |
| 50 | *Rhapis excelsa* | 7 | 2 | 150 | **2.0** | 80% | M | Nil | Garden | Nil | L | **Z12** |
| 51 | *× Cuprocyparis leylandii* | 6 | 3 | 150 | **2.0** | 70% | M | Hedge | Garden | Nil | M | **Z12** |
| 52 | *Magnolia grandiflora* | 5 | 4 | 200 | **2.4** | 70% | M | Nil | Garden | Nil | L | **Z12** |

| No. | Genus species | Height | Spread | DBH | TPZ | Foliage % | Age class | Defects/Comment | Location | Services | Significance | Tree AZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 10% | M | Dieback | Garden | Nil | I | **ZZ4** |
| 54 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 10% | M | Dieback | Garden | Nil | I | **ZZ4** |
| 55 | *Magnolia grandiflora* | 7 | 4 | 200 | **2.4** | 10% | M | Dieback | Garden | Nil | I | **ZZ4** |
| 56 | *Eucalyptus pilularis* | 28 | 22 | 900 | **10.8** | 80% | M | Nil | Garden | Nil | H | **AA1** |
| 57 | *Syagrus romanzofianum* | 6 | 3 | 300 | **3.6** | 70% | M | Nil | Garden | Building | L | **Z3** |
| 58 | *Eucalyptus pilularis* | 30 | 18 | 800 | **9.6** | 0% | M | Dead tree | Garden | Building | H | **ZZ4** |
| 59 | *Eucalyptus pilularis* | 30 | 20 | 600 | **7.2** | 0% | M | Dead tree | Garden | Nil | H | **ZZ4** |
| 60 | *Eucalyptus pilularis* | 30 | 16 | 700 | **8.4** | 80% | M | Nil | Garden | Nil | H | **A1** |
| 61 | *Eucalyptus pilularis* | 30 | 16 | 700 | **8.4** | 80% | M | Nil | Garden | Nil | H | **A1** |
| 62 | *Eucalyptus pilularis* | 30 | 16 | 600 | **7.2** | 80% | M | Nil | Garden | Nil | H | **A1** |
| 63 | *Quercus robur* | 9 | 8 | 450 | **5.4** | 80% | M | Nil | Grass | Nil | M | **A1** |

## Explanatory Notes

- **Measurements/estimates:** All dimensions are estimates unless otherwise indicated. Measurements taken with a tape or clinometer are indicated with a '*'. Less reliable estimated dimensions are indicated with a '?'.
- **Species:** The species identification is based on visual observations and the botanical name. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicated with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation sp if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.
- **Tree number:** relates to the reference number used on site diagram/report.
- **Height:** Height is estimated to the nearest metre.
- **Spread:** The average crown spread is visually estimated to the nearest metre from the outermost tips of the live lateral branches.
- **DBH:** These figures relate to 1.4m above ground level and are recorded in millimetres. If appropriate, diameter is measured with a diameter tape. 'M' indicates trees or shrubs with multiple stems.
- **Foliage Cover:** Percent of estimated live foliage cover for particular species range.
- **Age class:**

| | |
|---|---|
| **Y** | Young = recently planted |
| S | Semi-mature (<20% of life expectancy) |
| M | Mature (20-80% of life expectancy) |
| O | Over-mature (>80% of life expectancy) |

- **TPZ:** The Tree Protection Zone (TPZ) is the radial offset distance of twelve times the trunk diameter in meters.
- **Tree AZ:** See reference for Tree AZ categories in Appendix 3.
- **Significance:** A tree's significance/value in the landscape takes into account its prominence from a wide range of perspectives. This includes, but is not limited to neighbour hood perspective, local perspective and site perspective. The significance of the subject trees has been categorized into three groups, such as: High, Moderate or Low significance.

# APPENDIX 3

## TreeAZ Categories (Version 10.04-ANZ)

### Z Category Z: Unimportant trees not worthy of being a material constraint

**Local policy exemptions:** Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

| | |
|---|---|
| **Z1** | Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc |
| **Z2** | Too close to a building, i.e. exempt from legal protection because of proximity, etc |
| **Z3** | Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc |

**High risk of death or failure:** Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure

| | |
|---|---|
| **Z4** | Dead, dying, diseased or declining |
| **Z5** | Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc |
| **Z6** | Instability, i.e. poor anchorage, increased exposure, etc |

**Excessive nuisance:** Trees that are likely to be removed within 10 years because of unacceptable impact on people

| | |
|---|---|
| **Z7** | Excessive, severe and intolerable inconvenience to the extent that a locally recognised court or tribunal would be likely to authorise removal, i.e. dominance, debris, interference, etc |
| **Z8** | Excessive, severe and intolerable damage to property to the extent that a locally recognised court or tribunal would be likely to authorise removal, i.e. severe structural damage to surfacing and buildings, etc |

**Good management:** Trees that are likely to be removed within 10 years through responsible management of the tree population

| | |
|---|---|
| **Z9** | Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc |
| **Z10** | Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc |
| **Z11** | Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc |
| **Z12** | Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc |

**NOTE:** Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorisation hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

### A Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

| | |
|---|---|
| **A1** | No significant defects and could be retained with minimal remedial care |
| **A2** | Minor defects that could be addressed by remedial care and/or work to adjacent trees |
| **A3** | Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years |
| **A4** | Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment) |

**NOTE:** Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorisation hierarchy and should be given the most weight in any selection process.

TreeAZ is designed by Barrell Tree Consultancy (www.treeaz.com/tree_az/)

# APPENDIX 4

## Tree protection fencing and signs - Illustrative specification

**Protective fencing:** Protective 1.8m high fencing should be installed at the location illustrated on the Tree Management Plan before any site works start. All uprights should be fixed in position for the duration of the development activity. The fixings must be able to withstand the pressures of everyday site work.

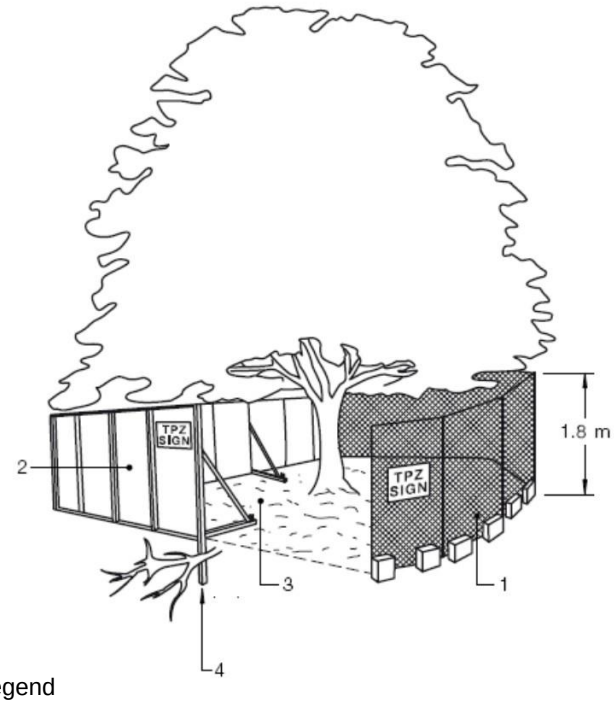
Inside the protective fencing, the following rules must be strictly observed:

- **No vehicular access**
- **No storage of excavated debris, building materials or fuels**
- **No excessive cultivation for landscape planting**
- **No fires**
- **No mixing of cement**
- **No service installation or excavation**

Once erected, protective fencing must not be removed or altered without consulting first with the project Arborist.

Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area and signage must be attached to outside of fencing.

**Signage:** All signs are to provide clear and readily accessible information to indicate that a TPZ has been established. Signage identifying the TPZ must be attached to outside of fencing and be visible from within the development site.




Signage example:

Legend

1. Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2. Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3. Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

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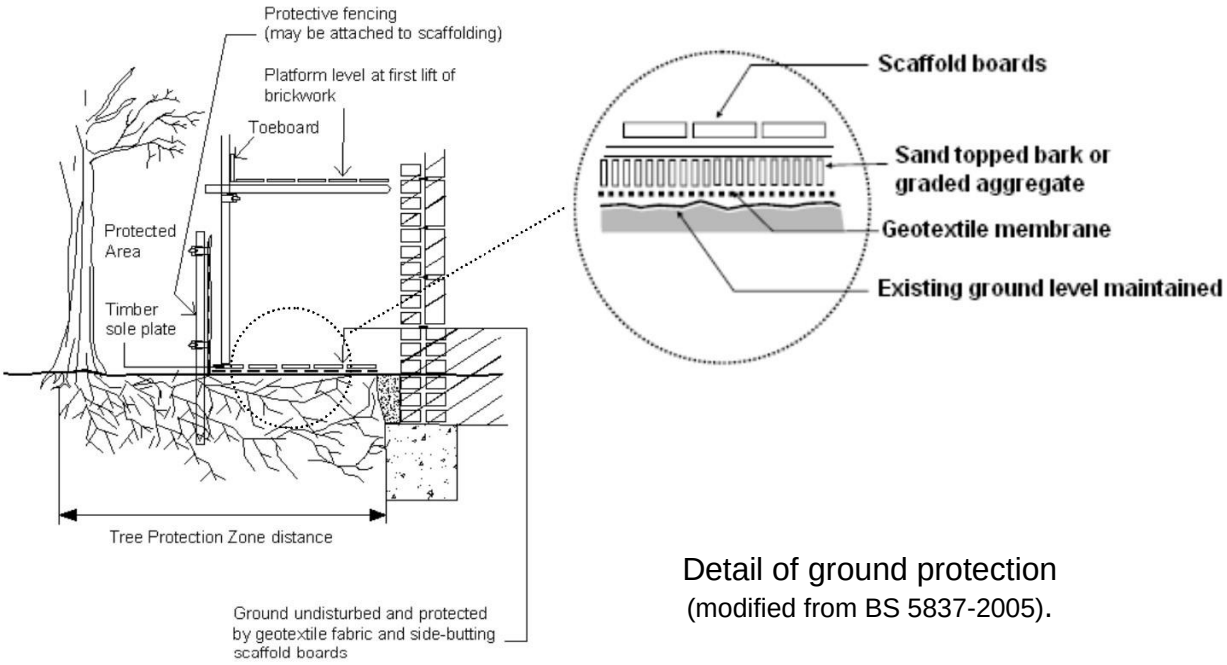
# APPENDIX 5

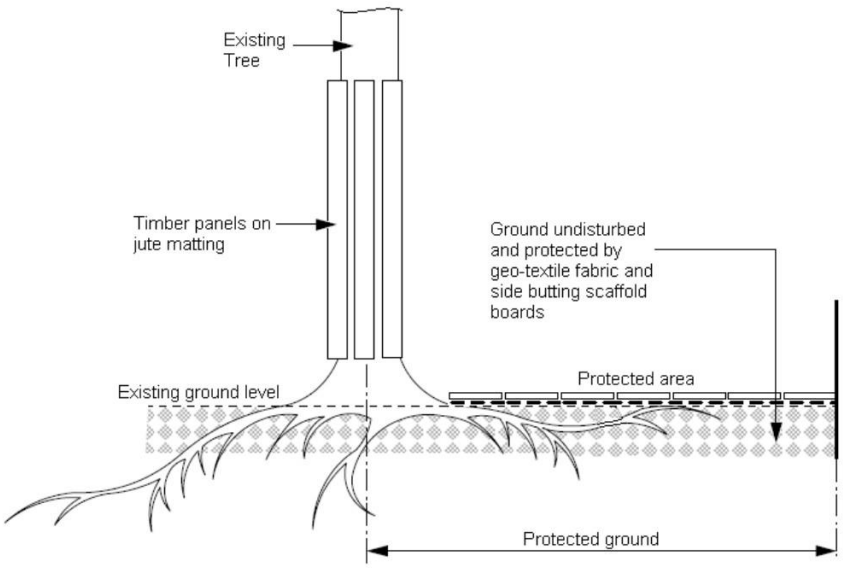
## Root zone and trunk protection - Illustrative specification

**Root zone protection:** Where necessary, access through the TPZ can be achieved by laying aggregate and timber boards (or similar) over the root zone to protect roots. The ground beneath the boarding should be left undisturbed and should be protected with a porous geo-textile fabric covered with sand or mulch.




Detail of ground protection
(modified from BS 5837-2005).

**Trunk protection:** Where fencing cannot be installed, the vertical trunk of exposed trees shall be protected by the placement of 3.6m lengths of 50 x 100mm hardwood timbers, spaced vertically, at 150mm centres and secured by 2mm wire at 300mm wide spacing over suitable protective padding material e.g. Jute Matting. The trunk protection shall be maintained intact until the completion of all work on site.




Detail of trunk protection.

# APPENDIX 6

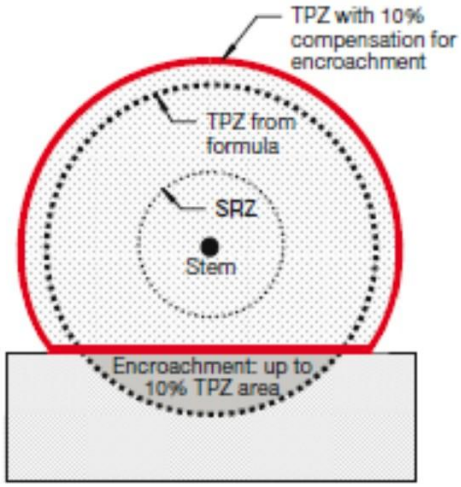
## Tree Protection Zone Encroachments AS4970-2009

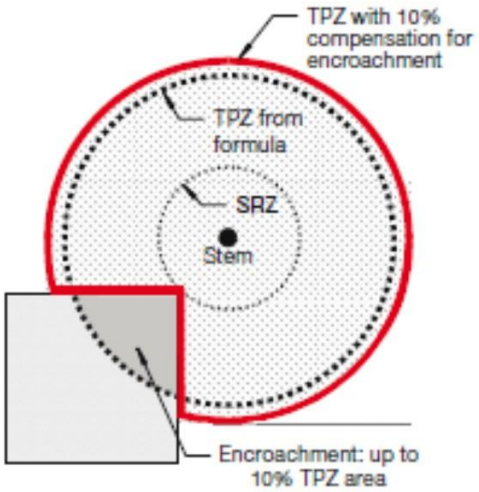
### Minor Encroachments

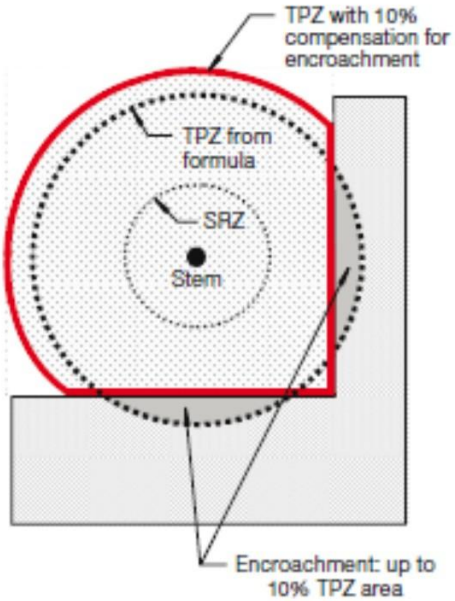
The proposed encroachment is less than 10% of the TPZ and outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

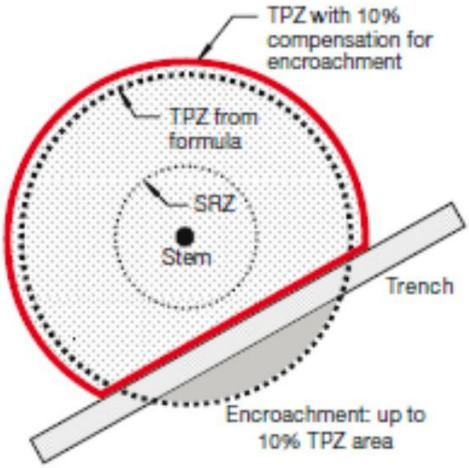
### Major Encroachments

The proposed encroachment exceeds 10% of the TPZ or inside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods.



# APPENDIX 7

## General guidance for working in TPZ

## 1 PURPOSE OF THIS GUIDANCE

This guidance sets out the general principles that must be followed when working within a TPZ. Where more detail is required, it will be supplemented by illustrative specifications in other appendices in this document (refer Appendix 4 and 5).

This guidance is based on the Australian Standards (2009) AS4970: *Protection of Trees on Construction Sites*.

Once the site works start, this guidance is specifically for the site personnel to help them understand what has been agreed and explain what is required to fully meet their obligations to protect trees. All personnel working in TPZs must be properly briefed about their responsibilities towards important trees based on this guidance.

This guidance should always be read in conjunction with the Tree Management Plan (TMP01) illustrating the areas where specific precautions are necessary. Each area where precautions are required is explained on the plan as identified on the legend. All protective measures should be installed according to the prevailing site conditions and agreed as satisfactory by the Project Arborist before any demolition or construction work starts.

## 2 TREE PROTECTION

### 2.1 Tree Protection Zone (TPZ)

The TPZ is a radial setback, extending outwards from the centre of the trunk, where disturbance must be minimised if important trees are to be successfully retained. The TPZ area is illustrated on the Tree Management Plan (TMP01) accompanying this guidance.

- The TPZ is a radial setback extending outwards from the centre of the trunk equal to the DBH x 12.
- This area shall be protected by tree protective fencing (refer Appendix 4).
- Any part of the TPZ outside of the tree protective fencing area must be isolated from the work operations by protective barriers and/or root zone protection for the duration of the work (refer Appendix 5).
- The Project Arborist shall approve the extent of the TPZ prior to commencement of works.
- The TPZ shall be mulched to a depth of 90mm with approved organic mulch e.g. leaf and wood chip where possible.
- Supplementary watering shall be provided in dry periods to reduce water or construction stress, particularly to those trees which may incur minor root disturbance.

The following activities shall be excluded within the TPZ:

- Excavation, compaction or disturbance of the existing soil.
- The movement or storage of materials, waste or fill.
- Soil level changes
- Disposal/runoff of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids
- Movement or storage of plant, machinery, equipment or vehicles.
- Any activity likely to damage the trunk, crown or root system.

### 2.2 Arboricultural supervision

Any work within TPZs requires a high level of care. Qualified arboricultural supervision is essential to minimise the risk of misunderstanding and misinterpretation. Site personnel must be properly briefed before any work starts. Ongoing work must be inspected regularly and, on completion, the work must be signed off by the Project Arborist to confirm compliance by the contractor.

### 2.3 Tree protection fencing, root zone and trunk protection

Prior to site establishment, tree protection fencing and root zone and trunk protection shall be installed to establish the TPZ for trees to be retained in accordance with site conditions. These protective barriers shall be maintained entire for the duration of the construction program (refer Appendix 4 and 5).

Tree protection fencing and trunk and root zone protection shall be removed following completion of construction. The mulch layer in the TPZ shall be retained and replenished where required to maintain a 75mm thickness

### 2.4 Pruning

All pruning work required (including root pruning) should be in accordance with Australian Standard No 4373-1996 - Pruning of Amenity Trees.

### 2.5 Tree Damage

In the event of damage to a tree or the TPZ, the Project Arborist shall be engaged to inspect and provide advice on remedial action. This should be implemented as soon as practicable and certified by the Project Arborist.

### 2.6 Post construction maintenance

In the event of any tree deteriorating in health after the construction period, the Project Arborist shall be engaged to provide advice on any remedial action. Remedial action shall be implemented as soon as practicable and certified by the Project Arborist.

## 3 EXCAVATION AND FILL IN TPZ

### 3.1 Excavation within TPZ

If excavation within the TPZ is required the following shall be applied to preserve tree root systems:

- Excavation within TPZ must be carried out under the instruction and supervision of the Project Arborist.
- A root mapping exercise is to be undertaken and certified by the Project Arborist. Root mapping shall be undertaken by either ground penetrating radar, air spade, water laser or by hand excavation using hand tools, taking care not to damage the bark and wood of any roots.
- The purpose of the root mapping shall be to locate woody structural roots greater than 40mm in diameter. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage.
- If digging by hand, a fork shall be used to loosen the soil and help locate any substantial roots.
- Once roots have been located, the trowel shall be used to clear the soil away from them without damaging the bark.
- Exposed roots to be removed shall be cut cleanly with a sharp saw or secateurs.
- Roots temporarily exposed shall be protected from direct sunlight, drying out and extremes of temperature by appropriate covering.

### 3.2 Fill within TPZ

Placement of fill material within the Tree Protection Zone of trees to be retained should be avoided where possible. However, where fill cannot be avoided:

- All fill material to be placed within the TPZ should be approved by Project Arborist and consist of a course, gap-graded material to provide aeration and percolation to the root zone. Materials containing a high percentage of ‘fines’ is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.
- No fill material should be placed in direct contact with the trunk.

# 4 DEMOLITION OF SURFACING/STRUCTURES IN TPZ

## 4.1 Definitions of surfacing and structures

For the purposes of this guidance, the following broad definitions apply:

• **Surfacing:** Any hard surfacing used as a vehicular road, parking or pedestrian path including tarmac, solid stone, crushed stone, compacted aggregate, concrete and timber decking.

• **Structures:** Any man-made structure above or below ground including service pipes, walls, gate piers, buildings and foundations. Typically, this would include drainage structures, services, car-ports, bin stores and concrete slabs that support buildings.

## 4.2 Demolition and access

Roots frequently grow adjacent to and beneath existing surfacing/structures so great care is needed during access and demolition. Damage can occur through physical disturbance of roots and/or the compaction of soil around them from the weight of machinery or repeated pedestrian passage. This is not generally a problem whilst surfacing/structures are in place because they spread the load on the soil beneath and further protective measures are not normally necessary. However, once they are removed and the soil below is newly exposed, damage to roots becomes an issue and the following guidance must be implemented:

- No vehicular or repeated pedestrian access into TPZ permitted unless on existing hard surfacing or root zone protection.
- Regular vehicular and pedestrian access routes must be protected from compaction with temporary root zone protection as set out in Appendix 5.
- Where a TPZ is exposed by the work, it must be protected as set out in AS4970 until there is no risk of damage from the development activity.

## 4.3 Removal of surfacing/structures

Removing existing surfacing/structures is a high-risk activity for any adjacent roots and the following guidance must be observed:

- Appropriate tools for manually removing debris may include a pneumatic breaker, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow.
- Machines with a long reach may be used if they can work from outside the TPZ or from protected areas within the TPZ.
- Debris to be removed from the TPZ manually must be moved across existing hard surfacing or temporary root zone protection in a way that prevents compaction of soil. Alternatively, it can be lifted out by machines provided this does not disturb the TPZ.
- Great care must be taken throughout these operations not to damage roots.

# 5 INSTALLATION OF SURFACING/STRUCTURES IN TPZ

**5.1 Basic principles:** New surfacing/structures in a TPZ are potentially damaging to trees because they may disturb the soil and disrupt the existing exchange of water and gases in and out of it. Adverse impact on trees can be reduced by minimising the extent of these changes within the TPZ.

- **Surfacing:** Suitable surfacing should be relatively permeable to allow water and gas movement, load spreading to avoid localised compaction and require little or no excavation to limit direct damage. The actual specification of the surfacing is an engineering issue that needs to be considered in the context of the bearing capacity of the soil, the intended loading and the frequency of loading. The detail of product and specification are beyond the scope of this guidance and must be provided separately by the appropriate specialist.

- **Structures:** Where possible structures are to be constructed above ground level on piled supports and redirecting water to where it is needed. The detailed design and specification of such structures is an engineering issue that should be informed and guided by the Project Arborist. Conventional strip foundations in the TPZ for any significant structure may cause excessive root loss and are unlikely to be acceptable. However, disturbance can be significantly reduced by supporting the above ground part of the structures on small diameter piles/piers or

cast floor slabs set above ground level. The design should be sufficiently flexible to allow the piles to be moved if significant roots are encountered in the preferred locations.

### 5.2 Establishing the depth of roots

The precise location and depth of roots within the soil is unpredictable and will only be known when careful digging starts on site. Ideally, all new surfacing within a TPZ should be no-dig, i.e. requiring no excavation whatsoever, but this is rarely possible on undulating surfaces.

New surfacing normally requires an evenly graded sub-base layer, which can be made up to any high points with granular, permeable fills such as crushed stone or sharp sand. This sub-base must not be compacted as would happen in conventional surface installation. Some limited excavation is usually necessary to achieve this and need not be damaging to trees if carried out carefully and large roots are not cut.

Tree roots and grass roots rarely occupy the same soil volume at the top of the soil profile, so the removal of a turf layer up to 50mm is unlikely to be damaging to trees. It may be possible to dig to a greater depth depending on local conditions but this would need to be assessed by the Project Arborist.

## 6 SERVICES IN TPZ

For the purposes of this guidance, services are considered as structures. Excavation to upgrade existing services or to install new services within a TPZ may damage retained trees and should only be chosen as a last resort. In the event that excavation emerges as the preferred option, the decision should be reviewed by the Project Arborist before any work is carried out. If excavation is agreed, all digging should be done carefully and follow the guidance set out in 3.1 above.

## 7 SOFT LANDSCAPING IN TPZ

For the purposes of this guidance, soft landscaping includes the re-profiling of existing soil levels and covering the soil surface with new plants or an organic covering (mulch). It does not include the installation of solid structures or compacted surfacing.

Soft landscaping activity after construction can be extremely damaging to trees.

No significant excavation or cultivation shall occur within the TPZ (e.g. planting holes). Where new designs require levels to be increased to tie in with new structures or surrounding ground level, good quality and relatively permeable top soil should be used for the fill. It should be firmed into place but not over compacted in preparation for turfing or careful shrub planting.

All areas close to tree trunks should be kept at the original ground level and have a mulched finish rather than grass to reduce the risk of mowing damage.

# APPENDIX 8

## Schedule of works and responsibilities

| Hold Point | Task | Responsibility | Certification | Timing of Inspection |
|---|---|---|---|---|
| 1 | Indicate clearly (with spray paint) trees approved for removal only | Principal Contractor | Project Arborist | Prior to demolition and site establishment |
| 2 | Establishment of tree protection fencing and additional root, trunk and/or branch protection | Principal Contractor | Project Arborist | Prior to demolition and site establishment |
| 3 | Supervise all excavations works proposed within the TPZ | Principal Contractor | Project Arborist | As required prior to the works proceeding adjacent to the tree |
| 4 | Inspection of trees by Project Arborist | Principal Contractor | Project Arborist | Monthly during construction period |
| 5 | Final inspection of trees by Project Arborist | Principal Contractor | Project Arborist | Prior to the issue of Occupation Certificate |

# APPENDIX 9

## Tree management plan

-refer attached Tree Management Plan, Dwg No. TMP01 (Revision A),
by Naturally Trees dated 9 April 2025

LEGEND:

- 01 — Category AA
- 01 — Category A
  Trees worthy of being a constraint
- 01 — Category Z
- 01 — Category ZZ
  Trees not worthy of being a constraint
- Existing layout
- Proposed layout
- Tree protection zone (TPZ) boundaries
- Protective fencing and TPZ area within
- TPZ where ground protection must be installed. Retain all existing levels.
- 01 — Tree to be retained & protected
- 01 — Tree to be removed

0 5 10m

| ISSUE | DATE | REVISION |
|---|---|---|

NOTE DO NOT SCALE FROM DRAWING. USE FIGURED DIMENSIONS ONLY. CHECK ALL DIMENSIONS ON SITE BEFORE ANY MANUFACTURE OR CONSTRUCTION

PROJECT

**19-25 Balfour Street, Lindfield NSW**

CLIENT

**Balfour Group Pty Ltd**

DRAWING

**Tree Management Plan**

Naturally Trees

| PROJECT # | DWG # | REV |
|---|---|---|
| DATE | 09/04/2025 | |
| SCALE @ A1 | 1:300 | TMP01 A |
| DRAWN | AS | |

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