

1 Summary

Reason for Assessment

Tree Logic Pty. Ltd. was engaged by the City of Port Phillip to undertake an arboricultural assessment and prepare a report for the property located at 351 St Kilda Road, St Kilda.

The requirements of the arboricultural report include:

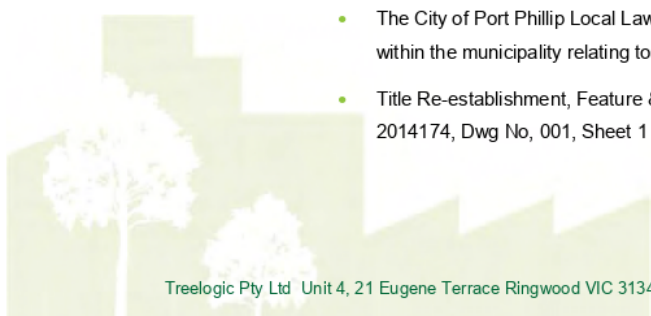
- To provide information on the species, origin, dimensions, health and structure of the trees and their appropriateness for retention.
- Determine the Tree Protection Zones (TPZ) and Structural root zones (SRZ) for trees compliant with AS4970 'Protection of trees on development sites'.
- Review the statutory requirements relating to tree preservation that apply to the subject site.
- To offer recommendations regarding management for retained trees including, design or construction considerations and tree protection measures.

2 Method

- 2.1 A site inspection was carried out on Thursday June 17, 2021. The trees were inspected from the ground and observations were made of the growing environment and surrounding area. The trees were not climbed and no samples of the trees or soil were taken for further analysis.
- 2.2 Only trees were assessed and data collected. A tree is generally a plant with a height greater than 5 metres on a single trunk with a single trunk (stem) diameter (DBH) being greater than 150 mm at a height of 1.4 metres above ground level.
- 2.3 Observations were made of the assessed trees to determine the species, age category, and condition with measurements taken to establish tree crown height (measured with a height meter) and crown width (paced) and trunk dimensions (measured 1.4 metres above ground level with a diameter tape unless otherwise stated). Descriptors used in the assessment can be seen in Appendix 3.
- 2.1 Trees located within neighbouring properties were assessed from within the subject site. Observations were limited to one side only and all measurements were estimated.
- 2.2 Assessment details of individual trees are listed in the tree assessment detail attached as Appendix 1 and their location can be seen in Appendix 2.
- 2.3 Some photographs of the trees and the environs were taken for further reference and inclusion in the report.
- 2.4 Each of the assessed trees was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health and structure) with tree amenity value. Definitions of arboricultural ratings can be seen in Appendix 3.
- 2.5 The assessed trees have been allocated tree protection zones (TPZ). The Australian Standard, AS 4970-2009, has been used as a guide in the allocation of TPZs for the assessed trees. This method provides a TPZ that addresses both the stability and growing requirements of a tree. TPZ distances are measured as a radius, from the centre of the trunk at (or near) ground level. All TPZ measurements for retained trees are provided in Appendix 1.

Documents viewed;

- Planning Property Report for 351 St Kilda Road, St Kilda (www.planning.vic.gov.au, cited 21/06/2021).
- The subject site is located within the City of Port Phillip Planning Scheme and scheduled to the General Residential Zone (GRZ13).
- The City of Port Phillip Local Law No.1 (Community Amenity) (2013) applies to all land within the municipality relating to significant trees.
- Title Re-establishment, Feature & Level Plan, prepared by Land Surveys, Job No. 2014174, Dwg No, 001, Sheet 1 of 1, Rev A, dated 03/06/2021.



3 Observations

- 3.1 The subject site was a flat parcel of land located on the western side of St Kilda Road, near the intersection of Carlisle Street. The site was approximately 434 m² in size that consisted of planted trees with a turfgrass understorey. Residential properties abutted the site to the north and west. See Figure 1.



Figure 1: An aerial view of the tree study area located at 351 St Kilda Road, St Kilda (nearmaps.com, cited 21/06/2021).

Tree Population

- 3.2 Nine (9) individual trees and one (1) tree group (comprising 8 stems) were assessed in total. The details of each tree can be seen in the tree assessment table attached as Appendix 1 and their location can be seen in Appendix 2.
- 3.3 Based upon the species present, they were all planted specimens.
- Trees 1 – 4 were a mix of Prickly-leaved Paperbarks (*Melaleuca styphelioides*) and Cyprian Plane (*Platanus Xorientalis* 'Digitata') trees located within the road reserve of St Kilda Road.
 - Trees 5 – 9 were all Prickly-leaved Paperbarks located within the subject site.
 - Tree group 1 consisted of 8 x Bhutan Cypress (*Cupressus torulosa*) trees was located within the western neighbouring property.



- 3.4 Tree health was based on foliage colour, size and density as well as shoot initiation and elongation. The assessed trees were displaying fair health with characteristics that were typical of the species growing under the current environment conditions. The trees were not exhibiting any signs of decline or health-related issues.
 - The northern most tree within Tree group 1 was dead.
- 3.5 Tree structure was assessed for structural defects and deficiencies, likelihood of failures and risk to potential targets. The assessed trees exhibited no major structural defects that present an elevated risk. Acute primary unions were observed within several trees and the crowns of some trees were partly suppressed by adjacent trees.
- 3.6 The assessed trees were attributed with an arboricultural rating. This rating relates to the combination of tree condition factors, including health and structure (arboricultural merit), and conveys an amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within an urban landscape context.

Table 1: Summary of arboricultural ratings.

Arboricultural Rating	No. of trees	Tree numbers
Moderate B	1	1, Tree group 1
Moderate C	8	2, 3, 4, 5, 6, 7, 8, 9
Total	9	

- 3.7 A summary of the arboricultural ratings applied by Treelogic is provided below. The arboricultural rating attributed to each tree feature can be seen in Appendix 1 and the descriptors used to determine the rating can be seen in Appendix 4.

Trees attributed with an arboricultural rating of High represent trees of high quality in better than typical condition. Generally, the tree is a prominent feature of the landscape, or a good example of the species, rare or uncommon. It may also have significant conservation or other cultural value. These trees have the potential to be medium to long-term components of the landscape if managed appropriately.

Trees attributed with an arboricultural rating of Moderate A represent trees that are moderate to large mature examples in fair or better condition that contribute to the landscape character. These trees may have conservation or other cultural values. Retention of these trees is highly desirable as they have the potential to be medium to long-term features of the landscape if managed appropriately.

Trees attributed with an arboricultural rating of Moderate B represent trees that are greater than 50 % of their attainable size, are well established in the landscape, exhibit fair or better overall condition with good vigour and contribute to the landscape character. These trees have a moderate to long useful life expectancy if managed appropriately and are desirable to be retained within any proposed development.



Trees attributed with an arboricultural rating of Moderate C were of moderate quality in fair condition. They may also be relatively of small size and semi or early-mature in age or, a maturing tree with accumulating deficiencies, trending towards becoming of Low arboricultural value. These trees may have a moderate-long useful life expectancy, if managed appropriately and retention of these trees is generally desirable within a development context.

Trees attributed with an arboricultural rating of Low represent trees displaying health and/or structural issues that are limiting factors to their retention or, were of small size that could be easily replaced within new landscape plantings. These trees should not be a constraint on development occurring within the site however, they could be retained if not requiring a disproportionate expenditure of resources for a tree in its current condition and location.

Trees attributed with an arboricultural rating of None exhibit a severe health problem and/or structural defect that cannot be sustained with practical arboricultural treatment and the loss of the tree is expected in the short-term.

4 Photos

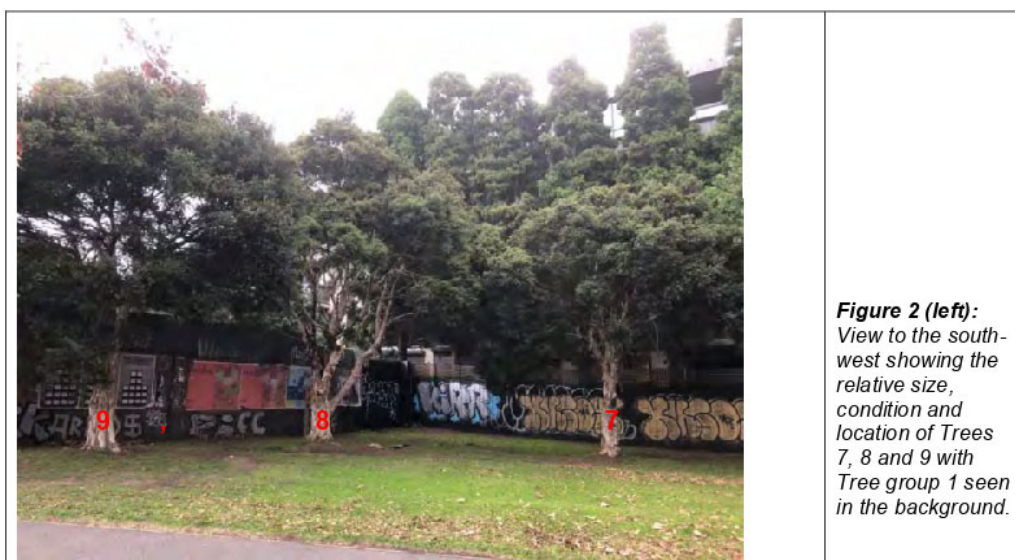




Figure 3 (left): View to the north-west showing the relative size, condition and location of Trees 5, 6 and 7 with Tree group 1 seen in the background.



Figure 4 (above left): View to the south showing Trees 2- 4 located within the road reserve of St Kilda Road.



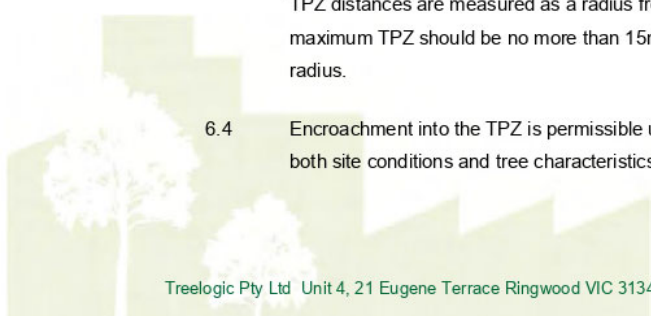
Figure 5 (above right): Shows the relative size, condition and location of Tree 1 located within the road reserve of St Kilda Road.

5 Permit Requirements.

- 5.1 The City of Port Phillip Local Law No.1 (Community Amenities) (2013) applies to all land within the municipality relating to significant trees.
- 5.2 A 'Significant Tree' is defined as a tree or palm located on private land:
- with a trunk circumference of 150 centimetres or greater measured 1 metre from its base;
 - a multi-stemmed tree on private land where the circumference of its exterior stems equals or is greater than 1.5 metres when measured 1 metre from its base: or
 - if the tree has been removed a trunk circumference of 150 centimetres or greater measured at its base.
- 5.3 Under the Local Law No. 1 (2013) a permit is required to:
- destroy, damage or remove or allow to be destroyed, damaged or removed; or
 - cut, trim, lop or prune or allow to be cut, trimmed, lopped or pruned,
- 5.4 Trees 5, 6, 8 and 9 conform to the Local Law No. 1 (2013) and would require a permit if they are to be removed, lopped or destroyed or cut, trimmed or pruned.
- 5.5 Tree 7 and Tree group 1 are undersized and exempt from permit requirements under the Local Law No. 1 (2013). However, Tree group 1 would require permission from the tree owner should they be removed, lopped or destroyed.
- 5.6 Trees 1 – 4 would require permission from the Responsible Authority if they are to be removed, lopped or destroyed.

6 Tree protection zones

- 6.1 The most important consideration for the successful retention of trees is to allow appropriate above and below ground space for the trees to continue to grow. This requires the allocation of tree protection zones for retained trees.
- 6.2 The Australian Standard (AS 4970-2009) 'Protection of Trees on Development Sites' has been used as a guide in the allocation of TPZs for the assessed trees. The TPZ for individual trees is calculated based on trunk diameter (DBH measured in centimetres), measured at 1.4 metres up from ground level. The radius of the TPZ is calculated by multiplying the trees DBH by 12.
- 6.3 This method provides a TPZ that addresses both the stability and growing requirements of a tree. TPZ distances are measured as a radius from the centre of the trunk at (or near) ground level. The maximum TPZ should be no more than 15m radius and the minimum TPZ should be no less than 2m radius.
- 6.4 Encroachment into the TPZ is permissible under certain circumstances though this is dependent on both site conditions and tree characteristics. Minor encroachment, up to 10% of the TPZ, is generally



permissible provided encroachment is compensated for by recruitment of an equal area contiguous with the TPZ. Encroachment must also consider the crown of the tree and ensure that excessive pruning is not required that would cause the tree to become unbalanced or disfigured.

- 6.5 The 10% encroachment on one side equates to approximately a 1/3 reduction of the radial distance.

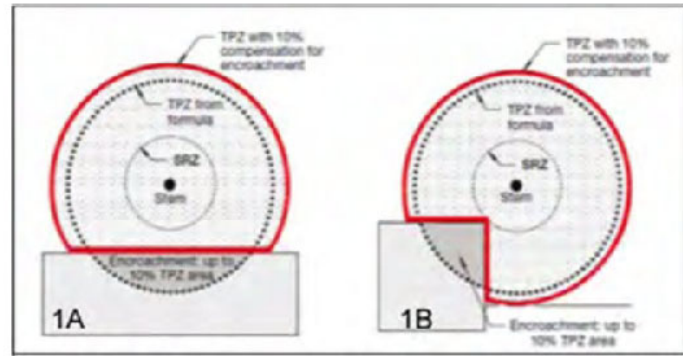
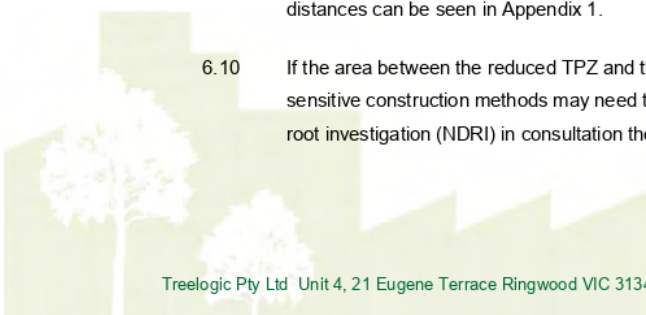


Diagram 1A & 1B: Examples of minor encroachment into a TPZ
 Extract from: AS4970-2009, Appendix D, p30 of 32

Figure 6: Examples of minor encroachment are provided in Diagram 1A & 1B.

- 6.6 Encroachment greater than 10% is considered major encroachment under AS4970-2009 and is only permissible if it can be demonstrated that after such encroachment the tree would remain viable. A non-destructive root investigation (NDRI) may be required to investigate and identify the location of roots within the proposed area of encroachment and root sensitive construction methods may need to be utilized.
- 6.7 Tree root growth is opportunistic and occurs where the essentials to life (primarily air and water) are present. Heterogeneous soil conditions, existing barriers, hard surfaces and buildings may have inhibited the development of a symmetrically radiating root system. Existing infrastructure around some trees may be within the TPZ or root plate radius. Where this has occurred, the roots of some trees may have grown in response to the site conditions and if existing hard surfaces and building alignments are utilised in new designs the impacts on trees should be minimal.
- 6.8 All TPZ measurements are provided in the tree assessment data in Appendix 1.
- 6.9 The Structural Root Zone (SRZ) is the area in which the larger woody roots required for tree stability are found close to the trunk and which then generally taper rapidly. This is the minimum area recommended to maintain tree stability but does not reflect the area required to sustain tree health. No works are permitted within the SRZ radius as tree stability maybe compromised. All SRZ distances can be seen in Appendix 1.
- 6.10 If the area between the reduced TPZ and the SRZ is encroached within the proposed design, root sensitive construction methods may need to be adopted that are based on results of non-destructive root investigation (NDRI) in consultation the consulting arborist or Responsible Authority.



7 Discussion

- 7.1 The arboricultural assessment report provides information to Architects, Designers and Planners about the tree population. It assists in determining which trees are best suited for retention within a development context and provides measures to protect and preserve their condition.
- 7.2 Protecting retained trees during all phases of the development process is critical to maintain their ongoing condition. Repairing 'stressed' or 'injured' trees is rarely successful therefore, their protection ensures they provide tangible benefits to the landscape and broader community into the medium to long-term future.
- 7.3 The tree population was in overall fair condition exhibiting no significant health or structural issues that limit the potential within the landscape. In general, they were in the early phase of their lifecycle and are expected to continue to develop in size. Therefore, within the context of a site development they were in a condition suitable for retention.
- 7.4 Trees 1 – 4 were located within the road reserve of St Kilda Road and must be considered for retention within a development context.
- 7.5 Tree Group 1 was located within the neighbouring western property and must be considered for retention within a development context. The tree group of was located close to the title boundary and it would be expected that their roots have developed within the subject site. Root development on the western side is likely to be restricted by the apartment complex. Due to the root restriction, any encroachment into the 4.2 m TPZ may require exploratory investigation to determine the extent of root growth within the subject site.
- 7.6 Where trees are to be retained within the proposed any proposed development, the erection of tree protection fencing at the edge of the TPZ is imperative to prevent damage to roots, trunk, branches and soil compaction within the TPZ that can have an adverse impact upon tree condition. Figure 7 provides a suitable type of fencing around retained trees.

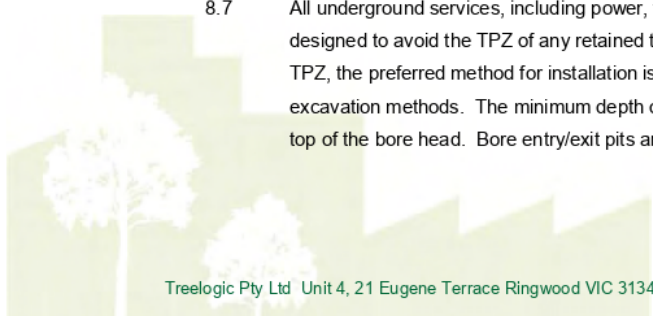


Figure 7: Example of signage for TPZ and of appropriate TPZ fencing for a street tree that can be utilised for all retained trees.

- 7.7 If protection fencing is unsuitable during construction, a ground protection system in accordance with Section 4.5.3 (Ground protection) of the Australian Standard (AS4970-2009) for Protection of trees on development sites must be installed (See Appendix 4).
- 7.8 All underground services, including power, telecommunication, gas, water, drainage must be designed to avoid the TPZ of any retained tree. Where it is unavoidable to locate services within the TPZ, the preferred method for installation is horizontal directional boring or, utilising root sensitive excavation methods. The minimum depth of the bore is 600 mm below the existing soil grade to the top of the bore head. Bore entry/exit pits are to be located outside the TPZs of retained trees.
- 7.9 The existing soil grade must be maintained within the TPZ of any retained tree.
- 7.10 All conditions of the tree protection guidelines attached as Appendix 4 must be adopted and applied for the duration of the site development including, demolition, bulk earthworks, excavation or the installation of underground services or any construction related activity.

8 Conclusion

- 8.1 Nine (9) individual trees and one (1) tree group (comprising 8 stems) in total were assessed in relation to the subject site located at 351 St Kilda Road in St Kilda.
- 8.2 The tree population consisted of planted specimens located within and adjacent to the subject site. The trees were in fair overall condition, exhibiting no significant health or structural issues that limit the potential within the landscape or retention viability.
- 8.3 The City of Port Phillip Local Law No.1 (Community Amenity) (2013) applies to all land within the municipality relating to significant trees. Trees 5, 6, 8 and 9 conform to the Local Law No. 1 (2013) and would require a permit if they are to be removed, lopped or destroyed or cut, trimmed or pruned. Tree 7 and tree group 1 would be exempt from permit requirements.
- 8.4 Trees 1 – 4 would require permission from the Responsible Authority if they are to be removed, lopped or destroyed.
- 8.5 Tree protection and structural root zones have been calculated for the assessed trees in accordance with the Australian Standard (AS 4970-2009) 'Protection of Trees on Development Sites'. This method provides a TPZ that addresses both the stability and growing requirements of a tree. See Appendix 1 for all distances.
- 8.6 Where trees are retained with a development context, they must be appropriately protected during all phases of construction activity to ensure their ongoing condition is maintained.
- 8.7 All underground services, including power, telecommunication, gas, water, drainage must be designed to avoid the TPZ of any retained tree. Where it is unavoidable to locate services within the TPZ, the preferred method for installation is horizontal directional boring or, utilising root sensitive excavation methods. The minimum depth of the bore is 600 mm below the existing soil grade to the top of the bore head. Bore entry/exit pits are to be located outside the TPZs of retained trees.



- 8.8 The existing soil grade must be maintained within the TPZ of any retained tree.
- 8.9 All conditions of the tree protection guidelines attached as Appendix 4 must be adopted and applied for the duration of the site development including, demolition, bulk earthworks, excavation or the installation of underground services or any construction related activity.

I am available to answer any questions arising from this report.

No part of this report is to be reproduced unless in full.

Signed



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References

Australian Standard (4970-2009) Protection of Trees on development sites. Standards Australia, Sydney NSW Australia.

Clark, J.R. & Matheny, N.P (1998), Trees and Development: A technical guide to preservation of trees during land development. ISA, Champaign, Illinois.

Australian Standard (4373-2007) Pruning of amenity trees. Standards Australia, Sydney NSW Australia.

Harris R.W., Clark J.R. & Matheny N.P., Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines, Prentice Hall, Upper Saddle River, New Jersey 07458.



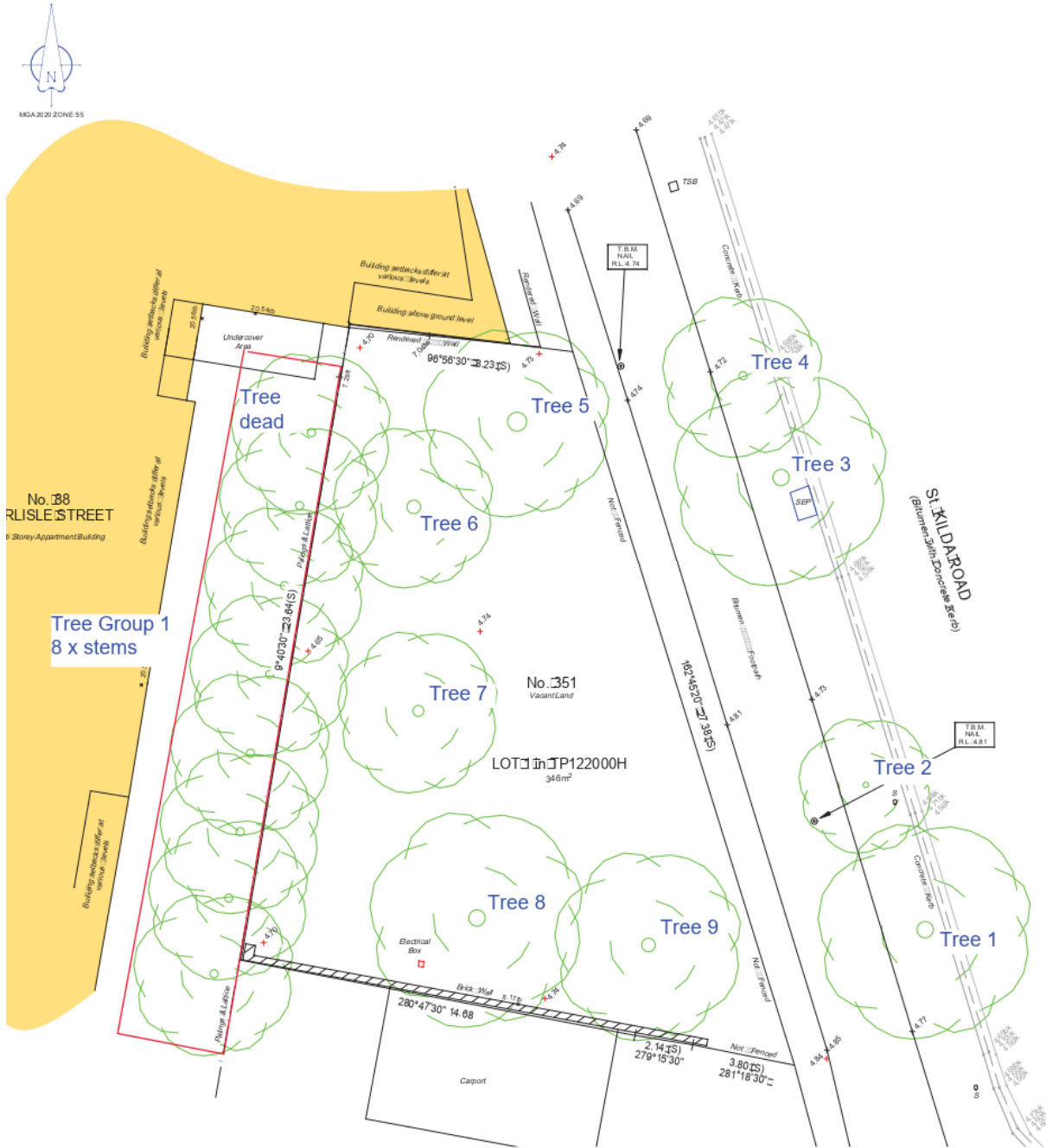
Appendix 1: Tree Assessment Table: 351 St Kilda Road, St Kilda (Treelogic, 2021).

Key: **DBH** = Diameter at breast height, 1.4m up trunk, unless otherwise indicated. Basal dimensions is trunk diameter at base immediately above root buttress. **ARB rating** = arboricultural rating. **TPZ** = Tree protection zone in radial metres. **SRZ** = Structural root zone in radial metres. **ULE** = Useful Life Expectancy measured in years. Definition of the descriptor categories used in the assessment can be seen Appendix 3.

Tree No	Common Name (Botanical Name)	Type	DBH (cm)	Trunk circumference (cm)	Height x Width (m)	Age	Health	Structure	Comment	Arb Rating	ULE	TPZ (m radius)	SRZ (m radius)	Local Law Permit Requirement
1	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	56 @ 0.5m	175.952	10 x 10	Maturing	Fair	Fair	Street tree.	Moderate B	20_30	6.7	2.7	Council permission
2	Cyprian Plane (<i>Platanus orientalis</i> 'Digitata')	Exotic deciduous	22	69.124	7 x 6	Semi-mature	Fair	Fair	Street tree. Minor crown asymmetry to north	Moderate C	20_30	2.6	1.9	Council permission
3	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	28,35	197.946	7 x 7	Early maturity	Fair	Fair-poor	Street tree.	Moderate C	20_30	5.4	2.6	Council permission
4	Cyprian Plane (<i>Platanus orientalis</i> 'Digitata')	Exotic deciduous	25	78.55	7 x 7	Semi-mature	Fair	Fair	Street tree.	Moderate C	20_30	3.0	2.1	Council permission
5	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	25,29,39	292.206	7 x 8	Early maturity	Fair	Fair-poor		Moderate C	20_30	6.6	2.7	Yes
6	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	13,19,24	175.952	7 x 8	Early maturity	Fair	Fair	Minor asymmetry-east	Moderate C	20_30	4.0	2.3	Yes
7	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	34 @ 1m	106.828	6 x 6	Early maturity	Fair	Fair-poor		Moderate C	20_30	4.1	2.2	No
8	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	40,20,20	251.36	7 x 8	Early maturity	Fair	Fair		Moderate C	20_30	5.9	2.5	Yes

Tree No	Common Name (Botanical Name)	Type	DBH (cm)	Trunk circumference (cm)	Height x Width (m)	Age	Health	Structure	Comment	Arb Rating	ULE	TPZ (m radius)	SRZ (m radius)	Local Law Permit Requirement
9	Prickly-leaved Paperbark (<i>Melaleuca styphelioides</i>)	Australian native	24,25	153.958	6 x 6	Early maturity	Fair	Fair-poor		Moderate C	20_30	4.2	2.4	Yes
Tree Group 1	Bhutan Cypress (<i>Cupressus torulosa</i>)	Exotic conifer	35	109.97	15 x 3	Early maturity	Fair	Fair	Neighbour's tree.8 x stems in total. Northern most tree dead.	Moderate B	20_30	4.2	2.1	No

Site location plan: 351 St. Kilda Road, St. Kilda (Treelogic, 2021).



Appendix 3: Arboricultural Descriptors (February 2019).

Note that not all of the described tree descriptors may be used in a tree assessment and report. The assessment is undertaken with regard to contemporary arboricultural practices and consists of a visual inspection of external and above-ground tree parts.

1. Tree Condition

The assessment of tree condition evaluates factors of health and structure. The descriptors of health and structure attributed to a tree evaluate the individual specimen to what could be considered typical for that species growing in its location under current climatic conditions. For example, some species can display inherently poor branching architecture, such as multiple acute branch attachments with included bark. Whilst these structural defects may technically be considered arboriculturally poor, they are typical for the species and may not constitute an increased risk of failure. These trees may be assigned a structural rating of fair-poor (rather than poor) at the discretion of the assessor.

Diagram 1, provides an indicative distribution curve for tree condition to illustrate that within a normal tree population the majority of specimens are centrally located within the condition range (normal distribution curve). Furthermore, that those individual trees with an assessed condition approaching the outer ends of the spectrum occur less often.

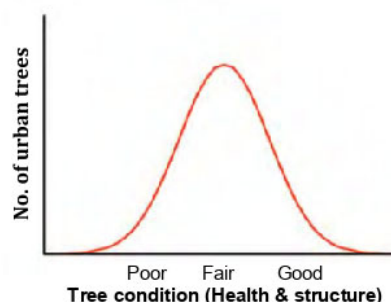


Diagram 1: Indicative normal distribution curve for tree condition

2. Tree Name

Provides botanical name, (genus, species, variety and cultivar) according to accepted international code of taxonomic classification, and common name.

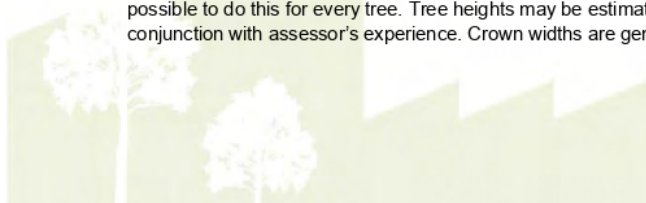
3. Tree Type

Describes the general geographic origin of the species and its type e.g. deciduous or evergreen.

Category	Description
Indigenous	Occurs naturally in the area or region of the subject site. Remnant.
Victorian native	Occurs naturally within some part of the State of Victoria (not exclusively) but is not indigenous (component of EVC benchmark). Could be planted indigenous trees.
Australian native	Occurs naturally within Australia but is not a Victorian native or indigenous
Exotic deciduous	Occurs outside of Australia and typically sheds its leaves during winter
Exotic evergreen	Occurs outside of Australia and typically holds its leaves all year round
Exotic conifer	Occurs outside of Australia and is classified as a gymnosperm
Native conifer	Occurs naturally within Australia and is classified as a gymnosperm
Native Palm	Occurs naturally within Australia. Woody monocotyledon
Exotic Palm	Occurs outside of Australia. Woody monocotyledon

4. Height and Width

Indicates height and width of the individual tree; dimensions are expressed in metres. Crown heights are measured with a height meter where possible. Due to the topography of some sites and/or the density of vegetation it may not be possible to do this for every tree. Tree heights may be estimated in line with previous height meter readings in conjunction with assessor's experience. Crown widths are generally paced (estimated) at the widest axis or can be



measured on two axes and averaged. In some instances the crown width can be measured on the four cardinal direction points (North, South, East and West).

Crown height, crown spread are generally recorded to the nearest half metre (crown spread would be rounded up) for dimensions up to 10 m and the nearest whole metre for dimensions over 10 m. Estimated dimensions (e.g. for off-site or otherwise inaccessible trees where accurate data cannot be recovered) shall be clearly identified in the assessment data.

5. Trunk diameters

The position where trunk diameters are captured may vary dependent on the requirements of the specific assessment and an individual trees specific characteristics. DBH is the typical trunk diameter captured as it relates to the allocation of tree protection distances. The basal trunk diameter assists in the allocation of a structural root zone. Some municipalities require trunk diameters be captured at different heights, with 1.0 m above grade being a common requirement. The specific planning schemes will be checked to ascertain requirements.

Stem diameters shall be recorded in centimetres, rounded to the nearest 1 cm (0.01 m).

Diameter at Breast Height (DBH)

Indicates the trunk diameter (expressed in centimetres) of an individual tree measured at 1.4m above the existing ground level or where otherwise indicated, multiple leaders are measured individually. Plants with multiple leader habit may be measured at the base. The range of methods to suit particular trunk shapes, configurations and site conditions can be seen in Appendix A of Australian Standard AS 4970-2009 *Protection of trees on development sites*. Measurements undertaken using foresters tape or builders tape.

Basal trunk diameter

The basal dimension is the trunk diameter measured at the base of the trunk or main stem(s) immediately above the root buttress. Used to ascertain the Structural Root Zone (SRZ) as outlined in AS4970.

6. Health

Assesses various attributes to describe the overall health and vitality of the tree.

Category	Vitality, Extension growth	Decline symptoms, Deadwood, Dieback	Foliage density, colour, size, intactness	Pests and or disease
Good	Above typical. Excellent. Full canopy density	Negligible	Better than typical	Negligible
Fair	Typical vitality. >80% canopy density	Minor or expected. Little or no dead wood	Typical. Minor deficiencies or defects could be present.	Minor, within damage thresholds
Fair to Poor	Below typical - low vitality	More than typical. Small sub-branch dieback	Exhibiting deficiencies. Could be thinning, or smaller	Exceeds damage thresholds
Poor	Minimal - declining	Excessive, large and/or prominent amount & size of dead wood. Significant dieback	Exhibiting severe deficiencies. Thinning foliage, generally smaller or deformed	Extreme and contributing to decline
Dead	N/A	N/A	N/A	N/A



7. Structure

Assesses principal components of tree structure (Diagram 2).

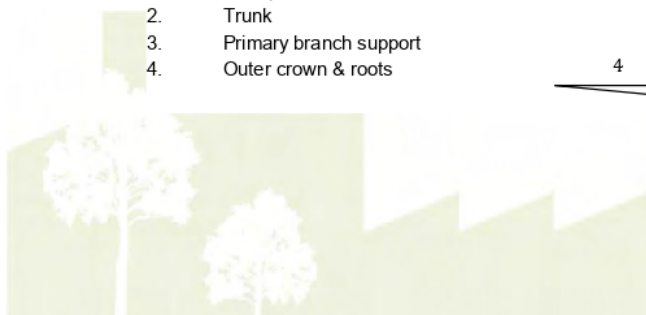
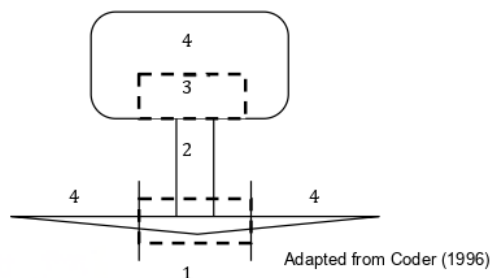
Descriptor	Zone 1 - Root plate & lower stem	Zone 2 - Trunk	Zone 3 - Primary branch support	Zone 4 - Outer crown and roots
Good	No obvious damage, disease or decay; obvious basal flare / stable in ground	No obvious damage, disease or decay; well tapered	Well formed, attached, spaced and tapered. No history of failure.	No obvious damage, disease, decay or structural defect. No history of failure.
Fair	Minor damage or decay. Basal flare present.	Minor damage or decay	Generally, well attached, spaced and tapered branches. Minor structural deficiencies may be present or developing. No history of branch failure.	Minor damage, disease or decay; minor branch end-weight or over-extension. No history of branch failure.
Fair to Poor	Moderate damage or decay; minimal basal flare.	Moderate damage or decay; approaching recognised thresholds	Weak, decayed or with acute branch attachments; previous branch failure evidence.	Moderate damage, disease or decay; moderate branch end-weight or over-extension. Minor branch failure evident.
Poor	Major damage, disease or decay; fungal fruiting bodies present. Excessive lean placing pressure on root plate	Major damage, disease or decay; exceeds recognised thresholds; fungal fruiting bodies present. Acute lean. Stump re-sprout	Decayed, cavities or has acute branch attachments with included bark; excessive compression flaring; failure likely. Evidence of major branch failure.	Major damage, disease or decay; fungal fruiting bodies present; major branch end-weight or over-extension. Branch failure evident.
Very Poor	Excessive damage, disease or decay; unstable / loose in ground; altered exposure; failure probable	Excessive damage, disease or decay; cavities. Excessive lean. Stump re-sprout	Decayed, cavities or branch attachments with active split; failure imminent. History of major branch failure.	Excessive damage, disease or decay; excessive branch end-weight or over-extension. History of branch failure.

Structure ratings will also take into account general branching architecture, stem taper, live crown ratio, crown symmetry (bias or lean) and crown position such as tree being suppressed amongst more dominant trees.

The lowest or worst descriptor assigned to the tree in any column could generally be the overall rating assigned to the tree. The assessment for structure is limited to observations of external and above ground tree parts. It does not include any exploratory assessment of underground or internal tree parts unless this is requested as part of the investigation. Trees are assessed and then given a rating for a point in time. Generally, trees with a poor or very poor structure are beyond the benefit of practical arboricultural treatments.

Diagram 2: Tree structure zones

1. Root plate & lower stem
2. Trunk
3. Primary branch support
4. Outer crown & roots



The management of trees in the urban environment requires appropriate arboricultural input and consideration of risk. Risk potential will consider the combination of likelihood of failure and impact, including the perceived importance of the target(s).

8. Age class

Relates to the physiological stage of the tree's life cycle.

Category	Description
Young	Sapling tree and/or recently planted. Approximately 5 or less years in location.
Semi-mature	Tree increasing in size and yet to achieve expected size in situation. Primary developmental stage.
Early-mature	Tree established, generally growing vigorously. > 50% of attainable age/size.
Mature	Specimen approaching expected size in situation, with reduced incremental growth.
Over-mature	Mature full-size with a retrenching crown. Tree is senescent and in decline. Significant decay generally present.

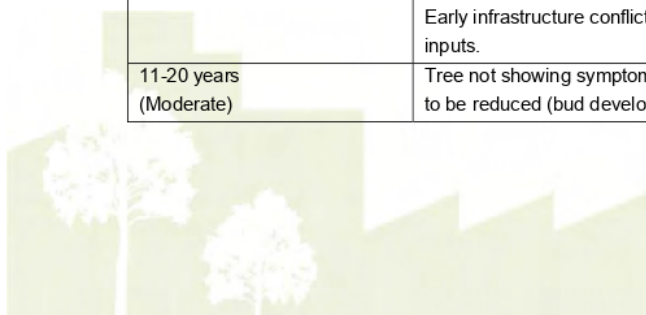
9. Useful life expectancy

Assessment of useful life expectancy provides an indication of health and tree appropriateness and involves an estimate of how long a tree is likely to remain in the landscape based on species, stage of life (cycle), health, amenity, environmental services contribution, conflicts with adjacent infrastructure and risk to the community. It would enable tree managers to develop long-term plans for the eventual removal and replacement of existing trees in the public realm. It is not a measure of the biological life of the tree within the natural range of the species. It is more a measure of the health status and the trees positive contribution to the urban landscape.

Within an urban landscape context, particularly in relation to street trees, it could be considered a point where the costs to maintain the asset (tree) outweigh the benefits the tree is returning.

The assessment is based on the site conditions not being significantly altered and that any prescribed maintenance works are carried out (site conditions are presumed to remain relatively constant and the tree would be maintained under scheduled maintenance programs).

Useful Life Expectancy	Typical characteristics
<1 year (No remaining ULE)	Tree may be dead or mostly dead. Tree may exhibit major structural faults. Tree may be an imminent failure hazard. Excessive infrastructure damage with high risk potential that cannot be remedied.
1-5 years (Transitory, Brief)	Tree is exhibiting severe chronic decline. Crown is likely to be less than 50% typical density. Crown may be mostly epicormic growth. Dieback of large limbs is common (large deadwood may have been pruned out). Major structural defects that cannot be remedied. Tree may be over-mature and senescing. Infrastructure conflicts with heightened risk potential. Tree has outgrown site constraints.
6-10 years (Short)	Tree is exhibiting chronic decline. Crown density will be less than typical and epicormic growth is likely to present. The crown may still be mostly entire, but some dieback is likely to be evident. Dieback may include large limbs. Structural defects present that influence the tree's risk rating, amenity or vitality. Over-mature and senescing or early decline symptoms in short-lived species. Early infrastructure conflicts with potential to increase regardless of management inputs.
11-20 years (Moderate)	Tree not showing symptoms of chronic decline, but growth characteristics are likely to be reduced (bud development, extension growth etc.). Developing structural



	defects that reduce viability with limited scope for management. Tree may be over-mature and beginning to senesce. Potential for infrastructure conflicts regardless of management inputs.
21-40 years (Moderately long)	Trees displaying normal growth characteristics, but vitality is likely to be reduced (bud development, extension growth etc.). Structural issues relatively minor and manageable with arboricultural input. Tree may be growing in restricted environment (e.g. streetscapes) or may be in late maturity. Semi-mature and mature trees exhibiting normal growth characteristics. Juvenile trees in streetscapes.
>40 years (Long)	Generally juvenile and semi-mature trees exhibiting normal growth characteristics within adequate spaces to sustain growth, such as in parks or open space. Could also pertain to maturing, long-lived trees. No observable major structural defects. Tree well suited to the site with negligible potential for infrastructure conflicts.

Note that ULE may change for a tree dependent on the prevailing climatic conditions, sudden changes to a tree's growing environment creating an acute stress or impact by pathogens.

The ULE may not be applicable for trees that are manipulated, such as topiary, or grown for specific horticultural purposes, such as fruit trees.

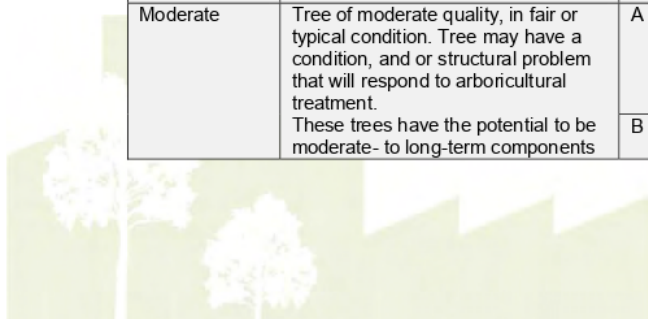
There may be instances where remedial tree maintenance could extend a tree's ULE.

10. Arboricultural Rating

Relates to the combination of assigned tree condition factors, including health and structure (arboricultural merit) and ULE, and conveys an amenity value (An amenity tree can occupy a site that complements its surroundings in a useful manner which culminates in the aid, protection, comfort and emotional response of humans. Adapted from Coder, 2004). Amenity relates to the trees biological, functional and aesthetic characteristics (Hitchmough, 1994) within an urban landscape context. The presence of any serious disease or tree-related hazards that would impact risk potential are considered.

The arboricultural rating can be used by applying only the main category high, moderate, low or very low without using the sub categories. The sub-categories can assist in differentiating a trees value and/or characteristic in more detail within the specific tree assessment context, such as a development site.

Arboricultural rating			
Category	Description		
High	Exemplary specimen due to multiple factors which could include; good condition and vitality, large size/canopy and prominence in the landscape. Likely to be a very long-term component in the landscape with a long ULE. Other factors that could contribute to a high rating: <ul style="list-style-type: none"> • Particularly good example of the species; rare or uncommon. • Tree has visual importance as a landscape feature; provides substantial contribution to landscape character. • Tree may have significant ecological or conservation value. • *Tree has historical, commemorative or other distinct social/cultural significance. Trees in this category must be considered for retention and/or incorporated within design proposals.		
Category	Description	Sub category	Description
Moderate	Tree of moderate quality, in fair or typical condition. Tree may have a condition, and or structural problem that will respond to arboricultural treatment. These trees have the potential to be moderate- to long-term components	A	Moderate to large, maturing tree. Suited to the site & contributes to the landscape character. Tree may have conservation or other cultural/social value.
		B	Moderate sized, established tree, > 50% of attainable age/size. Suited to the site



	of the landscape (moderate to long ULE) if managed appropriately. The sub-categories relate predominately to age, size and amenity. Trees in this category should be considered for retention and/or incorporated within design proposals.		& contributes to the landscape character (other attributes covered under 'Moderate' description)
		C	<ul style="list-style-type: none"> • Young to semi-mature, generally a smaller tree, established, >15 cm DBH, >5 years in the location. Not a dominant canopy. No significant qualities currently but has the potential to become a higher value tree & long-term component of the landscape. Replacement of tree is likely to take up to 6 - 10 years to attain similar attributes. • Semi- to mature tree with accumulating deficiencies and reducing ULE, trending towards Low arboricultural value.
<i>Category</i>	<i>Description</i>		
Low	<p>Unremarkable tree of low quality or little amenity value. Tree in either poor health and/or with poor structure. Short to transitory useful life expectancy (<10 years).</p> <ul style="list-style-type: none"> • Tree is not prominent in the landscape due to its size or age, such as young trees with a stem diameter below 15 cm. Tree < 5 years in location. These trees are easily replaceable or capable of being transplanted. • Tree (species) is functionally inappropriate to the specific location. Is causing excessive damage/nuisance to adjacent infrastructure or would be expected to be problematic if retained (i.e. palm tree under power lines). • Unremarkable tree of no material landscape, conservation or other cultural value. Not visible from surrounding landscapes. • Tree infected with pathogens that could lead to its decline. • Tree has potential to be an environmental woody weed (may be dependent on location of tree in an urban landscape). • Tree impacting or suppressing trees of better quality. <p>Retention of such trees may be considered if not requiring a disproportionate expenditure of resources for a tree in its condition and location.</p>		
<i>Category</i>	<i>Description</i>		
Very low	<p>Trees of low quality with a brief to no remaining ULE (<5 years).</p> <ul style="list-style-type: none"> • Tree has either a severe structural defect or health problem or combination that cannot be sustained with practical arboricultural techniques and the loss of the tree or tree part would be expected in the short term. • Tree whose retention would not be viable after the removal of adjacent trees, such as trees that have developed in close spaced groups and would not be expected to adapt to severe and sudden alterations to environmental & site conditions, e.g. removal of adjacent shelter trees. • Small or young tree, <5m in height, <10cm DBH. Easily replaced in short-term or capable of being transplanted. • Acknowledged environmental woody weed species. Tree has a detrimental effect on the environment, for example, the tree has weed potential and is likely to spread into waterways or natural areas if nearby. • Tree infected with pathogens that will lead to decline and has potential to spread to adjacent trees. • Tree is dead (dead tree may offer habitat values) or is showing signs of significant, immediate, and irreversible overall decline. <p>Tree cannot realistically be retained and should be considered for removal.</p>		

Other considerations - Even though a tree may be declining or dead, a tree could be retained for other purposes such as habitat or soil stabilisation. These trees would still need to be managed appropriately to reduce risk.



*A tree may have (attract) a high value by the community for historical, commemorative or other distinct social/cultural significance factors, albeit the tree may not be in good condition. In the context of an assessment, for multiple reasons, but more so for development, if it is a noted 'significant' tree it should receive higher consideration during the planning process.

Trees have many values, not all of which are considered when an arboricultural assessment is undertaken. However, individual trees or tree group features may be considered important community resources because of unique or noteworthy characteristics or values other than their age, dimensions, health or structural condition. Recognition of one or more of the following criteria is designed to highlight other considerations that may influence the future management of such trees.

Significance	Description
Horticultural Value/ Rarity	Outstanding horticultural or genetic value; could be an important source of propagating stock, including specimens that are particularly resistant to disease or exposure. Any tree of a species or variety that is rare.
Historic, Aboriginal Cultural or Heritage Value	Tree could have value as a remnant of a particular important historical period or a remnant of a site or activity no longer in action. Tree has a recognised association with historic aboriginal activities, including scar trees. Tree commemorates a particular occasion, including plantings by notable people, or having associations with an important event in local history.
Ecological Value	Tree could have value as habitat for indigenous wildlife, including providing breeding, foraging or roosting habitat, or is a component of a wildlife reserve. Remnant Indigenous vegetation that contribute to biological diversity

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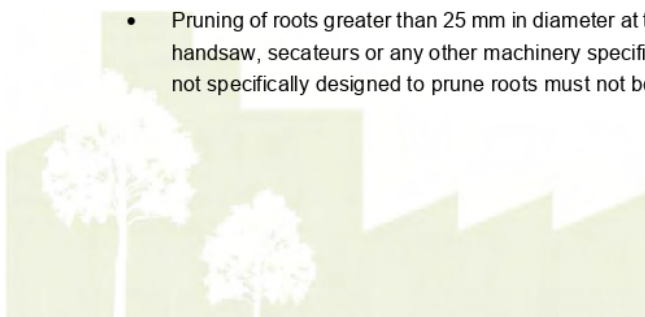
Standards Australia (2009) Australian Standard AS 4970-2009 Protection of trees on development sites.



Appendix 4: Protection of Retained Trees.

The following are guidelines that must be implemented to minimise the impact of the proposed construction works on the retained trees.

- The Tree Preservation Zone (TPZ) is fenced and clearly marked at all times. This fence should deter the placement of building materials, entry of heavy equipment and vehicles and also the entry of workers and/or the public into the TPZ. Australian Standard AS 4687 - 2007 Temporary fencing and hoardings, specifies appropriate fencing requirements. Existing perimeter fencing can be incorporated into the protective fencing. Shade cloth should be attached to reduce the movement of dust and other particulates into the TPZ. Signs identifying the TPZ are to be placed on the fencing.
- If the area within the TPZ is to be accessed during the construction phase then the area will need ground protection. Measures may include a permeable membrane, such as a geotextile, to cover the TPZ area beneath a 100 mm layer of crushed rock below rumble boards.
- Contractors and site workers should receive written and verbal instruction as to the importance of tree protection and preservation within the site. Successful tree preservation occurs when there is a commitment from all relevant parties involved in designing, constructing and managing a development project. Members of the project team need to interact with each other to minimise the impacts to the trees, either through design decisions or construction practices.
- The consultant arborist is on-site to supervise excavation works around the existing trees where the TPZ will be encroached.
- No persons, vehicles or machinery to enter the TPZ without the consent of the consulting arborist or site manager.
- Any underground service installations within the allocated TPZ should be bored and utility authorities should common trench where possible.
- No fuel, oil dumps or chemicals shall be allowed in or stored on the TPZ and the servicing and re-fuelling of equipment and vehicles should be carried out away from the root zones.
- No storage of material, equipment or temporary building should take place over the root zone of any tree.
- Nothing whatsoever should be attached to any tree including temporary services wires, nails, screws or any other fixing device.
- Any pruning that is required must be carried out by trained and competent arborist who has a thorough knowledge of tree physiology and pruning methods and carry out pruning to the Australian Standard AS 4373 – 2007 '*Pruning of Amenity Trees*'.
- All root excavation should be carried out by hand digging or with the use of 'Air-Excavation' techniques, and roots should be severed by saw cutting or with a sharp axe and not with a Backhoe or any machinery or blunt instrument.
- Pruning of roots greater than 25 mm in diameter at the edge of the TPZ must be undertaken using a sharp handsaw, secateurs or any other machinery specifically designed to prune tree roots. Machinery or tools not specifically designed to prune roots must not be used.



- Where required, trunk protection can be achieved with the use of adequate padding secured around the trunk or branch/es. Timber hoarding or palings, sufficient in length to cover the trunk or branch, laid over rubber or similar padding wrapped around the trunk or branch and fixed using non-invasive fixing device such as steel strapping is suitable.
- Attaching items to a trunk requiring invasive fittings such as screws, nails or bolts is not permitted.
- Trunk protection material should not be maintained for prolonged periods and should be removed from the tree as soon as the threat ceases.

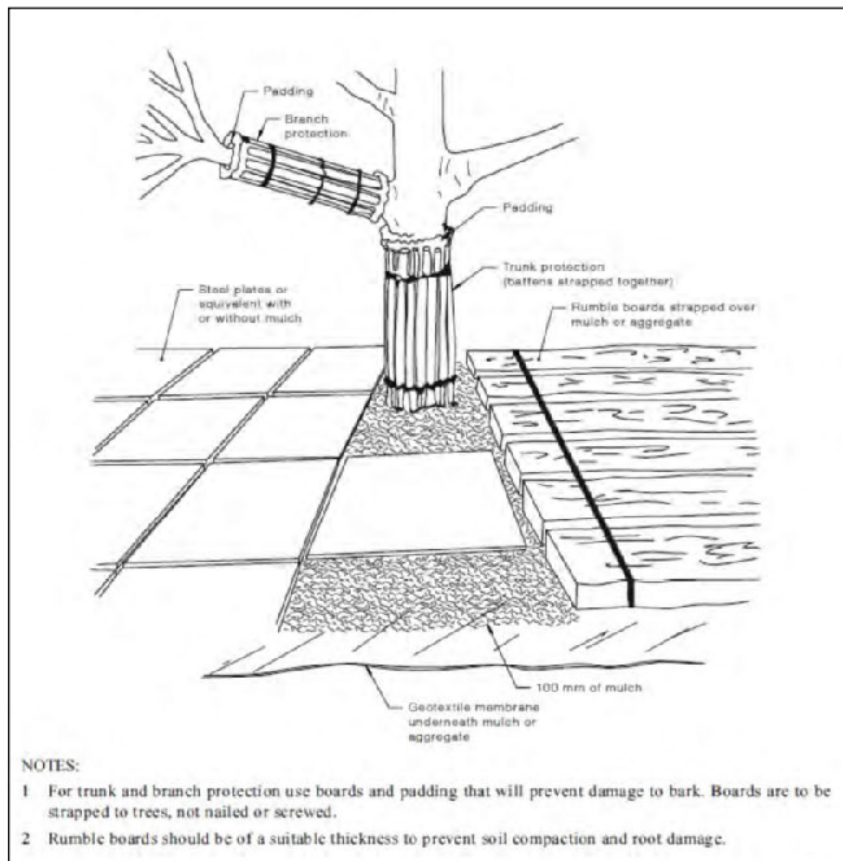


Diagram 1. Examples of appropriate Trunk, limb and ground protection system.
Extract from Australian Standard (4970-2009) Protection of Trees on development sites – Section 4.5.3.



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