

# TREE PROTECTION PLAN

## DEVELOPMENT WITHIN ST BERNADETTE'S PRIMARY SCHOOL, THE BASIN

FEBRUARY 2021

Prepared by Stephen Fitzgerald  
for:  
St Bernadette's Primary School, The Basin



**ARBORICULTURE PTY LTD**

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12/2/2021

## Tree Protection Plan Development within St Bernadette's Primary School, The Basin

### 1. Summary of Findings and Recommendations

An existing building is to be demolished and a new one constructed in its place with a slightly larger footprint. For the new building to be constructed three exotic trees need to be removed, one of which is listed as an environmental weed in Schedule 3 to the Significant Landscape Overlay. A Tree Protection Plan (TPP) is provided in Appendix 3b – *Tree Location / Protection Plan – New Building*.

An existing crushed rock access track that runs from Thornton Court near an area of significant native vegetation is to be used during the works. For vehicles to safely use the access track minor pruning of overhanging branches will most likely be needed. A Tree Protection Plan (TPP) is provided in Appendix 3a – *Tree Location / Protection Plan – Access Track*.

As no native trees or other native vegetation is to be removed, destroyed or lopped more than 1/3 of its canopy, for this construction project there are no triggers requiring a permit under Clause 52.17. This assumes tree protection is carried out diligently as per this report.

### 2. Objectives

This Tree Protection Plan (TPP) has been devised at the request of St Bernadette's Primary School, The Basin (1264 Mountain Hwy, The Basin). The TPP is to protect:

- natural vegetation near an existing approximate 86m long track that runs from Thornton Court at the south to an existing basketball court within St Bernadette's. The basketball court is to be used for parking and materials storage to service the construction of a new building within the school;
- Exotic and planted native trees near a building to be demolished with a new one being constructed.

This document follows the principals and guidance provided in Australian Standard AS4970 – 2009 *Protection of Trees on Development Sites*, (Standards Australia, 2009).

This Tree Protection Plan does not provide tree protection advice for:

- Excavation/boring of services including gas, electricity, water, etc. It is expected that specific advice will be sought if services are to potentially

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impact tree protection areas.

- Any landscape construction work including installation of sprinkler systems, plantings, earthworks, etc.

This document consists of this report (the *Tree Management Plan Development within St Bernadette's Primary School, The Basin* or "TPP"), and its appendices (Appendix 1 – Photographs, Appendix 2 – Tree Inspection Records, Appendix 3a – *Tree Location / Protection Plan – Access Track*, Appendix 3b – *Tree Location / Protection Plan – New Building*, and, Appendix 4 – Definitions and Methods.)

All parts of this document must be kept together and cross referenced for proper understanding and implementation. Appendix 3a and 3b – *Tree Location / Protection Plans* must be printed at A3 in colour.

### 3. Background

Plans have been prepared for demolition of an existing, and construction of a new building, within the school grounds. Access for construction vehicles including trucks, cranes (if required), and delivery of materials, etc. is required from Thornton Court to the south. An existing track leads from the back gate through an area of indigenous vegetation to an existing basketball court to be used for parking and storage. As part of the construction project there are plans to add crushed rock to the track to level and stabilise it for the expected traffic during demolition and construction.

#### 3.1. Planning Overlays

The vegetation either side of the track (as well as other native vegetation within the school) is protected under the Knox Planning Scheme Environmental Significance Overlay (Schedules ESO2 and ESO3) and under the *Native Vegetation* Planning Provision (Clause 52.17).

The environmental overlays seek to protect and improve the condition and viability of remnant indigenous vegetation and aquatic systems including identified sites of biological significance. With regard to vegetation protection, the schedules require a planning permit to remove, destroy or lop indigenous vegetation within Knox with certain exemptions<sup>1</sup>.

With regard to Clause 52.17 – *Native Vegetation*, vegetation including trees are protected under the Victorian Planning Provisions. Clause 52.17 of the Planning Scheme requires all native vegetation proposed for removal to be quantified and offset. This applies to all native trees whether alive or dead, as well as maintenance works where more than 1/3 of the canopy is proposed for removal. A permit is required under Clause 52.17 for the removal, destruction or lopping of native vegetation.

As no native trees or other native vegetation is to be removed, destroyed or lopped more than 1/3 of its canopy, there are no triggers requiring a permit under Clause 52.17. This assumes tree protection is carried out diligently as per this report.

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<sup>1</sup> See [planning-schemes.api.delwp.vic.gov.au/schemes/knox/ordinance/42\\_01s03\\_knox.pdf](http://planning-schemes.api.delwp.vic.gov.au/schemes/knox/ordinance/42_01s03_knox.pdf)

St Bernadette's Primary School has been assessed as having vegetation formations that are of state significance. These areas contain representations of two vegetation types that are regionally endangered, albeit with substantial modification by humans and weeds with two of the indigenous plant species present being rare (but not threatened) in Knox (Lorimer, 2010).

The site is also subject to the Knox Planning Scheme Significant Landscape Overlay (Schedule SLO3) which is aimed at protecting sensitive environmental and visual aspects of residential areas at the foothills of the Dandenong Ranges. With regard to vegetation protection the schedule requires a planning permit to remove, destroy or lop a tree if it has a height of 5 metres or more or a trunk girth greater than 0.5 metre when measured at a height of 0.5 metres with certain exemptions<sup>2</sup>. Three exotic trees are to be removed for building construction with two requiring a permit under SLO3.

There are no plans to destroy, remove, lop or prune any of the indigenous vegetation and as such this TPP is to ensure its protection during the project. Two planted exotic trees and one weedy tree (exempt from requiring a permit) growing around the existing building (to be demolished) are to be removed as part of the project and as such a planning permit will be required under Schedule 3 of the Significant Landscape Overlay for the two trees.

A tree survey was carried out on 14/12/2020 and 5/02/2021. The surveys included trees around the building to be replaced and along the edges of the access track. Only larger trees within the vegetation patch either side of the access track were included with the reason being that the larger tree protection zone areas (TPZ) of the trees would also protect the understory vegetation below. See Appendix 1 – *Photos* and Appendix 2 – *Tree Inspection Records* for full details of trees inspected.

The vegetation either side of the track consists mainly of indigenous native eucalypts (*Eucalyptus obliqua*, *E. radiata* and *E. cephalocarpa*), wattles and blackwoods, bursaria and cherry ballart as well as a range of other native and weedy exotic plant species.

#### 4. TPZ Impact analysis

Under Australian Standard AS4970-2009 TPZ encroachments with an area of up to 10% of a tree's TPZ is considered a minor encroachments and those 10% and above are considered major encroachments. It is up to the consultant arborist to determine if the impact within the encroached area (e.g. depth of cut or fill, permeable or non-permeable surface, etc.) is likely to affect the tree's health or stability.

In considering the impacts of proposed TPZ encroachments the arborist may take into account the presence of existing or past structures or obstacles affecting root growth. Tree roots are opportunistic and grow where conditions are conducive: roots do not proliferate in dry soils or soils with high bulk density which may be considered obstacles to root growth for example.

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<sup>2</sup> See [planning-schemes.api.delwp.vic.gov.au/schemes/knox/ordinance/42\\_03s03\\_knox.pdf](https://planning-schemes.api.delwp.vic.gov.au/schemes/knox/ordinance/42_03s03_knox.pdf)

## 4.1. Thornton Court Works Access Track

The existing track is approximately 3m wide along most of its length although it can be seen by soil compaction that a slightly wider area has occasionally been used in places. The surface of the track consists of compacted soil and crushed rock. It appears that the track has been present for many years. The immediate sides of the track are sparsely vegetated with weedy grasses and herb species.

Root growth is likely to be limited any roots restricted to non-compacted layers deeper in the soil profile below the track. As such the addition of crushed rock, which is permeable to air and water and will serve to spread loads, and temporary traffic of construction vehicles is likely to have low impact on trees and other vegetation providing the impacts remains within the established track footprint.

To avoid physical impacts with stems and branches tree protection fences will need to be placed at distances from certain trees that lean over the track. Appendix 3 – Tree Location / Protection Plan has a table showing recommended minimum distances of TPZ fences and a diagram of approximate protection fence locations. Note that bollards made from lumber sleepers exist on the west side of the track but are insufficient to prevent vehicles accidentally entering the vegetated area beyond.

## 4.2. New Building

### 4.2.1 Trees to be removed

Three planted exotic trees exist around the perimeter of the existing building to be demolished and as such are to be removed. They are: an Evergreen Alder (tree #13 - *Alnus acuminata* subsp. *glabrata*), a Thornless Golden Honey Locust (tree #14 - *Gleditsia triacanthos* 'Sunburst') and a Box Elder (tree #19 - *Acer negundo*, listed as under environmental weed in SLO3). The trees to be removed are less than 20 years old (as can be seen in historical aerial images) and, due to their size and locations not significant to the greater landscape. The landscape amenity afforded by the trees will be easily compensated for by appropriate replacement plantings in locations nearby within the school.

The Evergreen Alder is within the footprint of the proposed building while the Honey Locust and Box Elder will suffer major TPZ and SRZ (structural root zone) encroachments by excavations for footings for the new building (see Figure 1 below). The details and photos of these trees are included in Appendix 1 – Photos and Appendix 2 – *Tree Inspection Records*.

A permit should be sought for the removal of trees #13 and #14 under SLO3. Tree #19 is exempt from a permit requirement as it is listed in the Table 1 – *Species exempt from permit* in the SLO3 Schedule.

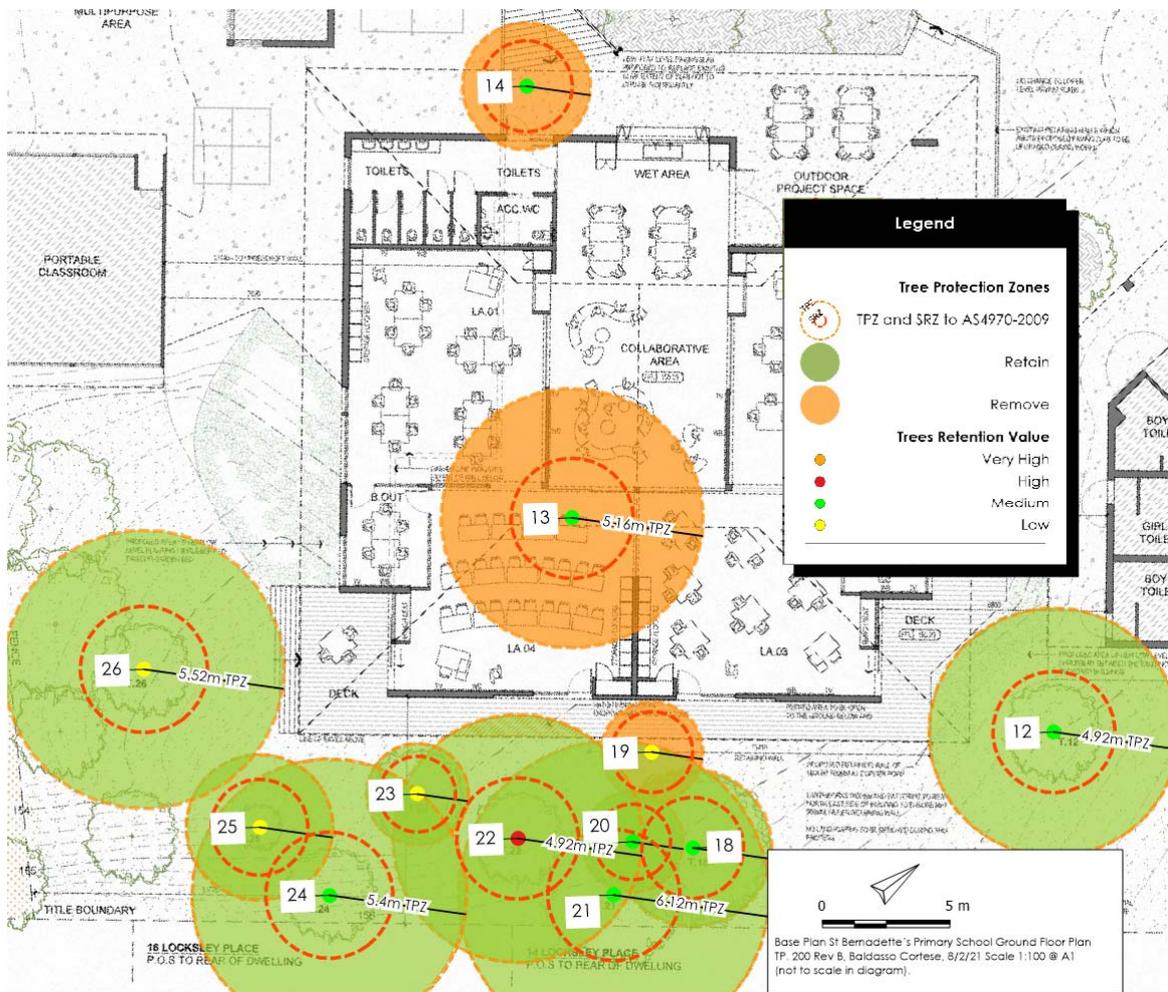
### 4.2.2 Trees to be protected and retained

Design modifications to the deck and retaining wall to the south and north east of the proposed new building have been made in revision B (8/2/2021) to the plans to reduce impacts on trees along the east fence line (trees #12 and #18 to #29 not including tree #19 - Box Elder, an environmental weed to be removed) so they can be retained without suffering major TPZ encroachments. In assessing the TPZ encroachment into the TPZ areas of trees being retained a reasonable

allowance has been made for additional excavation beyond the line edges shown in the plans provided. In this case 0.3m beyond the deck edge has been allowed for the deck footing excavations and 0.5m for the proposed retaining wall that runs for 13.41m along the northeast part of the deck. The largest TPZ encroachment is ~6% of TPZ area for tree #22 (a Blackwood). This and all other encroachments are minor and will not have an impact on the health or stability of the trees.

Among the trees to be protected and retained are trees that contribute significantly to the amenity of the landscape by providing screening between the recent residential development in Locksley Place and the school.

Tree Protection Fences must be erected as shown in Appendix 3b – *Tree Protection Plan Proposed Building*



**Figure 1 Location of three exotic trees to be removed for construction of new building. TPZs are shaded to indicate tree removal / retention. TPZs to AS4970-2009, red dashed circle are SRZs. Proposed deck presents minor encroachments to trees #26 and #22. Base plan is from St Bernadette's Primary School Ground Floor Plan TP. 200 Rev B, 8/2/21, Baldasso Cortese**

## 5. Tree Protection Measures

Tree Protection Plans have been prepared for the access track from Thornton Crescent and the proposed new building:

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- Appendix 3a – Tree Location / Protection Plan - Access Track, and;
- Appendix 3b – Tree Location / Protection Plan – New Building.

The following tree protection measures as well as those shown on the tree protection plans must be observed for successful tree protection.

### 5.1. Erection of tree protection fences

Tree protection fences must be erected as shown in the Tree Protection Plans (Appendix 3a and 3b).

Tree protection fences must be of a sturdy construction that is not easily moved or toppled (e.g. chainmesh fence with panels bolted or locked together). Signs must be affixed to the fence at intervals and should be easily readable from a distance of 10 metres displaying the words:

“TREE PROTECTION ZONE. NO ACCESS” (see Figure 1 below).

Signs must be made from a sturdy material such as corrugated plastic (e.g. ‘Coreflute’) or metal. Signs made from cardboard, paper (including laminated) or other materials that can fade, tear or disintegrate are not acceptable. Hand written signs are not acceptable and printed surfaces must be indelible. Lettering must be at least 100mm high and in a sans serif font.

Construction personnel and associated service people (delivery personnel, etc.) and contractors must not be allowed to enter the fenced TPZ areas without prior approval from a consultant arborist with an understanding of this TPP and the City of Knox. Garden maintenance staff or contractors may enter the fenced areas to carry out normal maintenance activities.

Materials must not be stored within tree TPZ areas, garden beds or near other trees being retained on site. Buckets, machines, wheelbarrows, vehicles and equipment must not be washed within or near tree TPZs.

Note that due to the narrow access track vehicles may need to stop and wait for other vehicles to exit the track before continuing. To allow for this an area has been marked on the tree protection plan (Appendix 3a) to allow vehicles to temporarily move off the track outside of the tree protection zones of the trees. This area could be located elsewhere outside the TPZ areas with a suitable location being established in consultation with a consultant arborist.



**Figure 2 Example of TPZ sign. From AS4970-2009 (signs may be made in landscape orientation)**

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## 5.2. Location of site offices, amenities and storage areas (Site facilities)

- Site facilities are to be placed outside of TPZ areas and areas that drain toward the protected vegetation areas;
- Site facilities must be placed such that tree branches do not require pruning or are interfered with.
- Wires, services, signage or any other items must not be attached to trees in any way;
- Site facilities must be fully contained and not leak liquids or other materials that may contaminate the protected vegetation areas.

## 5.3. Vehicles over 3.5m height

As there are trees leaning over the access track there is a risk that vehicles over 3.5m height could collide with their branches or stems. This height limitation may even reduce to 3m in wet weather when tree branches can subside due to the weight of water on their leaves and stems.

It is recommended that a sign indicating low branches be placed in a prominent position at the entrance gate and that the site manager ensure that only vehicles below 3.5m height enter the site. If vehicles requiring higher clearances are required to enter the site then the advice of a consultant arborist must be sought prior. A consultant arborist may be able to temporarily lift low branches or, if necessary, prune to increase clearance (pending permission from Knox City Council). It would be prudent to have an arborist carry out any minor uplift pruning shortly before construction begins.

## 5.4. Post construction

At the completion of construction activities, if required by Knox City Council, a consultant arborist should visually inspect the protected trees and advise the whether tree protection has been successful at which stage TPZ fences may be removed.

Should any matters in this report require clarification please contact me,



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## References

Standards Australia, (2009) AS 4970, *Protection of trees on development sites*, NSW  
Lorimer, Graeme S. (2010) *Sites of Biological Significance in Knox*, Vol.2 (2<sup>nd</sup> Ed), Biosphere Pty Ltd accessed at  
[www.knox.vic.gov.au/Files/SitesofBio/Bio\\_in\\_Knox\\_version\\_2.0\\_Vol\\_1\\_28\\_June\\_2010\\_without\\_front\\_cover.pdf](http://www.knox.vic.gov.au/Files/SitesofBio/Bio_in_Knox_version_2.0_Vol_1_28_June_2010_without_front_cover.pdf)

# Appendix 1 Photos

## St Bernadettes



Photo 1 from south: Tree 2 centre and tree 1 left centre



Photo 2 from west: Tree 3 centre

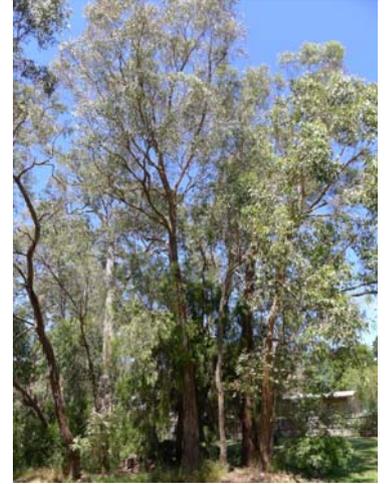


Photo 3 from west: Tree 4 centre



Photo 4 from south-west: Tree 5 centre (leaning over track)



Photo 5 from west: Tree 6 centre leaning over track



Photo 6 from north-east: Tree 7



Photo 7 from south-west: Tree 8 centre



Photo 8 from south-west: Tree 9 centre



Photo 9 from east: Tree 10 left centre

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Photo 10 from east: Tree 11 centre



Photo 11 from south-east: Tree 12



Photo 12 from south-west: Tree 13



Photo 13 from south-west: Tree 14



Photo 14 from south-west: Tree 14 bifurcation defect of stem



Photo 15 from north: Tree 18



Photo 16 from north: Tree 19



Photo 17 from north-west: Tree 20



Photo 18 from north-east: Tree 21

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Photo 19 from west: Tree 21



Photo 20 from north-west: Tree 22



Photo 21: Tree 23



Photo 22 from north-west: Tree 24



Photo 23 from west: Tree 25



Photo 24 from east: Tree 26

High quality and resolution images can be supplied on request. Please contact Arboriculture Pty Ltd

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## Appendix 2 - Tree Inspection Records - St Bernadettes

TREE #	SPECIES / COMMON NAME	AGE	DBH <sup>1</sup> Circumf	HEIGHT x Width	HEALTH STRUCTURE	DEFECTS <sup>2</sup>	ACTIONS <sup>3</sup>	RETENTION VALUE	TPZ <sup>4</sup> Encroach.	SRZ <sup>5</sup> Encroached <sup>?</sup>	ORIGIN	LIFE Exp. <sup>6</sup>	COMMENTS
1	<i>Eucalyptus obliqua</i> Messmate	Semimature	38cm (1) 1.2m	10-14m x 9m	Good Fair	Minor or none noticed	To be protected	Very High	4.56m 0%	2.3m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	Stem leans over track which is 1.5m from tree stem. TPZ fence can go no closer than 2m to base of stem
2	<i>Eucalyptus cephalocarpa</i> Silver Stringybark	Mature	61cm (1) 1.9m	15-19m x 14m	Good Fair	Minor or none noticed	To be protected	Very High	7.32m 0%	2.8m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	See Appendix 1 Photo 1
3	<i>Eucalyptus obliqua</i> Messmate	Semimature	19cm (1) 0.6m	10-14m x 6m	Good Good	Minor or none noticed	To be protected	Very High	2.28m 0%	1.7m <input type="checkbox"/> Encroached?	Vic Native	50+ years	1.3m from track edge See Appendix 1 Photo 2
4	<i>Eucalyptus obliqua</i> Messmate	Mature	55cm (1) 1.7m	15-19m x 8m	Fair Good	Minor or none noticed	To be protected	Very High	6.6m 0%	2.7m <input type="checkbox"/> Encroached?	Vic Native	50+ years	1.2m from track edge See Appendix 1 Photo 3
5	<i>Eucalyptus cephalocarpa</i> Silver Stringybark	Semimature	34cm (1) 1.1m	10-14m x 7m	Fair Fair	Minor or none noticed	To be protected	Very High	4.08m 0%	2.2m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	1.5m from track edge. TPZ fence at 2m from base of stem to avoid impact injury to stem See Appendix 1 Photo 4
6	<i>Eucalyptus obliqua</i> Messmate	Semimature	20cm (1) 0.6m	10-14m x 5m	Fair Fair	Bifurcation defects of stem	To be protected	Very High	2.4m 0%	1.8m <input type="checkbox"/> Encroached?	Vic Native	10-25 years	4m from track edge. TPZ fence at 3.5m from base of stem to avoid impact injury. Height clearance ~4.2m clearance only. If required pruning to be done by arborist See Appendix 1 Photo 5
7	<i>Eucalyptus cephalocarpa</i> Silver Stringybark	Mature	34cm (1) 1.1m	15-19m x 10m	Fair Fair	Minor or none noticed	To be protected	Very High	4.08m 0%	2.2m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	4.3m from track edge. TPZ fence at 4m from base of stem See Appendix 1 Photo 6
8	<i>Eucalyptus cephalocarpa</i> Silver Stringybark	Semimature	32cm (1) 1m	15-19m x 8m	Good Fair	Minor or none noticed	To be protected	Very High	3.84m 0%	2.1m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	5m from track edge. TPZ fence at 3.6m from base of stem See Appendix 1 Photo 7
9	<i>Eucalyptus cephalocarpa</i> Silver Stringybark	Semimature	39cm (1) 1.2m	15-19m x 8m	Good Fair	Minor or none noticed	To be protected	Very High	4.68m 0%	2.3m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	3m from track edge. TPZ fence at 2.5m from base of stem See Appendix 1 Photo 8
10	<i>Eucalyptus cephalocarpa</i> Silver Stringybark	Mature	52cm (1) 1.6m	15-19m x 12m	Fair Fair	Minor or none noticed	To be protected	Very High	6.24m 0%	2.6m <input type="checkbox"/> Encroached?	Vic Native	25-50 years	4.6m from track edge. TPZ fence at 4.6m from base of stem See Appendix 1 Photo 9

<sup>1</sup> DBH measured as per method outlined in AS4970. Where more than 1 stem is measured an equivalent single stem DBH is calculated based on the area of each stem as per AS4970. Where there is more than 1 stem the individual measurements are given in Comments field. Number of stems at 1.4m in brackets.

<sup>2</sup> Defects: Only defects deemed significant to the survival or safety of the tree are listed

<sup>3</sup> Recommended Actions may include pruning, removal or actions given impact analysis or tree condition, etc.

<sup>4</sup> TPZ (tree protection zone) calculated according to Australian Standard 4970-2009. TPZ measurement is radius from centre of main stem(s). TPZs have been reduced for dead trees as only stability would be required if retained. TPZ encroachment is percent of TPZ encroached by construction or other impacts

<sup>5</sup> SRZ (structural root zone) calculated according to Australian Standard 4970-2009. SRZ measurement is radius from centre of main stem(s). SRZ encroachment: Is SRZ encroached by construction or other impacts

<sup>6</sup> Landscape life expectancy - estimate forecast of how long the tree may contribute positively to the amenity of the local landscape given reasonable maintenance

TREE #	SPECIES / COMMON NAME	AGE	DBH <sup>1</sup> Circumf	HEIGHT x Width	HEALTH STRUCTURE	DEFECTS <sup>2</sup>	ACTIONS <sup>3</sup>	RETENTION VALUE	TPZ <sup>4</sup> Encroach.	SRZ <sup>5</sup> Encroached?	ORIGIN	LIFE Exp. <sup>6</sup>	COMMENTS
11	<i>Eucalyptus globulus</i> Blue Gum	Semimature	42cm (1) 1.3m	15-19m x 6m	Good Good	Minor or none noticed	To be protected	High	5.04m 0%	2.4m <input type="checkbox"/> Encroached?	Vic Native	50+ years	3.3m from track edge. TPZ fence at 3.3m from base of stem See Appendix 1 Photo 10
12	<i>Populus nigra var. italica</i> Lombardy Poplar	Semimature	41cm (4) 1.3m	15-19m x 6m	Good Fair	Bifurcation defects of stem	To be protected for retention	Medium	4.92m 1%	2.4m <input type="checkbox"/> Encroached?	Exotic	25-50 years	See Appendix 1 Photo 11 (Multi-DBH (cm): 17,21,21,23)
13	<i>Alnus acuminata subsp. glabrata</i> Evergreen Alder	Mature	43cm (3) 1.4m	15-19m x 10m	Good Fair	Minor or none noticed	To be removed to allow construction	Medium	5.16m 100%	2.4m <input checked="" type="checkbox"/> Encroached?	Exotic	25-50 years	See Appendix 1 Photo 12 (Multi-DBH (cm): 28,25,21)
14	<i>Gleditsia triacanthos</i> Honey Locust	Mature	21cm (2) 0.7m	8m x 7m	Good Poor	Bifurcation defect of stem	To be removed to allow construction	Medium	2.52m 100%	1.8m <input checked="" type="checkbox"/> Encroached?	Exotic	25-50 years	100% encroachment due to demolition of building See Appendix 1 Photos 13 & 14 (Multi-DBH (cm): 16,14)
18	<i>Eucalyptus leucoxylon subsp. megalocarpa</i> Large-fruited South Australian Blue Gum	Mature	26cm (1) 0.8m	10-14m x 12m	Fair Fair	Broken branch wound top of tree	To be protected for retention	Medium	3.12m 0%	2m <input type="checkbox"/> Encroached?	Aus Native	10-25 years	See Appendix 1 Photo 15
19	<i>Acer negundo</i> Box Elder	Semimature	15cm (2) 0.5m	7m x 5m	Fair Fair	Minor or none noticed	Tree Removal	Low	2m 70%	1.6m <input checked="" type="checkbox"/> Encroached?	Exotic	10-25 years	Reason for tree removal: Weed species See Appendix 1 Photo 16 (Multi-DBH (cm): 12,9)
20	<i>Eucalyptus leucoxylon subsp. megalocarpa</i> Large-fruited South Australian Blue Gum	Mature	11cm (2) 0.3m	6m x 3m	Fair Fair	Broken branch wound top of tree	To be protected for retention	Medium	2m 0%	1.5m <input type="checkbox"/> Encroached?	Aus Native	10-25 years	See Appendix 1 Photo 17 (Multi-DBH (cm): 9,7)
21	<i>Cupressus x leylandii</i> Leyland Cypress	Semimature	51cm (2) 1.6m	10-14m x 8m	Good Poor	Bifurcation defect of stem	To be protected for retention. Tree will need bolt bracing and/or cabling in future to prevent splitting of main stem	Medium	6.12m 0%	2.6m <input type="checkbox"/> Encroached?	Exotic	10-25 years	See Appendix 1 Photos 18 & 19 (Multi-DBH (cm): 38,34)
22	<i>Acacia melanoxylon</i> Blackwood	Mature	41cm (2) 1.3m	10-14m x 10m	Fair Fair	Full structure inspection of structure not possible because of climber on trunk	Remove ivy for further inspection, To be protected for retention	High	4.92m 0%	2.4m <input type="checkbox"/> Encroached?	Vic Native	10-25 years	3.4m from fence See Appendix 1 Photo 20 (Multi-DBH (cm): 33,25)

<sup>1</sup> DBH measured as per method outlined in AS4970. Where more than 1 stem is measured an equivalent single stem DBH is calculated based on the area of each stem as per AS4970. Where there is more than 1 stem the individual measurements are given in Comments field. Number of stems at 1.4m in brackets.

<sup>2</sup> Defects: Only defects deemed significant to the survival or safety of the tree are listed

<sup>3</sup> Recommended Actions may include pruning, removal or actions given impact analysis or tree condition, etc.

<sup>4</sup> TPZ (tree protection zone) calculated according to Australian Standard 4970-2009. TPZ measurement is radius from centre of main stem(s). TPZs have been reduced for dead trees as only stability would be required if retained. TPZ encroachment is percent of TPZ encroached by construction or other impacts

<sup>5</sup> SRZ (structural root zone) calculated according to Australian Standard 4970-2009. SRZ measurement is radius from centre of main stem(s). SRZ encroachment: Is SRZ encroached by construction or other impacts

<sup>6</sup> Landscape life expectancy - estimate forecast of how long the tree may contribute positively to the amenity of the local landscape given reasonable maintenance

TREE #	SPECIES / COMMON NAME	AGE	DBH <sup>1</sup> Circumf	HEIGHT x Width	HEALTH STRUCTURE	DEFECTS <sup>2</sup>	ACTIONS <sup>3</sup>	RETENTION VALUE	TPZ <sup>4</sup> Encroach.	SRZ <sup>5</sup> Encroached <sup>?</sup>	ORIGIN	LIFE Exp. <sup>6</sup>	COMMENTS
23	<i>Betula pendula</i> Silver Birch	Semimature	8cm (1) 0.3m	4m x 1m	Dead Poor	General decline of structure (advanced)	Tree Removal	Low	2m	1.5m	Exotic	0 years	TPZ and SRZ do not apply as tree is dead. No permit required to remove this tree Reasons for tree removal: Dead See Appendix 1 Photo 21
									0%	<input type="checkbox"/> Encroached?			
24	<i>Cupressus x leylandii</i> Leyland Cypress	Semimature	45cm (2) 1.4m	10-14m x 8m	Good Poor	Bifurcation defect of stem	To be protected for retention	Medium	5.4m	2.5m	Exotic	10-25 years	See Appendix 1 Photo 22 (Multi-DBH (cm): 31,33)
									0%	<input type="checkbox"/> Encroached?			
25	<i>Fraxinus angustifolia</i> Desert Ash	Semimature	24cm (1) 0.8m	10-14m x 6m	Good Good	Minor or none noticed	To be protected for retention	Low	2.88m	1.9m	Exotic	25-50 years	Reason for tree removal: Weed species See Appendix 1 Photo 23
									0%	<input type="checkbox"/> Encroached?			
26	<i>Salix matsudana 'Tortuosa'</i> Tortured Willow	Mature	46cm (1) 1.4m	10-14m x 9m	Good N/A	Inspection of structure not possible because of climber on trunk	Remove ivy for further inspection, To be protected for retention	Low	5.52m	2.5m	Exotic	10-25 years	See Appendix 1 Photo 24
									1%	<input type="checkbox"/> Encroached?			

<sup>1</sup> DBH measured as per method outlined in AS4970. Where more than 1 stem is measured an equivalent single stem DBH is calculated based on the area of each stem as per AS4970. Where there is more than 1 stem the individual measurements are given in Comments field. Number of stems at 1.4m in brackets.

<sup>2</sup> Defects: Only defects deemed significant to the survival or safety of the tree are listed

<sup>3</sup> Recommended Actions may include pruning, removal or actions given impact analysis or tree condition, etc.

<sup>4</sup> TPZ (tree protection zone) calculated according to Australian Standard 4970-2009. TPZ measurement is radius from centre of main stem(s). TPZs have been reduced for dead trees as only stability would be required if retained. TPZ encroachment is percent of TPZ encroached by construction or other impacts

<sup>5</sup> SRZ (structural root zone) calculated according to Australian Standard 4970-2009. SRZ measurement is radius from centre of main stem(s). SRZ encroachment: Is SRZ encroached by construction or other impacts

<sup>6</sup> Landscape life expectancy - estimate forecast of how long the tree may contribute positively to the amenity of the local landscape given reasonable maintenance

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# Appendix 3a – Tree Location / Protection Plan - Access Track

## Important Note

To minimise the risk of fuel, oil or other substances contaminating the ground within TPZ areas vehicles must not stop or park on the track between the entrance and the basketball court

Tree Protection Zone Signs that comply with AS4970-2009 must be placed on Tree Protection Fence at intervals such that they are easily visible from within the work site

Protection Fences must not be moved without consent of the Project Arborist or the Responsible Authority (Knox City Council)



Tree Protection Fencing (1.8m height chain mesh or equivalent in good condition) must be erected in locations shown at edge of compacted track and as per table below

Basketball Court  
Parking and storage area

### Legend

**Existing landscape features**

- Existing sleeper bollards
- Existing 3m wide track

**Tree Protection**

- Tree Protection Zone to AS4970-2009
- TPZ Fence to AS4970-2009
- Vehicle bypass / waiting area

**Trees Retention Value**

- Very High
- High
- Medium
- Low

Low branch 4.2m over track  
Will need to be pruned by arborist only if large vehicles are expected

### Tree Protection Zones

Prior to the commencement of works, tree protection fencing must be erected as shown. The fence must remain in place until all works are completed to the satisfaction of the Responsible Authority. All tree protection zones and fencing must comply with AS 4970-2009 Protection of Trees on Development Sites. Except with the written consent of the Responsible Authority, within the tree protection zone, the following are prohibited:

- vehicular or pedestrian access
- trenching or soil excavation
- storage or dumping of any soils, materials, equipment, vehicles, machinery or waste products
- entry and exit pits for underground services
- any other actions or activities that may result in adverse impacts to retained native vegetation.

**Note**  
Note that SRZ areas (structural root zone as per AS4970-2009) are not shown in this plan as they clutter the detail required and may confuse contractors as to where the TPZ is located. SRZs measures given in Appendix 2 the accompanying report.

## Trees on track edge and TPZ Fence Location

Tree #	Species	Common Name	TPZ radius	TPZ Fence Location
1	Eucalyptus obliqua	Messmate	4.6m	TPZ fence at 2m from base of stem
2	Eucalyptus cephalocarpa	Silver Stringybark	7.3m	Edge of track
3	Eucalyptus obliqua	Messmate	2.3m	Edge of track
4	Eucalyptus obliqua	Messmate	6.6m	Edge of track
5	Eucalyptus cephalocarpa	Silver Stringybark	4.1m	TPZ fence at 2m from base of stem
6	Eucalyptus obliqua	Messmate	2.4m	TPZ fence at 3.5m from base of stem
7	Eucalyptus cephalocarpa	Silver Stringybark	4.1m	TPZ fence at 4m from base of stem
8	Eucalyptus cephalocarpa	Silver Stringybark	3.8m	TPZ fence at 3.6m from base of stem
9	Eucalyptus cephalocarpa	Silver Stringybark	4.7m	TPZ fence at 2.5m from base of stem
10	Eucalyptus cephalocarpa	Silver Stringybark	6.2m	TPZ fence at 4.6m from base of stem
11	Eucalyptus globulus	Blue Gum	5.0m	TPZ fence at 3.3m from base of stem



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# Appendix 3b – Tree Location / Protection Plan - New Building

**Tree Protection Zones**

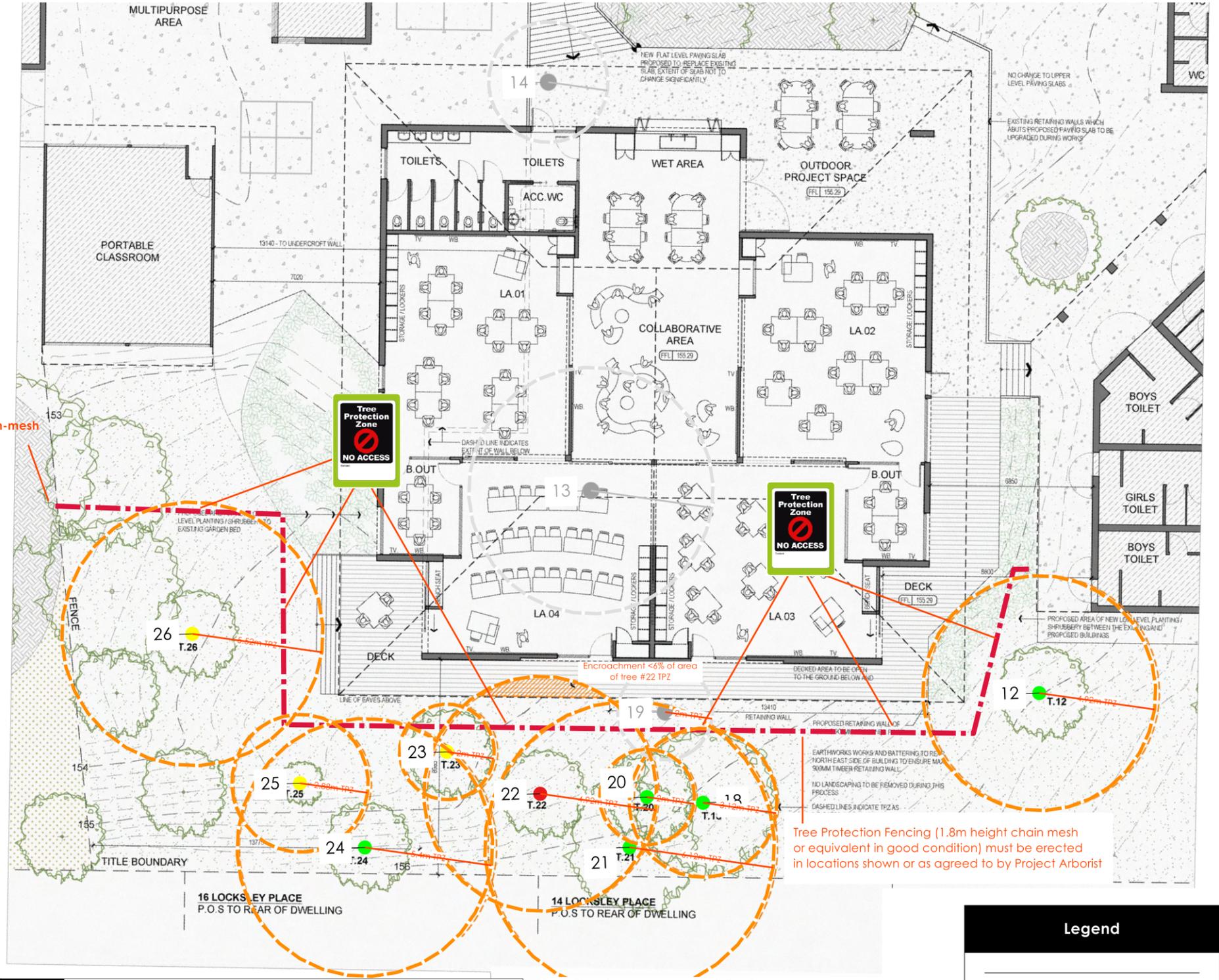
Prior to the commencement of works, tree protection fencing must be erected as shown. The fence must remain in place until all works are completed to the satisfaction of the Responsible Authority. All tree protection zones and fencing must comply with AS 4970-2009 Protection of Trees on Development Sites. Except with the written consent of the Responsible Authority, within the tree protection zone, the following are prohibited:

- vehicular or pedestrian access
- trenching or soil excavation
- storage or dumping of any soils, materials, equipment, vehicles, machinery or waste products
- entry and exit pits for underground services
- any other actions or activities that may result in adverse impacts to retained native vegetation.

TPZ Fence may join existing chain-mesh or boundary fences as required

Tree Protection Zone Signs that comply with AS4970-2009 must be placed on Tree Protection Fence at intervals such that they are easily visible from within the work site

Protection Fences must not be moved without consent of the Project Arborist or the Responsible Authority (Knox City Council)



Tree Protection Fencing (1.8m height chain mesh or equivalent in good condition) must be erected in locations shown or as agreed to by Project Arborist

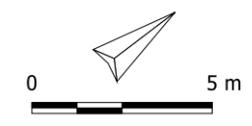
St Bernadette's Primary School  
Tree Inspection Survey, December 2020

**Trees near proposed new building**

Tree #	Species	Common Name	TPZ radius	TPZ Fence Location
12	Populus nigra var. italica	Lombardy Poplar	4.92m	As shown
18	Eucalyptus leucoxylon subsp. megalocarpa	Large-fruited South Australian Blue Gum	3.12m	As shown
20	Eucalyptus leucoxylon subsp. megalocarpa	Large-fruited South Australian Blue Gum	2m	As shown
21	Cupressus x leylandii	Leyland Cypress	6.12m	As shown
22	Acacia melanoxylon	Blackwood	4.92m	As shown
23	Betula pendula	Silver Birch	2m	As shown
24	Cupressus x leylandii	Leyland Cypress	5.4m	As shown
25	Fraxinus angustifolia	Desert Ash	2.88m	As shown
26	Salix matsudana 'Tortuosa'	Tortured Willow	5.52m	As shown

Base Plan shows proposed building from St Bernadette's Primary School Ground Floor Plan TP. 200 Rev B, Baldasso Cortese, 8/2/21 Scale 1:100 @ A1 (scale changed for this plan)

Note that SRZ areas (structural root zone as per AS4970-2009) are not shown in this plan as they clutter the detail required and may confuse contractors as to where the TPZ is located. SRZs are shown in Figure 1 and measures given in Appendix 2 the accompanying report.



1:200 @ A3

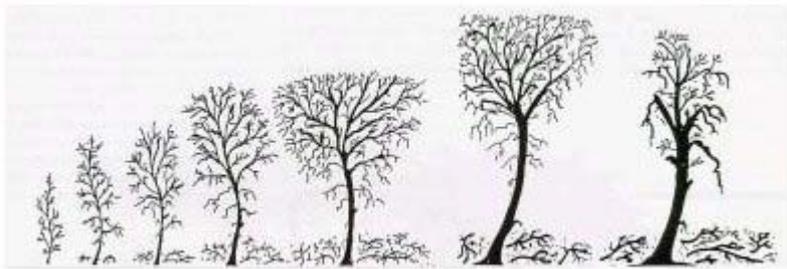
**Legend**

**Tree Protection Zones**  
TPZ to AS4970-2009

**Trees Retention Value**  
Very High  
High  
Medium  
Low

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## Appendix 4 Definitions and Methods

<b>Tree Number</b>	A number referencing a tree location record to the tree location plans.							
<b>Species</b>	Botanical Name (field identified)							
<b>Common Name</b>	Common name for species ( <i>Horticultural Flora of South-Eastern Australia</i> (R. Spencer, volumes 1-5, 1995-2005) are referenced wherever possible)							
<b>Age (class)</b>	<p>This field describes the stage of maturity of the tree or dominant specimens in a tree group as indicated by its form.</p> <p>Young                      Seedling or sapling stage</p> <p>Semi-mature              Approaching its expected form and size</p> <p>Mature                      Expected ultimate form and size of tree before decline</p> <p>Over-mature              Mature tree exhibiting signs of age related structural decline</p> <p>Occasionally stunted or atypical specimens were found that, despite being old in years, appeared semi-mature.</p>  <table border="1" data-bbox="448 1227 1369 1312"> <tr> <td>Young</td> <td>Semi-mature</td> <td>Mature</td> <td>Over-mature</td> </tr> </table>				Young	Semi-mature	Mature	Over-mature
Young	Semi-mature	Mature	Over-mature					
<b>Health</b>	<p>Health of a tree as determined by factors such as leaf colour and size, shoot growth extension and percentage of living canopy:</p> <p>Dead                      &lt; 10% of canopy living (shoots &amp; stems dead)</p> <p>Poor                      Determined by any single or combination of factors above. Tree health is declining or has declined usually due to pest, disease, senescence, unsuitable site conditions or physiological damage such as root severance or root death due to soil cut, fill or compaction.</p> <p>Fair                      Tree is in 'normal' health. Some pests, diseases, deadwood, minor crown dieback may be present but not considered to be severely affecting the tree's health.</p> <p>Good                      Tree is largely unaffected by pests, diseases and has no significant deadwood or crown dieback.</p>							
<b>Landscape Life Expectancy</b>	Landscape life expectancy is the estimated number of years (or range) a tree could be expected to live in a reasonably healthy and safe condition given moderate weather conditions and reasonable maintenance.							

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<b>Structure</b>	<p>Determined by both the existence of defects in the tree's structure.</p> <p>Hazard Tree structures that are highly likely to fail in the near future causing a hazard threat to people or property in its vicinity.</p> <p>Poor Trees with structural defects such as bifurcated trunks, significant wounds or cavities, noticeable girdling roots. Poor tree structures are common and not necessarily a cause for concern. Remedy with pruning or cable bracing may be an option.</p> <p>Fair Indicates trees with some minor structural defects.</p> <p>Good Trees with few if any significant form or structural defects</p>
<b>DBH</b>	<p>Trunk diameter measured at breast height (1.4m above ground). If the trunk divides into branches or stems at or below 1.4 metres then an equivalent single stem diameter is calculated from the DBH measurements of the individual stems using the formula:</p> $Total\ DBH = \sqrt{(DBH_1)^2 + (DBH_2)^2 + (DBH_3)^2}$ <p>If a buttress or deformity exists at 1.4m then the DBH is measured immediately above this point. See Australian Standard AS 4970, <i>Protection of Trees on Development Sites</i>, Appendix A for details of procedure used.</p> <p>DBH measurement is useful for categorising the size of trees for analysis and is also used in calculations: e.g. calculating the nominal TPZ.</p>
<b>DAB</b>	<p>Diameter above buttress. The trunk diameter measured immediately above the root buttress. The DAB is used to calculate the SRZ.</p>
<b>Trunks</b>	<p>Where the trunk divides into branches or stems at ground level it is considered to have more than one trunk or stem. This number is recorded here</p>
<b>Actions</b>	<p>List of recommended works. Works are specified as required to mitigate hazard or improve the landscape life expectancy of the tree. Where possible, terms specified in Australian Standard AS 4373-2007 <i>Pruning of Amenity Trees</i> are used.</p>
<b>Priority (action)</b>	<p><b>Action Priorities</b> are categorised as <i>Low, Medium, High</i> or <i>Urgent</i>.</p> <p><b>Low</b> work priorities are those that are not concerned with conditions that affect the immediate health and safety of trees (or people and property) and/or trees that are not considered valuable enough to warrant immediate attention. These works are mostly removal of small branches lodged in the tree crown or removal of branch stubs. It is recommended that these works be carried out optionally and when convenient over the next <b>24 months</b>. Tree work priorities may be increased to Medium on subsequent inspections if required.</p> <p><b>Medium</b> work priorities are specified if the work will improve the tree's health, safety and/or aesthetics or the safety of the area (people or property) if carried out in the short term. These works are often specified for trees with larger broken lodged branches and occupying a high profile position or frequently used area within the landscape. Tree removals in this category are those that do not pose high-risk danger to persons or property. It is recommended that these works be carried out within the next <b>6 to 12 months</b>.</p> <p><b>High</b> work priorities are specified where a tree condition poses a potential safety hazard to people or property or the tree and works are</p>

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	<p>considered significant enough to warrant immediate attention. Trees requiring high priority work will include those with large broken lodged branches, flawed or damaged structures (crown, trunk or roots) that are likely to lead to failure causing property damage, injury or death. Works in this classification should be carried out within <b>3 months</b> or sooner if budgets and convenience allow.</p> <p><b>Urgent</b> work priorities are usually specified where a tree condition causes an imminent safety hazard to people or property. Works in this classification should be carried out <b>as soon as possible</b>.</p>
<p><b>Retention Value</b></p>	<p>All trees surveyed were assigned a 'retention value'. Retention value can aid in decision making regarding cost vs. benefit as well as prioritisation of resources and planning.</p> <p>Factors contributing to retention value include:</p> <ul style="list-style-type: none"> <li>• tree origin;</li> <li>• age;</li> <li>• significance;</li> <li>• habitat value (hollows being used by fauna, etc);</li> <li>• species suitability to the urban residential/naturalistic parkland situation, and</li> <li>• condition (health and structure).</li> </ul> <p>Self-sown, remnant indigenous and planted indigenous trees of known local seed source were generally rated higher than trees from non-indigenous or unknown seed sources.</p> <p>Trees considered as being in a potentially dangerous condition rated lowest regardless of their significance or origins. Other tree species that rated low were weedy species, tree species regarded as being inappropriate to the urban residential situation and specimens with low life expectancy.</p> <p><b>No Retention Value</b> trees are those that would usually be best removed if landscape renovation or development were to take place in their vicinity. Trees should be removed if recommended specifically or if they are dead or have poor structure/health.</p> <p><b>Low Retention</b> trees should have low priority compared to development considerations. Trees considered to have low retention value should be eventually removed or replaced whether or not development goes ahead.</p> <p><b>Medium Retention</b> trees could be retained if desired but could be removed to allow for development at the discretion of the developer or planner. They are trees that are considered to be appropriate to their planting situation but not necessarily of high cultural, historical or landscape value. They range from young specimens with fair to good health with no significant structural defects, to mature trees in fair to good health with defects that may be managed by arboricultural or landscape planning techniques. Trees may contribute to the immediate landscape but would not contribute greatly to the wider landscape.</p> <p><b>High Retention</b> trees are those assessed as being of significant environmental, cultural or other significance and in suitable condition to be safely retained (remedial arboricultural works or landscape planning may be required for their retention). These trees should be preserved wherever possible and may justify some alterations of design.</p> <p><b>Very High Retention</b> trees are similar to High Retention trees but are considered to be remnant indigenous specimens or trees with other significance that may be of or eligible for State or National recognition.</p>

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	These trees should be preserved wherever possible and would usually justify alterations of development design to allow for their preservation.																														
<b>Risk</b>	<p>Evaluation of risk using recognised published method. In this case the Bartlett Method' (Smiley, E. T., Fraedrich, B. R., Hendrickson, N. (2002) Tree Risk Management, Charlotte NC, Bartlett Tree Research Laboratories)</p> <p>Each tree receives a score out of 15 as the result of multiple site and tree factors assessed.</p> <p><b>Risk Rating Method</b></p> <p>The method is basic and capable of being used in large scale tree data capture situations. The arborist makes an estimate of tree failure potential and the consequences of failure including the frequency of occupation of a site based on their experience. Limitations are that the method is not based on quantitative data and is very simple – as such it should be used as a guide only.</p> <p>Total Risk Score is derived by the addition of 2 criteria:</p> <table border="0"> <tr> <td><b><u>Failure Potential/Defect Severity (F)</u></b></td> <td><b>Score</b></td> </tr> <tr> <td>Critical Risk – Failure imminent</td> <td>10</td> </tr> <tr> <td>High Risk – Failure likely especially in storms</td> <td>7</td> </tr> <tr> <td>Moderate Risk – Failure possible especially in severe storms</td> <td>4</td> </tr> <tr> <td>Low Risk – Failure unlikely</td> <td>1</td> </tr> <tr> <td colspan="2"><b><u>Consequence of Failure (C)</u></b></td> </tr> <tr> <td colspan="2">Considers potential for injury/loss should a failure occur based on such factors as size of defective part, target value and frequency of use</td> </tr> <tr> <td>Severe Consequence</td> <td>5</td> </tr> <tr> <td>Moderate Consequence</td> <td>3</td> </tr> <tr> <td>Low Consequence</td> <td>1</td> </tr> <tr> <td colspan="2"><b><u>Total Risk Rating (= F + C)</u></b></td> </tr> <tr> <td>13-15</td> <td>Critical Risk: Failure imminent; Personal Injury and/or property damage inevitable (lower end of scale indicates lower potential for injury)</td> </tr> <tr> <td>10-12</td> <td>High Risk: Failure likely especially during storms; Personal injury and/or property damage likely (lower end of scale indicates lower potential for injury/property damage)</td> </tr> <tr> <td>7-9</td> <td>Moderate Risk: Failure unlikely, and/or high risk of failure but low risk of property damage/personal injury</td> </tr> <tr> <td>&lt;7</td> <td>Low Risk: Failure unlikely and low risk of property damage</td> </tr> </table>	<b><u>Failure Potential/Defect Severity (F)</u></b>	<b>Score</b>	Critical Risk – Failure imminent	10	High Risk – Failure likely especially in storms	7	Moderate Risk – Failure possible especially in severe storms	4	Low Risk – Failure unlikely	1	<b><u>Consequence of Failure (C)</u></b>		Considers potential for injury/loss should a failure occur based on such factors as size of defective part, target value and frequency of use		Severe Consequence	5	Moderate Consequence	3	Low Consequence	1	<b><u>Total Risk Rating (= F + C)</u></b>		13-15	Critical Risk: Failure imminent; Personal Injury and/or property damage inevitable (lower end of scale indicates lower potential for injury)	10-12	High Risk: Failure likely especially during storms; Personal injury and/or property damage likely (lower end of scale indicates lower potential for injury/property damage)	7-9	Moderate Risk: Failure unlikely, and/or high risk of failure but low risk of property damage/personal injury	<7	Low Risk: Failure unlikely and low risk of property damage
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<b>SRZ</b>	<p>The structural root zone (SRZ) is the area around the base of a tree required for its stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area (AS 4970, <i>Protection of trees on development sites</i>). An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress (DAB or diameter above buttress) according to AS 4970, <i>Protection of trees on development sites</i>.</p>																														

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<b>TPZ</b>	The tree protection zone (TPZ) is a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development (AS 4970, <i>Protection of trees on development sites</i> ). The nominal TPZ is calculated from the DBH according to AS 4970, <i>Protection of trees on development sites</i> .
<b>Comments</b>	General comments regarding individual trees or conditions.

### Visual Inspection

Visual tree inspection is part of a process of assessing trees for conditions that may affect safety. An inspection is made of a tree for signs or symptoms of defects. Only when indications of defects are found which are considered serious enough, is further investigation recommended or undertaken. Further investigation may be a closer visual examination (such as accessing the tree canopy via climbing techniques or by way of an Elevated Platform Vehicle) or a rigorous, detailed technical examination using mechanical or electronic instruments (eg. sound or stress-wave timer device or devices that measure the force needed to drill test holes into the tree).

Visual Tree Assessment (VTA) is a method described by biomechanical engineer Dr Claus Mattheck in his book *The Body Language of Trees* (Mattheck & Breloer 1994). It involves visual inspection of the tree and provides guidelines for identifying symptoms of stress in trees caused by defects. It is based on the *Axiom of uniform stress* in which trees grow in such a way that all stresses on their surfaces are distributed evenly (Mattheck & Breloer 1994). Where this state is disturbed the tree repairs its structure by forming locally thicker annual rings. These reparative structures are recognised as symptoms of internal defects in the tree.

### References

Mattheck, C., and Breloer, H. 1994, *The Body Language of Trees: A Handbook for Failure Analysis.*, HMSO Publications. London