Arboricultural Assessment
Former Deer Park Primary School

Prepared for
Department of Education and Early Childhood Development

Prepared by David Phillips

9/01/2014

treelogic
Tree management for the urban forest

Tree Logic Pty Ltd Unit 4, 21 Eugene Terrace Ringwood Vic 3134 Ph 03 9870 7700 **treelogic.com.au**

Contents.

Title Page Images

Left: Shows Tree 14, a Spotted Gum (*Corymbia maculata*) of Moderate arboricultural value.

Top Right: Shows Trees 4 and 5, both Yellow Gums (*Eucalyptus leucoxylon*) located on the eastern boundary.

Bottom right: Shows Trees 28, 39 and 40 located along the northern boundary.

Ref: DEECD site_former Deer Park Primary School.

File No.	Version	Author	Issue date	Issued by.
13_5363	1	David Phillips	9/01/2014	DP

Client Brief

Department of Education and Early Childhood Development contracted Tree Logic to undertake an assessment of trees associated with rezoning and potential development of the former Deer Park Primary School at 95 Station Street, Deer Park.

The arboricultural consultancy was required to;

- Describes assessment methods.
- Provide a detailed tree assessment including species, dimensions, condition and arboricultural rating.
- Guidelines for tree protection.
- A plan (aerial image) that geographically locates and identifies (unique identifier - Tree No.) the assessed trees.
- Additional information included
    - Recommendations on any tree pruning works required to successfully retain suitable trees.
    - Geo-location point data for each tree point (X, Y co-ordinates).

1. Summary

1 Forty eight (48) trees were assessed within the tree study area.

2 In general the site comprised trees of low quality primarily confined to perimeter plantings.

3 All trees were attributed an arboricultural rating that reflects the retention value of each tree.

- Sixteen (16) trees were attributed an arboricultural rating of Moderate. (33.3 %)
- Thirty (30) trees were rated Low. (62.5 %)
- Two (2) trees was attributed an arboricultural rating of None. (4.2%)

Refer to Table 3 in Section 3 for tree numbers and tree assessment data in Appendix 1.

3.1 Moderate rated trees represent the best opportunity to retain established trees of fair or better quality.

3.2 Low rated trees had health or structural deficiencies or were established tree weed species. Such trees are not considered worthy of being a constraint on reasonable design intent.

3.3 Trees rated None generally had structural defects that were beyond arboricultural management and should be removed.

4 Tree protection zones (TPZ) have been calculated for each tree in accordance with the Australian Standard for Protection of Trees on Development Sites (AS 4970-2009). The TPZ is provided in the tree assessment data in Appendix 1, as a radial measurement.

4.1 The nominated TPZ may be reduced by 10% on one side if a commensurate area is allocated elsewhere and contiguous with the TPZ. Reduced TPZs have also been supplied in Appendix 1.

4.2 Existing soil grades must remain unaltered within the reduced tree protection zone.

4.3 Excavation or trenching for installation of footings or underground services must not occur within the reduced TPZ of any retained trees unless based on results of Non-destructive root investigation (NDRI) and approved by the site arborist and the relevant authority.

2. **Method**:

2.1 Site inspection methodology;

A site inspection was undertaken during mild conditions on Wednesday, December 4, 2013. 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 site soil were taken.

Observations were made of the trees to determine age and condition, with measurements taken to establish tree height (measured with a height meter), crown width (paced) and trunk diameter (measured at 1.4m above grade unless otherwise stated). Definitions of arboricultural descriptors can be seen in Appendix 3.

The trees were plotted on orthorectified aerial imagery with GIS based software on field tablet computers with GPS and measuring tool capabilities. Geographical latitude and longitudinal reference points (X, Y coordinates) have been generated and included in the assessment data tables supplied with the report. The coordinates are accurate to within 2 to 3 metres and are considered adequate for pre-planning purposes. The location of trees nominated to be retained should be accurately located by conventional survey means prior to preparing any final designs.

The report includes assessment details in the Tree Assessment Tables in Appendix 1 and relate to the trees numbered on the site plan in Appendix 2.

Photographs of some trees and site conditions were taken for further reference and inclusion in the report.

2.2 Arboricultural assessment method;

The health and structural characteristics of each tree were assessed and each tree was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within a built environment. The arboricultural rating in combination with other factors can assist the project team and planners in nominating trees suitable for retention. The four arboricultural ratings used by Tree Logic include:

- **High:** Trees of high quality in good to fair condition. Retention of such trees is highly desirable.
- **Moderate:** Trees with a Moderate arboricultural rating were generally suitable for retention and design should attempt to incorporate these trees and provide adequate clearances during development stages where reasonable design intent is not unduly hampered.
- **Low:** Trees with a Low arboricultural rating generally have low retention values. They are either fair specimens of relatively small size or displayed general health or structural deficiencies. Retention of Low rated trees may be considered in some instances if not requiring a disproportionate expenditure of resources to successfully incorporate into the design or manage ongoing condition.
- **None:** Trees attributed an arboricultural rating of None have health or structural characteristics that are beyond arboricultural maintenance or are environmental weed species.

  Full tree descriptors are attached as Appendix 3.

2.3 Establishing Tree Protection Zones (TPZ);

2.3.1 To successfully retain suitable trees within or around a development site, consideration must be given to protecting the trunk, crown and roots of each specimen. Tree protection zones (TPZ's) are used to provide adequate space for the preservation of sufficient roots to maintain tree health (particularly important for mature trees) whilst providing a buffer zone between construction activity and the tree trunk and crown.

2.3.2 The method for determining tree protection zones adopted in this report is the 'Australian Standard for Protection of trees on development sites' (AS4970-2009). The TPZ area is based on the trunk diameter measurement measured in metres at 1.4m from ground level and multiplied by 12 and is a guide for planning purposes. The trunk of the tree is used as the centre point for the measurement. TPZ measurements are included in the tree assessment data in Appendix 1.

2.3.3 Additional measurements can be calculated to determine the allowable encroachment on one side of the TPZ (reduced TPZ) and the Structural Root Zone (SRZ) which is the absolute minimum required to maintain tree stability without consideration to ongoing health.
Details of tree protection zone establishment, permissible encroachment and management guidelines are outlined in Appendix 4.

2.4 Documents reviewed include;

- Planning property reports and City of Brimbank Council planning zones and overlays. The site is currently zoned Public Use Zone-Education (PUZ2).
- There are no planning overlays relating to tree controls that apply to the site.
- Clause 52.17 of the Victorian Planning Provisions of the Planning and Environment Act, 1987 (Vic) applies to the site because the allotment is greater than 4,000 m^2 in area.

  Under clause 52.17 it is necessary to demonstrate what steps have been taken
  - To avoid the removal of (Victorian) native vegetation.
  - To minimise the removal of native vegetation.
  - To appropriately offset the loss of native vegetation.

    - Clause 52.17 applies only to vegetation native to Victoria. Vegetation planted for purposes of 'shelter belts, woodlots, street trees, gardens or the like' are exempt under 52.17-6 *unless planted with assistance from public funding*.

3 Observations

The tree study area is the former site of Deer Park Primary School. It is a flat allotment of approximately 2.3 Ha with no creeks or natural drainage lines within the site. The site is located on the west side of Station Street with residential housing abutting part of the southern and northern boundaries. All of the school buildings have been removed and only trees and some of the previous pavement sections have been retained.

3.1 The subject site comprises open space that was formerly playing fields, paved surfaces and building footprints.
The majority of trees were located around the perimeter of the site.

3.2 Trees located in the south east corner adjacent to Station Street and Western Highway were not within the site boundary and were not assessed.

Tree population.

3.3 Forty eight (48) trees were inspected.
Refer to Appendix 2 for tree locations and numbering.

3.4 The origin of all the trees was assessed to determine if any trees were indigenous to the local area, Victorian Native or of botanical significance. The origin of the assessed trees is indicated in Table 1.

Table 1:

Table 1: Tree origin	Total	
Victorian Native	19	39.6 %
Australian Native	15	31.3 %
Exotic Deciduous	8	16.7 %
Exotic Evergreen	6	12.5
Total	48	100%

Nineteen (19) trees of Victorian Native origin were distributed throughout the tree population. Based on the species selection, spatial arrangement and generally even age and size, it is concluded that all trees were specimens planted primarily for garden and amenity purposes and there were no naturally occurring indigenous trees.

3.5 Seventeen (17) different species were observed within the tree population. The most prevalent species on site are indicated in Table 2.

Table 2:

Table 2. Predominant species	Number of trees
River Red Gum (*Eucalyptus camaldulensis*)	7
Prickly-leaved Paperbark (*Melaleuca styphelioides*)	7
Yellow Gum (*Eucalyptus leucoxylon*)	6
Peppercorn Tree (*Schinus areira*)	6
Desert Ash (*Fraxinus angustifolia* subsp. *angustifolia*)	6
Spotted Gum (*Corymbia maculata)*	3
Swamp She-oak (*Casuarina glauca*)	2
Bracelet-honey Myrtle (*Melaleuca armillaris*)	2
Total	39 of 48

These species represented 81 % of the total tree population. Some of these trees made a significant contribution to the site in terms of amenity and landscape values.

3.6 Tree health:
The health rating was assessed based on foliage colour, size and density as well as shoot initiation and elongation.

In general the trees displayed Fair health or better (85%) considered to be typical for the species growing in this environment under current conditions.

3.7 Tree structure:
The structure of the trees was assessed for structural defects and deficiencies, likelihood of failures and presence of targets.

In general, the majority of trees displayed a Fair-poor (37.5 %) or Poor (18.7 %) structural condition. Some deficiencies were considered typical for the species and there were few structural defects that could not be amended with arboricultural maintenance.

Structural defects that were observed within the tree population included; basal and trunk decay, limb failures and included bark unions. Structural deficiencies included; over extended limbs amongst others.

Tree 9 is a Peppercorn Tree (*Schinus areira)* that was exhibiting several structural defects that attributed to its arboricultural rating of Low. A seam wound located on the east side of the tree trunk had the presence of wood decay. In addition a large pruning cut on the south side encouraged the development of epicormic growth from this area that is poorly attached. As these poorly attached branches extend further, the likelihood of failure increases, therefore it is recommended to reduce these limbs heading to the south and west if the tree is to be retained.

3.8 Trees may be considered significant to the landscape because of their size, dominance within the site, presence within outlooks and general amenity in terms of shade, screen, foliage and flowers and historic, cultural or horticultural characteristics. The key requirement for successful tree retention is to identify the trees that represent the best opportunity for retention and implement tree protection and design amendments before any site works commence. The arboricultural rating in combination with other factors can assist the project team and planners in nominating trees suitable for retention.

Each of the assessed trees was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within an urban landscape context and its ability to continue provide these qualities into the medium to long term future.
It should be noted that the arboricultural rating is different to the conservation/ecological values placed on trees by other professions.

Table 3 indicates the arboricultural ratings attributed to the trees inspected.

Table 3: Arboricultural Rating	Total	Trees number
Moderate	16	5, 6, 10, 14, 19, 21, 23, 28, 29, 30, 34, 35, 37, 39, 45, 47
Low	30	1, 2, 3, 4, 7, 8, 9, 11, 12, 13, 15, 16, 17, 18, 20, 22, 25, 26, 27, 31, 32, 33, 36, 38, 40, 41, 42, 43, 46, 48
None	2	24, 44
Total	48	

3.7.1 Moderate rated trees represent trees of fair or better condition. These trees are considered to be suitable to retain and as having the best potential to be medium to long term features of the surrounding landscape if retained.

Pruning recommendations should be undertaken to enhance the longevity and safe retention of these trees.

3.7.2 Low rated trees were generally either of relatively small dimensions, of unremarkable quality, had a relatively short useful life expectancy, were considered to be environmental weed species or displayed below typical health or structure.

Low rated trees are not considered to be worthy of being a constraint on reasonable design intent and development within the site. Such trees may still contribute to the landscape amenity as an established tree resource and have the potential to be safely retained if appropriate tree protection measures and arboricultural maintenance is provided as required.

3.7.3 Trees rated None were generally defective or hazardous and beyond practical arboricultural management.

(Refer to Appendix 2 for tree location and numbering and Appendix 3 for tree descriptors).

4 Permit requirement:

Based on the species selection, spatial arrangement and generally even age and size, it is concluded that all trees were specimens planted primarily for garden and amenity purposes and are exempt from consideration under Clause 52.17 of the Victorian Planning Provisions of the Planning and Environment Act, 1987 (Vic).

5 Design proposal:

5.1 The pre-development arboricultural inspection report provides planners and designers with information on the measures required to protect trees suitable to be retained. At the time of undertaking the tree assessment there was no requirement to undertake a concept design review.

5.2 In the absence of formal design plans, it is not appropriate to speculate on which trees are most appropriate for retention beyond the general guide provided by the arboricultural ratings attributed to each tree feature.

5.3 It is recommended that trees of Moderate arboricultural value be considered for retention and protection over trees of Low or No arboricultural value during any redevelopment of the site.

5.4 The Low rated trees within the site were either deficient in health or structure or were of small size, considered to be environmental weed species and are not worthy of being a constraint on reasonable design intent.

5.4.1 However not all Low rated trees should be dismissed altogether. Some Low rated trees can be retained as an established tree resource where they are not impacted directly by any proposed construction activity or where they perform a role such as screening neighbouring properties or the like or protect from erosion, winds, frosts or other actions.

5.5 Weed species should generally be removed for sound environmental reasons.

5.6 The tree protection zones (TPZ) have been determined for each tree based on the Australian Standard for Protection of Trees on Development Sites (AS 4970-2009). The method for calculating, applying and managing the tree protection zone is described in Appendix 4.

5.6.1 Where construction related activity is confined to only one side of the tree, the nominal TPZ may be reduced by 10% of the TPZ area which is equivalent to approximately 1/3 radial distance.

5.6.2 It is recommended that no construction be proposed beneath the canopy extents of any mature River Red Gum trees or for that matter any of the larger maturing eucalypts including Sugar Gums and Bushy Sugar Gums due to the potential for limb failure and mature trees being more sensitive to site disturbance.

5.7 It is well understood that trees develop a relatively shallow lateral root system as opposed to a ‘tap’ root. Managing these surface roots must be considered with regard to any tree that is to be retained. Ensuring that existing soil levels are maintained within the nominated tree protection zone is important and any construction proposed within the TPZ of a retained tree must adopt a root sensitive design and construction method approved under consultation with the site arborist or the relevant authorities.

5.8 It is recommended that where maturing native trees occur within any proposed subdivision allotments, the allotment must be of sufficient size to permit reasonable use and development of the site in conjunction with allowing for sufficient area surrounding the tree to fully protect the nominated tree protection zone.

5.9 It is recommended that exclusion fencing be established around all retained trees prior to any further works occurring on site including bulk earthworks, excavation for footings or installation of underground services or any construction related activity to prevent damage to roots, buttress, trunk or limbs and to prevent soil compaction.

5.9.1 The area within the TPZ should be mulched to 100mm depth with matured wood chip mulch with a particle size of 25mm for 75% of the volume.

5.9.2 The growth of self-sown saplings or weed invasion should be controlled within the TPZ areas.

6. Photographic examples

1

2

3

4

5

1. Photo 1: Shows the relative size, condition and location of Tree 19, a Sugar Gum (*Eucalyptus cladocalyx*). The tree is of moderate arboricultural value and contributed to the site in terms of amenity and landscape values.
2. Photo 2: Shows the relative size, location and condition of moderately rated Tree 6, a River Red Gum (*Eucalyptus camaldulensis*). The tree was in a condition suitable for retention within future development of the site.
3. Photo 3: Shows a view from the north-west corner towards the centre of the site. The site was an open, flat allotment with former playing fields and trees remaining on site after the removal of the school buildings. Trees 25, 26 and 27 were of Low arbroricultural value due to structural defects and Tree 27 was becoming weedy in the locale.
4. Photo 4: Shows the relative size, condition and location of Tree 9, a Peppercorn Tree (*Schinus areira*) of low arboricultural value due to the tree exhibiting structural defects. The insert shows a seam wound on the east side of the tree trunk with the presence of decay.
5. Photo 5: Shows the relative size, condition and location of Trees 28 and 29 both River Red Gums and Tree 30 a mature Bushy Sugar Gum (*Eucalyptus cladocalyx* 'Nana') located on the western boundary. It is recommended to allow for adequate space around the canopy of mature Bushy Sugar Gums due to the potential for limb failure and mature trees being more sensitive to changes in their growing environment.

7. Conclusion and Recommendations:

7.1. Forty eight (48) trees were inspected within the site of the former Deer Park Primary School at 95 Station Street, Deer Park.

7.2. All trees were attributed an arboricultural rating that reflects the retention value of each tree.

- Sixteen trees were attributed an arboricultural rating of Moderate.
- Thirty trees were rated Low.
- Two trees were attributed an arboricultural rating of None.

Refer to Page 7, Table 3 for tree numbers, Appendix 2 for tree locations and Appendix 3 for tree descriptors.

7.3. To successfully retain the nominated suitable trees, tree protection measures must be implemented prior to any commencing any construction related activity including demolition, bulk earthworks and must be maintained for the duration of the construction process including landscaping.

7.3.1. Tree protection zones must be appropriately fenced to prevent vehicle access, excavation, trenching, contamination or raised soil levels occurring within the reduced TPZ.

7.4. Any pruning recommendations must be undertaken by a suitably qualified and experienced arborist and comply with Australian Standard AS 4373-2007 - Pruning of Amenity trees to extend the useful life expectancy of retained trees.

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

Signed

David Phillips

Consulting Arborist- Treelogic P/L

Associate Degree (Env Hort)

M 0433 813 587 E david.phillips@treelogic.com.au

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.

Standards Australia (2007), Australian Standard (4373-2007) - Pruning of Amenity trees, Standards Australia, Homebush, NSW.

Appendix 1: Tree details: Former Deer Park Primary School.

Refer to following 5 pages.

DBH = Diameter at Breast Height (measured in centimetres at 1.4m above ground unless otherwise stated).

TPZ = Tree Protection Zone (metre radius). Radius distances measured in metres from the centre of the trunk.

For tree location and numbering refer Appendix 2. See Appendix 3 for Tree descriptors.

Appendix 1: Tree Assessment detail: former Deer Park Primary School (Tree Logic, 2014).

Tree No.	Common Name (Botanical name)	Origin	DBH (cm)	Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention Value	Comments	Recommended Work	Tree Protection Zone (radial metres)	Reduced TPZ (metres)	Latitude	Longitude
1	Peppercorn Tree (Schinus areira)	Exotic Evergreen	37,21,13	6	8	Semi-mature	Fair	Fair - Poor	Low	Basal Decay, Limb failure	Remove	5.3	3.7	-37.76868	144.774795
2	Peppercorn Tree (Schinus areira)	Exotic Evergreen	34	6	9	Semi-mature	Fair	Poor	Low	Basal Decay.	Remove	4.1	2.9	-37.7687	144.774795
3	Peppercorn Tree (Schinus areira)	Exotic Evergreen	20,21,32 @ 1.0m	6	10	Semi-mature	Fair	Poor	Low	Basal Decay, Limb failure	Remove	5.2	3.6	-37.76874	144.774795
4	Yellow Gum (Eucalyptus leucoxylon)	Victorian Native	38	12	11	Mature	Fair	Fair - Poor	Low			4.6	3.2	-37.76892	144.774765
5	Yellow Gum (Eucalyptus leucoxylon)	Victorian Native	31,35	10	16	Mature	Fair	Fair - Poor	Moderate	Over-extended Limbs to east & west.	Crown Reduce	5.6	3.9	-37.76895	144.774765
6	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	70	20	17	Mature	Fair	Fair	Moderate			8.4	5.9	-37.76936	144.774695
7	Desert Ash (Fraxinus angustifolia subsp. angustifolia)	Exotic Deciduous	37 @ 0.5m	8	9	Semi-mature	Fair	Fair	Low	Weed Species.		4.4	3.1	-37.7695	144.774646
8	Desert Ash (Fraxinus angustifolia subsp. angustifolia)	Exotic Deciduous	30 @ 0.5m	7	9	Semi-mature	Fair	Fair	Low	Weed Species.		3.6	2.5	-37.76953	144.774646
9	Peppercorn Tree (Schinus areira)	Exotic Evergreen	123 @ 0.5m	13	17	Mature	Fair	Poor	Low	Trunk Decay. Regrowth to south & west poorly attached from previous pruning. Reduce southern & western limbs.		14.8	10.3	-37.7693	144.774452
10	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	39	10	7	Semi-mature	Fair	Fair	Moderate			4.7	3.3	-37.76942	144.774274
11	Sweet Pittosporum (Pittosporum undulatum)	Victorian Native	9,10,8,9	6	6	Semi-mature	Fair	Fair - Poor	Low	Weed Species.		2.2	1.5	-37.76942	144.774213
12	Locust (Robinia pseudoacacia 'Freisa')	Exotic Deciduous	41 @ 0.5m	10	12	Semi-mature	Fair	Fair - Poor	Low	Included Bark Fork.		4.9	3.4	-37.76932	144.774089

Appendix 1: Tree Assessment detail: former Deer Park Primary School (Tree Logic, 2014).

Tree No.	Common Name (Botanical name)	Origin	DBH (cm)	Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention Value	Comments	Recommended Work	Tree Protection Zone (radial metres)	Reduced TPZ (metres)	Latitude	Longitude
13	Desert Ash (Fraxinus angustifolia subsp. angustifolia)	Exotic Deciduous	17 @ 1.0m	6	6	Semi-mature	Fair	Fair - Poor	Low	Weed Species.		2.0	1.4	-37.76932	144.774007
14	Spotted Gum (Corymbia maculata)	Victorian Native	52	16	12	Semi-mature	Fair	Fair	Moderate			6.2	4.4	-37.76933	144.773864
15	Claret Ash (Fraxinus 'Raywood')	Exotic Deciduous	16	5	6	Semi-mature	Fair	Fair	Low	Small size		2.0	1.4	-37.76943	144.773843
16	Peppercorn Tree (Schinus areira)	Exotic Evergreen	24	7	11	Semi-mature	Fair - Poor	Fair	Low	Foliage sparse.		2.9	2.0	-37.76949	144.773707
17	Desert Ash (Fraxinus angustifolia subsp. angustifolia)	Exotic Deciduous	19	8	8	Semi-mature	Fair	Fair	Low	Weed Species.		2.3	1.6	-37.76951	144.773707
18	Peppercorn Tree (Schinus areira)	Exotic Evergreen	18,14	8	7	Semi-mature	Fair	Fair	Low			2.7	1.9	-37.76953	144.773707
19	Sugar Gum (Eucalyptus cladocalyx)	Australian Native	89	18	18	Mature	Fair	Fair	Moderate		Deadwood	10.7	7.5	-37.76904	144.77398
20	Swamp She-oak (Casuarina glauca)	Australian Native	10,10,8,10 @1.0m	5	6	Semi-mature	Fair	Poor	Low	Stump Resprout.		2.3	1.6	-37.76934	144.773431
21	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	32 @ 1.0m	6	8	Semi-mature	Fair	Fair - Poor	Moderate			3.8	2.7	-37.76929	144.77332
22	Swamp She-oak (Casuarina glauca)	Australian Native	12,11,9,6,6	9	7	Semi-mature	Fair	Poor	Low	Self sown, saplings		2.5	1.7	-37.76929	144.773209
23	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	41	9	9	Semi-mature	Fair	Fair - Poor	Moderate		Uplift	4.9	3.4	-37.76922	144.772968
24	Desert Ash (Fraxinus angustifolia subsp. angustifolia)	Exotic Deciduous	15,8,9,8,9 @ 1.0m	6	8	Mature	Fair	Very Poor	None	Basal Decay.		2.7	1.9	-37.76922	144.772843
25	Yellow Gum (Eucalyptus leucoxylon)	Victorian Native	27	10	8	Semi-mature	Fair	Fair - Poor	Low	Past Limb Failure		3.2	2.3	-37.76873	144.773177
26	Yellow Gum (Eucalyptus leucoxylon)	Victorian Native	10,11,9	4	9	Semi-mature	Fair	Poor	Low	Multi Stemmed		2.1	1.5	-37.76873	144.773389
27	Desert Ash (Fraxinus angustifolia subsp. angustifolia)	Exotic Deciduous	30 @ 1.0m	7	10	Semi-mature	Fair	Fair	Low	Weed Species.		3.6	2.5	-37.76878	144.773713

Appendix 1: Tree Assessment detail: former Deer Park Primary School (Tree Logic, 2014).

Tree No.	Common Name (Botanical name)	Origin	DBH (cm)	Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention Value	Comments	Recommended Work	Tree Protection Zone (radial metres)	Reduced TPZ (metres)	Latitude	Longitude
28	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	37,35	15	10	Semi-mature	Fair - Poor	Fair	Moderate			6.1	4.3	-37.76858	144.77275
29	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	38	9	9	Semi-mature	Good	Fair	Moderate	Power line clearance	Crown Reduce	4.6	3.2	-37.76848	144.772785
30	Bushy Sugar Gum (Eucalyptus cladocalyx 'Nana')	Australian Native	52 @ 0.5m	10	15	Mature	Fair	Fair	Moderate	Minor branch over extension	Crown Reduce	6.2	4.4	-37.76831	144.772785
31	Red Ironbark (Eucalyptus sideroxylon)	Australian Native	28	12	9	Semi-mature	Fair - Poor	Fair	Low	Foliage sparse.		3.4	2.4	-37.76828	144.772789
32	Yate (Eucalyptus cornuta)	Australian Native	37	11	10	Semi-mature	Fair	Fair - Poor	Low	Trunk wound, epicormics		4.4	3.1	-37.76825	144.772789
33	Spotted Gum (Corymbia maculata)	Victorian Native	16	11	4	Semi-mature	Fair	Fair	Low	small size		2.0	1.4	-37.76825	144.772843
34	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	44	18	8	Semi-mature	Fair	Fair - Poor	Moderate	Acute Branch union.		5.3	3.7	-37.7682	144.772789
35	Spotted Gum (Corymbia maculata)	Victorian Native	43	14	11	Semi-mature	Fair	Fair	Moderate			5.2	3.6	-37.76822	144.772985
36	Bracelet Honey-myrtle (Melaleuca armillaris)	Victorian Native	18	5	5	Semi-mature	Fair	Poor	Low			2.2	1.5	-37.76823	144.77312
37	Yellow Gum (Eucalyptus leucoxylon)	Victorian Native	31 @ 1.0m	7	9	Semi-mature	Fair	Fair	Moderate			3.7	2.6	-37.76823	144.773153
38	Pincushion Hakea (Hakea laurina)	Australian Native	28 @ 0.5m	3	5	Mature	Fair	Poor	Low			3.4	2.4	-37.76829	144.773423
39	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	15,15,22, 14	7	9	Semi-mature	Fair	Fair - Poor	Moderate			4.0	2.8	-37.7683	144.773524
40	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	19,14	5	7	Semi-mature	Fair	Fair - Poor	Low			2.8	2.0	-37.76831	144.773625
41	Gum Tree (Eucalyptus sp.)	Australian Native	18	9	5	Semi-mature	Fair	Fair - Poor	Low	Acute Branch union.		2.2	1.5	-37.76838	144.773763
42	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	18,16,12 @ 1.0m	4	6	Semi-mature	Fair	Fair - Poor	Low			3.2	2.3	-37.76836	144.77385

Appendix 1: Tree Assessment detail: former Deer Park Primary School (Tree Logic, 2014).

Tree No.	Common Name (Botanical name)	Origin	DBH (cm)	Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention Value	Comments	Recommended Work	Tree Protection Zone (radial metres)	Reduced TPZ (metres)	Latitude	Longitude
43	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	36	14	9	Semi-mature	Fair - Poor	Fair - Poor	Low			4.3	3.0	-37.76838	144.773893
44	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	40	16	8	Semi-mature	Poor	Poor	None	In decline.		4.8	3.4	-37.76842	144.774045
45	Yellow Gum (Eucalyptus leucoxylon)	Victorian Native	18	6	6	Semi-mature	Fair	Fair	Moderate	Remove steel guard	Action - other	2.2	1.5	-37.76843	144.774132
46	Bracelet Honey-myrtle (Melaleuca armillaris)	Victorian Native	14	3	4	Semi-mature	Fair	Fair - Poor	Low			2.0	1.4	-37.76843	144.774219
47	River Red Gum (Eucalyptus camaldulensis)	Victorian Native	72	20	20	Mature	Fair	Fair	Moderate	Over-extended Limbs.	Crown Reduce	8.6	6.0	-37.76847	144.774219
48	Prickly-leaved Paperbark (Melaleuca styphelioides)	Australian Native	25	5	5	Semi-mature	Fair - Poor	Fair - Poor	Low			3.0	2.1	-37.76846	144.774304

Appendix 2: Tree numbers & locations: Former Deer Park Primary School.

Refer to following page.

Appendix 2: Tree numbers & locations: former Deer Park Primary School (Tree Logic, 2014)

Appendix 3: Arboricultural Descriptors (August 2013)

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.

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. 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 author.

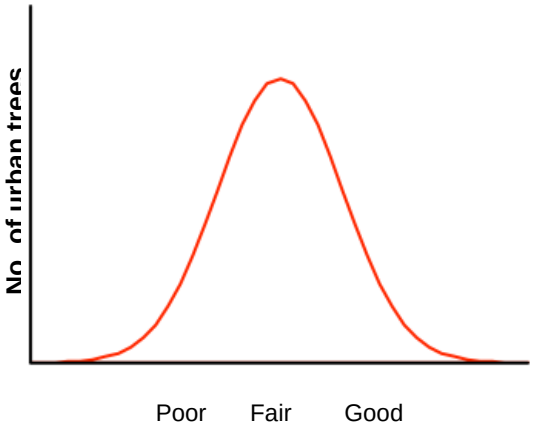


Diagram 1: Indicative normal distribution curve for tree condition

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.

Tree Name

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

Tree Type

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

Category	Description
1 Indigenous	Occurs naturally in the area or region of the subject site
2 Victorian native	Occurs naturally within some part of the State of Victoria (not exclusively) but is not indigenous
3 Australian native	Occurs naturally within Australia but is not a Victorian native or indigenous
4 Exotic deciduous	Occurs outside of Australia and typically sheds its leaves during winter
5 Exotic evergreen	Occurs outside of Australia and typically holds its leaves all year round
6 Exotic conifer	Occurs outside of Australia and is classified as a gymnosperm
7 Native conifer	Occurs naturally within Australia and is classified as a gymnosperm
8 Native Palm	Occurs naturally within Australia. Woody monocotyledon

Category	Description
9 Exotic Palm	Occurs outside of Australia. Woody monocotyledon

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 author'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).

Trunk diameters

The position where trunk diameters are captured may vary dependent on the requirements of the specific assessment. 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.

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 with forestersø 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.

Health

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

Category	Vigour/Extension growth	Decline symptoms/Deadwood/Dieback	Foliage density, colour, size, intactness	Pests and or disease
Good	Above typical	Negligible	Better than typical	Negligible
Fair	Typical	Minor or expected	Typical	Minor, within damage thresholds
Fair to Poor	Below typical	More than typical	Exhibiting deficiencies	Exceeds damage thresholds
Poor	Minimal	Excessive, large and/or prominent amount/size	Exhibiting severe deficiencies	Extreme and contributing to decline
Dead	N/A	N/A	N/A	N/A

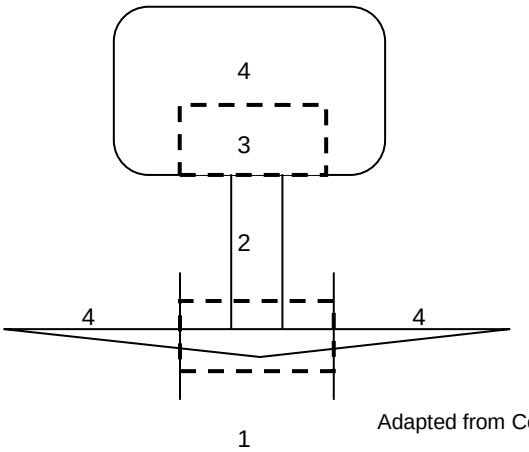
Structure

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 obvious damage, disease, decay or structural defect
Fair	Minor damage or decay. Basal flare present.	Minor damage or decay	Typically formed, attached, spaced and tapered	Minor damage, disease or decay; minor branch end-weight or over-extension
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
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 resprout	Decayed, cavities or has acute branch attachments with included bark; excessive compression flaring; failure likely	Major damage, disease or decay; fungal fruiting bodies present; major branch end-weight or over-extension
Very Poor	Excessive damage, disease or decay; unstable / loose in ground; altered exposure; failure probable	Excessive damage, disease or decay; cavities. Excessive lean. Stump resprout	Decayed, cavities or branch attachments with active split; failure imminent	Excessive damage, disease or decay; excessive branch end-weight or over-extension

Diagram 2: Tree structure zones

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



Adapted from Coder (1996)

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 the 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.

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

Life Stage

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.
Maturing	Specimen approaching expected size in situation, with reduced incremental growth
Over-mature	Tree is senescent and in decline. Significant decay generally present

Arboricultural Rating

Relates to the combination of tree condition factors, including health and structure (arboricultural merit), and also conveys an amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics (Hitchmough 1994) within an urban landscape context.

Category	Description
High	Tree of high quality in good to fair condition. Generally a prominent arboricultural feature. These trees have the potential to be a medium- to long-term component of the landscape if managed appropriately. Retention of these trees is highly desirable.
Moderate	Tree of moderate quality, in fair or better condition. Tree may have a condition, and or structural problem that will respond to arboricultural treatment. These trees have the potential to be a medium- to long-term component of the landscape if managed appropriately. Retention of these trees is generally desirable.

Low	Tree of low quality and/or little amenity value. Tree in poor health and/or with poor structure. Tree is not significant because of its size and/or age. These trees are easily replaceable. Tree (species) is functionally inappropriate to specific location and would be expected to be problematic if retained. Retention of such trees may be considered if not requiring a disproportionate expenditure of resources for a tree in its condition and location.
None	Tree has a severe structural defect and/or health problem that cannot be sustained with practical arboricultural techniques and the loss of tree would be expected in the short term. Tree whose retention would not be viable after the removal of adjacent trees (includes trees that have developed in close spaced groups and would not be expected to acclimatise to severe alterations to surrounding environment – removal of adjacent shelter trees). Tree has a detrimental effect on the environment, for example, the tree is a woody weed with potential to spread into waterways or natural areas.

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 criterion 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

Bibliography:

Coder, K D. (1996) Construction damage assessments: trees and sites, University of Georgia, USA

Hitchmough, J.D. (1994) Urban landscape management, Inkata Press, Australia

Gooding, R.F., Ingram, J.B., Urban, J.R., Bloch, L.B., Steigerwaldt, W.M, Harris, R.W. and Allen, E.N. (2000) Guide for plant appraisal, 9th edition, International society of Arboriculture, USA

Pollard, A. H. (1974) Introductory statistics: a service course, Pergamon Press Australia, Australia.

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

Appendix 4: Tree protection zones. Tree logic Pty. Ltd. © 2005

1.0 Introduction

In order to sustain trees on a development site consideration must be given to the establishment of tree protection zones.

The physical dimensions of tree protection zones can sometimes be difficult to define. The projection of a tree's crown can provide a guide but is by no means the definitive measure. The unpredictable nature of roots and their growth, differences between species and their tolerances, and observable and hidden changes to the trees growing environment, as a result of development, are variables that must be considered.

Most vigorous, broad canopied trees survive well if the area within the drip-line of the canopy is protected. Fine root density is usually greater beneath the canopy than beyond (Gilman, 1997). If few to no roots over 3cm in diameter are encountered and severed during excavation the tree will probably tolerate the impact and root loss. A healthy tree can sustain a loss of between 30% and 50% of absorbing roots (Harris, Clark, Matheny, 1999), however encroachment into the structural root system of a tree may be problematic.

The structural root system of a tree is responsible for ensuring the stability of the entire tree structure in the ground. A tree could not sustain loss of structural root system and be expected to survive let alone stand up to average annual wind loads upon the crown.

2.0 Allocation of tree protection zone (TPZ)

The method of allocating a TPZ to a particular tree will be influenced by site factors, the tree species, its age and developed form.

Once it has been established, through an arboricultural assessment, which trees and tree groups are to be retained, the next step will require careful management through the development process to minimise any impacts on the designated trees. The successful retention of trees on any particular site will require the commitment and understanding of all parties involved in the development process. The most important activity, after determining the trees that will be retained is the implementation of a TPZ.

The intention of tree protection zones is to:

- mitigate tree hazards;
- provide adequate root space to sustain the health and aesthetics of the tree into the future;
- minimise changes to the trees growing environment, which is particularly important for mature specimens;
- minimise physical damage to the root system, canopy and trunk; and
- define the physical alignment of the tree protection fencing

Tree protection

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.

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 (stem) diameter (DBH), measured at 1.4 metres up from ground level. The radius of the TPZ is calculated by multiplying the trees DBH by 12. The 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 minimum TPZ should be no less than 2m and the maximum no more than 15m radius. The TPZ of palms should be not less than 1.0m outside the crown projection.

Encroachment into the TPZ is permissible under certain circumstances though 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. Examples are provided in Diagram 1. 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.

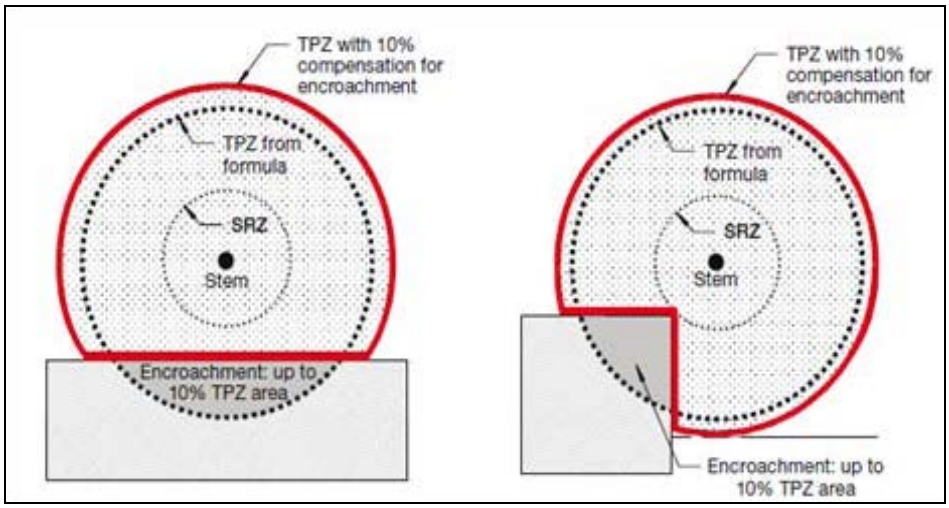


Diagram 1: Examples of minor encroachment into a TPZ. Extract from: AS4970-2009, Appendix D, p30 of 32

The 10% encroachment on one side equates to approximately ⅓ radial distance. 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. The roots of some trees may have grown in response to the site conditions and therefore if existing hard surfaces and building alignments are utilised in new designs the impacts on the trees should be minimal. The most reliable way to estimate root disturbance is to find out where the roots are in relation to the demolition, excavation or construction works that will take place (Matheny & Clark, 1998). Exploratory excavation prior to commencement of construction can help establish the extent of the root system and where it may be appropriate to excavate or build.

The TPZ should also give consideration to the canopy and overall form of the tree. If the canopy requires severe pruning in order to accommodate a building and in the process the form of the tree is diminished it may be worthwhile considering altering the design or removing the tree.

General tree protection guidelines

The most important factors are:

- Prior to construction works the trees nominated for tree works should be pruned to remove larger dead wood. Pruning works may also identify other tree hazards that require remedial works.
- Installation of tree protection fencing. Once the tree protection zones have been determined the next step is to mulch the zone with woodchip and erect tree protection fencing. This must be completed prior to any materials being brought on-site, erection of temporary site facilities or demolition/earth works. The protection fencing must be sturdy and withstand winds and construction impacts. The protection fence should only be moved with approval of the site supervisor. Other root zone protection methods can be incorporated if the TPZ area needs to be traversed.
- Appropriate signage is to be fixed to the fencing to alert people as to importance of the tree protection zone.
- The importance of tree preservation must be communicated to all relevant parties involved with the site.
- Inspection of trees during excavation works.

Exploratory excavation

The most reliable way to estimate root disturbance is to find out where the roots are in relation to the demolition, excavation or construction works that will take place (Matheny & Clark, 1998).

Exploratory excavation prior to commencement of construction can help establish the extent of the root system and where it may be appropriate to excavate or build. This also allows management decisions to be made and allows time for redesign works if required.

Any exploratory excavation within the allocated TPZ is to be undertaken with due care of the roots. Minor exploration is possible with hand tools. More extensive exploration may require the use of high pressure water or air excavation techniques. Either hydraulic or pneumatic excavation techniques will safely expose tree roots; both have specific benefits dependent on the situation and soil type. An arborist is to be consulted on which system is best suited for the site conditions.

Substantial roots are to be exposed and left intact.

Once roots are exposed decisions can be made regarding the management of the tree. Decisions will be dependent on the tree species, its condition, its age, its relative tolerance to root loss, and the amount of root system exposed and requiring pruning.

Other alternative measures to encroaching the TPZ may include boring or tunnelling.

Construction Guidelines

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

- The Tree Protection Zone (TPZ) is fenced and clearly marked at all times. The actual fence specifications should be a minimum of 1.2 - 1.5 metres of chain mesh or like fence with 1.8 meter posts (e.g. treated pine or star pickets) or like support every 3-4 metres and a top line of high visibility plastic hazard tape. The posts should be strong enough to sustain knocks from on site excavation equipment. This fence will 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. Note: There are many different variations on the construction type and material used for TPZ fences, suffice to say that the fence should satisfy the responsible authority.
- 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 importance of tree preservation must be communicated to all relevant parties involved with the site.
- The consultant arborist is on-site to supervise excavation works around the existing trees where the TPZ will be encroached.
- A layer of organic mulch (woodchips) to a depth of no more than 100mm should be placed over the root systems within the TPZ of trees, which are to be retained so as to assist with moisture retention and to reduce the impact of compaction.
- No persons, vehicles or machinery to enter the TPZ without the consent of the consulting arborist or site manager.
- Where machinery is required to operate inside the TPZ it must be a small skid drive machine (i.e Dingo or similar) operating only forwards and backwards in a radial direction facing the tree trunk and not altering direction whilst inside the TPZ to avoid damaging, compacting or scuffing the roots.
- 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.
- Supplementary watering should be provided to all trees through any dry periods during and after the construction process. Proper watering is the most important maintenance task in terms of successfully retaining the designated trees. The areas under the canopy drip lines should be mulched with woodchip to a depth of no more than 100mm. The mulch will help maintain soil moisture levels. Testing with a soil probe in a number of locations around the tree will help ascertain soil moisture levels and requirements to irrigate. Water needs to be applied slowly to avoid runoff. A daily

watering with 5 litres of water for every 30 mm of trunk calliper may provide the most even soil moisture level for roots (Watson & Himelick, 1997), however light frequent irrigations should be avoided. Irrigation should wet the entire root zone and be allowed to dry out prior to another application. Watering should continue from October until April.

References

Bernatzky, A. 1978. *Tree Ecology and Preservation.* New York: Elsevier Publishing.

British Standard 5837. 1991. *Guide for Trees in relation to construction*. British Standards Institute.

Gilman, E. F. 1997. *Trees for Urban and Suburban Landscapes.* Delmar.

Harris, R. W, Clark J.R. & Matheny N.P. 1999. *Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines*, *Third Edition.* Prentice - Hall, New Jersey.

Helliwell, D. R. 1985. *Trees on Development Sites*. Arboricultural Association UK.

Matheny, N. & Clark, J. R. 1998. *Trees and development – A technical guide to preservation of trees during land development*. International Society of Arboriculture, Publishers.

Mattheck, C. & Breloer, H. 1994. *The Body Language of Trees* HMSO

Mattheck C. 2002. *Tree Mechanics*, Forschungszentrum Karlsruhe GMBH

Tattar, T. A. 1989. *Diseases of Shade Trees*, 2nd ed. San Diego: Academic Press.

Watson, G. W. & Himelick, E. B. 1997. *Principals and Practices of Planting Trees and Shrubs.* International Society of Arboriculture.

Tree Logic Pty. Ltd.

Unit 4, 21 Eugene Terrace

Ringwood Vic 3134

Arboricultural Consultancy:
Precedent disclaimer and copyright

Disclaimer: Although Tree Logic uses all due care and skill in providing you the information made available in this report, to the extent permitted by law Tree Logic otherwise excludes all warranties of any kind, either expressed or implied.

To the extent permitted by law, you agree the Tree Logic is not liable to you or any other person or entity for any loss or damage caused or alleged to have been caused (including loss or damage resulting from negligence), either directly or indirectly, by your use of the information (including by way of example, arboricultural advice) made available to you in this report. Without limiting this disclaimer, in no event will Tree Logic be liable to you for any lost revenue or profits, or for special, indirect, consequential or incidental damage (however caused and regardless of the theory of liability) arising out of or related to your use of that information, even if Tree Logic has been advised of the possibility of such loss or damage.

This disclaimer is governed by the law in force in the State of Victoria, Australia.

Report Assumptions:

- Any legal description provided to Tree Logic Pty. Ltd. is assumed to be correct. Any titles and ownerships to any property are assumed to be correct. No responsibility is assumed for matters outside the consultant's control.
- Tree Logic Pty. Ltd. assumes that any property or project is not in violation of any applicable codes, ordinances, statutes or other local, state or federal government regulations.
- Tree Logic Pty. Ltd. shall take care to obtain all information from reliable sources. All data shall be verified insofar as possible; however Tree Logic can neither guarantee nor be responsible for the accuracy of the information provided by others not directly under Tree Logic's control.
- No Tree Logic employee shall be required to give testimony or to attend court by reason of the report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
- Loss of the report or alteration of any part of the report not undertaken by Tree Logic Pty. Ltd. invalidates the entire report.
- Possession of the report or a copy thereof does not imply right of publication or use for any purpose by anyone but the client or their directed representatives, without the prior consent of the Tree Logic Pty. Ltd.

- The report and any values expressed therein represent the opinion of Tree Logic's consultant and Tree Logic's fee is in no way conditional upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
- Sketches, diagrams, graphs and photographs used in the report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural drawings, reports or surveys.
- Unless expressed otherwise: i) Information contained in the report will cover those items that were outlined in the project brief or that were examined during the assessment and reflect the condition of those items at the time of inspection; and ii) The inspection is limited to visual examination of accessible components without dissection, excavation or probing unless otherwise stipulated.
- There is no warranty or guarantee, expressed or implied by Tree Logic Pty. Ltd., that the problems or deficiencies of the plants or site in question may not arise in the future.
- All instructions (verbal or written) that define the scope of the report have been included in the report and all documents and other materials that the Tree Logic consultant has been instructed to consider or to take into account in preparing the report have been included or listed within the report.

To the writer's knowledge all facts, matter and all assumptions upon which the report proceeds have been stated within the body of the report and all opinion contained within the report will be fully researched and referenced and any such opinion not duly researched is based upon the writers experience and observations.