

Arboricultural Impact Assessment



Prepared 12th October 2021

Site Location

33 Newton Road
Strathfield NSW 2135

Client

Mr Eric Wai

DISCLAIMER

The author and Tree & Landscape Consultants take no responsibility for actions taken and their consequences, contrary to those expert and professional instructions given as recommendations pertaining to safety by way of exercising our responsibility to our client and the public as our duty of care commitment, to mitigate or prevent hazards from arising, from a failure moment in full or part, from a structurally deficient or unsound tree or a tree likely to be rendered thus by its retention and subsequent modification/s to its growing environment either above or below ground contrary to our advice.

Peter Richards

Tree & Landscape Consultants

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Site Analysis, Arboricultural Assessments



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1. INTRODUCTION

This report has been prepared by Tree & Landscape Consultants for Mr Eric Wai. The site was inspected by the author and the subject trees, and their general growing environment evaluated on the 28th September 2021.

The site is subject to a Development Application and this report, and any works recommended herein, that require approval from the consenting authority are provided to form part of that development application and its consent conditions. The Tree Locations (Appendix C) and Tree Protection Plan (Appendix D) are to be included into and used in conjunction with the approval for *the site*.

The aims and objectives of this report are to detail and comply with the tree protection requirements specified in AS4970 (2009) *Protection of trees on development sites* to identify and assesses the condition of the subject tree/s; determine the impact of development on the subject tree/s; provide recommendations for retention or removal of the subject tree/s; provide specifications for protection of tree/s to be retained. The information in this report is intended to provided tree management and protection through all stages of development. This report has relied upon the following plans as a point of reference:

Site & Roof Plan, scale 1:200 @ A3, Drawing Number DA 01 Rev C Dated 20th September 2021 by Blu Print Designs
Survey Plan, scale 1:150 @ A1, date 2/11/2010 Drawing Reference 201526-001 by RGM.

2.0 AIMS & OBJECTIVES

Aims

Detail the condition of the tree/s on the site or on adjoining sites where such tree/s may be affected by the proposed works, by assessment of individual specimens or stands, and indicate remedial works or protection measures for their retention in a safe and healthy condition, or a condition not less than that at the time of initial inspection for this report, or in a reduced but sustainable condition due to the impact of the development but ameliorated through tree protection measures able to be applied, and will consider the location and condition of the trees in relation to the proposed building works, or recommend removal and replacement where appropriate.

Provide as an outcome of the assessment, the following: a description of the tree/s, observations made, discussion of the effects the location of the proposed building works may have on the tree/s, and make recommendations required for remedial or other works to the trees, if and where appropriate.

Determine from the assessment a description of the works or measures required to ameliorate the impact upon the tree/s to be retained, by the proposed building works or future impacts the trees may have upon the new building works if and where appropriate, or the benefits of removal and replacement if appropriate for the medium to long term safety and amenity of the site.

Objectives

Assess the condition of the subject trees.

Determine impact of development on the subject trees.

Provide recommendations for management of the subject trees.

3. METHODOLOGY

- 3.1 The method of assessment of tree/s is applied from the ongoing knowledge and development of the author and considers but is not confined to:
- Tree health and subsequent stability, both long and short term
 - Sustainable Retention Index Value (S.R.I.V.)© IACA 2009)
 - Amenity values
 - Significance
- 3.2 This assessment is undertaken using a standard tree assessment criteria for each tree based on the values above and is implemented as a result of at least one comprehensive and detailed site inspection.
- 3.3 In this report the dimensions of the tree recorded by the author for the trunk *diameter at breast height* (DBH) measurement is calculated at 1.4m above ground from the base of the tree. Where a tree is trunkless or branches at or near ground such as a mallee formed tree, an average diameter is determined by recording the radial extent of the stem mass at its narrowest and widest dimensions, adding the two dimensions together and dividing them by 2 to record an average.
- 3.4 Crown spreads are expressed as length by breadth measurements to accurately record their dimensions. Where appropriate, *crown spread orientation* is described along the length of the crown spread e.g. North/South, or as *radial* if the crown is distributed at an approximately even radius from the trunk e.g. 6x6m.
- 3.5 The Australian Standard AS 4970-2009 "Protection of trees on development sites, where applicable is applied to trees to be retained in this report as a point of reference and guide for the recommended minimum clearances from the centre of tree trunks to development works and is applied as a generalised benchmark and the distances may be increased or decreased by the author as a result of other factors providing mitigating circumstances or constraints as indicated by but not restricted to the following:
- *Tolerance of individual species to disturbance,*
 - *Geology e.g. physical barriers in soil, floaters, bedrock to surface*
 - *Topography e.g. slope, drainage,*
 - *Soil e.g. depth, drainage, fertility, structure,*
 - *Microclimate e.g. due to landform, exposure to dominant wind,*
 - *Engineering e.g. techniques to ameliorate impact on trees such as structural soil, lateral boring,*
 - *Construction e.g. techniques to ameliorate impact on trees such as pier and beam, bridge footings, suspended slabs*
 - *Arboriculture e.g. exploration trenches to map location of roots,*
 - *Physical limitations - existing modifications to the environment and any impact to tree/s by development e.g. property boundaries, road reserves, previous impact by excavation in other directions, soil level changes by cutting or filling, existing landscaping works within close proximity, modified drainage patterns.*

4. TREE ASSESSMENTS

4.1 Table 1

Tree No.	Genus & Species Common Name	Age Y = Young M = Mature O = Overmature	Condition G = Good F = Fair P = Poor D = Dead	Pest & Diseases	Branch Bark Included	Canopy Orientation Sy = Symmetrical N,S,E,W = North South East West	Trunk Diameter (1.4m above ground in mm)	Height (m)	Spread (m)	Tree Vigour L = Low G = Good A = Abnormal	Trunk Lean X = Straight or Slightly Leaning A = Acaulescent M = Moderate	SRIV (Age, Vigour, Condition, Index Rating)
1	Lophostemon confertus Brush Box/ Brisbane Box	M	F	No	No	Sy	400	9	5	G	X	MGVF9
Comments: Crown lopped to clear overhead wires.												
2	Sapium sebiferum Chinese Tallow Tree	M	P	No	No	Sy	280	4	6	G	X	MGVP6
Comments: Crown lopped to clear overhead wires. Dieback of lower order leaders evident.												

4.2– Setback for Tree Protection Zone

This table only applies to trees being retained. Tree Protection Zone fencing locations as measured from the centre of each tree and the recommended distances for the side closest to the building construction works e.g. excavation (see explanatory notes below). Prescribed Tree Protection Zones (TPZs) are determined utilising the Australian Standard AS4970-2009 section 3.2 .

A	B	C	D	E	F	G
Tree No.	Trunk Diameter (1.4m above root buttress in mm)	Trunk Diameter (above root buttress)	Tree Vigour L = Low G = Good A = Abnormal	Age of Tree Y = Young M = Mature O = Over-Mature (Senescent)	Calculated Structural Root Zone (SRZ) (radius in meters- Calculated Structural Root Zone (SRZ) in metres being Radius=(Dx50)0.42 x0.64)	Distance of Tree Protection Zone (TPZ) (radius in meters Australian Standard AS 4970-2009 "Protection of trees on development sites" TPZ=DBH x 12)
1	400	420	G	M	2.3	4.8

Descriptors for modified setbacks in columns above.

- Special conditions apply to protect the roots of trees generally..
- Additional protective fencing information is detailed in recommendations.
- Acceptable due to the good relative tolerance of the species to development impacts.
- Range of setbacks for the trees at each end of a linear stand, see Appendix C.
- Acceptable as fence located at a substantial distance beyond dripline, or may also include the location of a smaller tree in proximity to a larger tree to be retained and the smaller tree being protected well within the protective fencing for that larger tree.
- Acceptable due to additional special protection works.
- Acceptable as pre-existing site conditions were conducive to having restricted the development of root growth in this direction.
- Street tree with protective fencing of minimal width to allow for pedestrian access along road reserve.
- Acceptable as tree transplanted reducing the area of the root zone.
- Acceptable as not effected by development works.
- Young tree not expected to have established a substantially expansive root system and able to re-establish or modify growth to be sustainable due to age and good vigour.
- Set back prescribed by the consent authority.
- Acceptable as tree growing on a lean and encroachment on compression wood side where root growth is of reduced structural importance.
- Acceptable as root mapping has indicated extent of structural woody roots with a diameter of 20 mm or more.
- Acceptable as a specimen of palm taxa tolerant of encroachment.
- Acceptable as excavation on down slope or across slope side of tree.
- Acceptable as encroachment into growing area below ground minor, with one corner of building or excavation works extending to within the radius of the dripline.
- Acceptable as encroachment by pier, including screw piles, with minimal disturbance.
- Acceptable as encroachment above grade without excavation or sub-base compaction.
- Acceptable as located within 0.5 m from edge of dripline.
- Acceptable as encroachment with gap graded fill that can accommodate gaseous exchange between roots/soil and the atmosphere and ongoing root growth.
- Minimum TPZ setback 2 m, AS4970 (2009) section 3, 3.2.
- Maximum TPZ setback 15 m, AS4970 (2009) section 3, 3.2.
- Tree is a palm, other monocot, cycad or tree fern TPZ is to be 1 m outside crown projection AS4970 (2009) section 3, 3.2.
- Minimum Structural Root Zone (SRZ) for trees less than 0.15 m diameter is 1.5 m, AS4970 (2009) section 3, 3.5.
- Acceptable due to compensation of TPZ encroachment with contiguous soil volume in other directions AS4970 (2009) section 3, 3.3.3.
- Acceptable as encroachment for bulk earthworks by shoring with piles reducing over excavation e.g. benching or batters.

4.3 Discussion

Of the two trees assessed, both are generally of smaller dimensions having been lopped to clear overhead wires. Lopping is the cutting of branches between branch unions resulting in stress impacts which contributes to trees decline.

It is proposed to demolish the existing dwelling and construct a new property home. As part of these works the existing driveway and layback are to be demolished and street kerb reinstated, with a new vehicle entry to be constructed on the western side of the property. These works will necessitate the removal of the smaller of the two street trees numbered 2 "Chinese Tallowwood". The tree species is problematic in regard to roots and displacement of surrounding infrastructure with dieback of its crown evident often self seeding and seen as a weed species.

The property supports two street trees at its frontage and removal of the smaller Chinese Tallowwood will be consistent with other properties in the street supporting only one street tree reducing any perceived impacts upon landscape amenity of the immediate area. A tree valuation system has been applied resulting in a replacement value of \$1,666 (See Attachment H).

It is considered that tree 1 can be adequately retained subject to the following construction constraints being introduced as part of the development.

4.4 Tree Protection Zone Fencing (Tree- 1)

Extract from AS4970-2009 Section 4.3 PROTECTIVE FENCING

Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access. AS 4687 specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area. Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots. Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

Response: *Tree Protection Zone (TPZ) fencing is to be erected excluding the rear reserve and public walkway in accordance with AS4970-4.3 to provide a physical barrier between the trees and the development works. TPZ signage is to be attached to fencing. See also appendix D-Tree Protection Plan.*

4.5 Ground Protection within TPZs-(Tree 1)

(Extract from AS4970-2009- 4.5.3 Ground protection).

If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards.

Response: *Any site movement required within prescribed TPZs during construction is to be subject to ground protection as per AS4970 section 4.5.3. See also appendix D-Tree Protection Plan.*

4.6 Trunk Protection (Tree 1)

(Extract from AS4970-2009- 4.5.2 Trunk and branch protection)

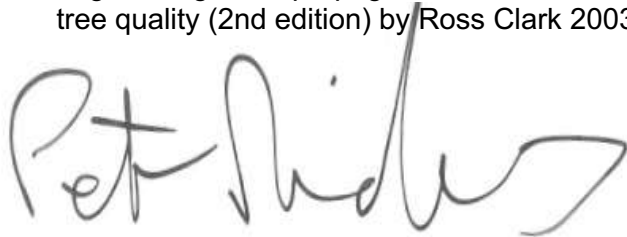
Where necessary, install protection to the trunk and branches of the trees. The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2 m is recommended. Do

not attach temporary powerlines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.

Response: *If fencing as per section 4.5 requires temporary removal trunk protection is to be erected as per AS4970- section 4.5.2. TPZ signage is to be attached to trunk armoring. See also appendix D-Tree Protection Plan.*

5. RECOMMENDATIONS

- a. That tree 1 be retained.
- b. That protection for tree 1 be in accordance with sections 4.4,4.5 & 4.6 and “Appendix D” of this report.
- c. That tree 2 be removed and replaced with an alternate plantings as part of final landscape works either as a planting within the property boundary or as a contribution to the LGA for further enhancement of the areas street scape..
- d. That removal works be undertaken by a qualified Arborist with appropriate competencies recognised within the Australian Qualification Framework, with a minimum of 5 years of continual experience within the industry of operational amenity arboriculture, and covered by appropriate and current types of insurance to undertake such works and in accordance with Work Cover NSW 2007, Code of Practice Tree Work. Any replacement tree species to be planted, be an advanced specimen with stem gradually tapering, with crown symmetrical and roots established and proportional to the crown but not pot bound in at least a 25 litre volume bag, having been propagated to the standards of Specifying Trees a Guide to assessment of tree quality (2nd edition) by Ross Clark 2003), or approved similar



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Appendix A

Matrix - Sustainable Retention Index Value (S.R.I.V.)©

Developed by IACA – Institute of Australian Consulting Arboriculturists www.iaca.org.au
Version 4, 2010

To be used with the values defined in the Glossary.
An Index value as indicated where ten (10) is the highest value.

Age Class	Vigour Class and Condition Class					
	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
Young (Y)	YGVG - 9 Index Value 9 Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5 m. High potential for future growth and adaptability. Retain, move or replace.	YGVF - 8 Index Value 8 Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium-high potential for future growth and adaptability. Retain, move or replace.	YGVP - 5 Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Low-medium potential for future growth and adaptability. Retain, move or replace.	YLVG - 4 Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium potential for future growth and adaptability. Retain, move or replace.	YLVF - 3 Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	YLVP - 1 Index Value 1 Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height <5 m. Low potential for future growth and adaptability.
Mature (M)	MGVG - 10 Index Value 10 Retention potential - Medium - Long Term.	MGVF - 9 Index Value 9 Retention potential - Medium Term. Potential for longer with improved growing conditions.	MGVP - 6 Index Value 6 Retention potential - Short Term. Potential for longer with improved growing conditions.	MLVG - 5 Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions.	MLVF - 4 Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions.	MLVP - 2 Index Value 2 Retention potential - Likely to be removed immediately or retained for Short Term.
Over-mature (O)	OGVG - 6 Index Value 6 Retention potential - Medium - Long Term.	OGVF - 5 Index Value 5 Retention potential - Medium Term.	OGVP - 4 Index Value 4 Retention potential - Short Term.	OLVG - 3 Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions.	OLVF - 2 Index Value 2 Retention potential - Short Term.	OLVP - 0 Index Value 0 Retention potential - Likely to be removed immediately or retained for Short Term.

Appendix B

Definitions & Terminology

From
Dictionary for Managing Trees in Urban Environments
Institute of Australian Consulting Arboriculturists (IACA) 2009.

Condition of trees

Condition A tree's *crown form* and growth habit, as modified by its *environment* (aspect, suppression by other trees, soils), the *stability* and *viability* of the *root plate*, trunk and structural branches (first (1st) and possibly second (2nd) order branches), including structural defects such as wounds, cavities or hollows, *crooked* trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with *vigour* and it is possible for a tree to be of *normal vigour* but in *poor condition*. Condition can be categorized as *Good Condition*, *Fair Condition*, *Poor Condition* and *Dead*.

Good Condition Tree is of good habit, with *crown form* not severely restricted for space and light, physically free from the adverse effects of *predation* by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by *vigour*.

Fair Condition Tree is of good habit or *misshapen*, a form not severely restricted for space and light, has some physical indication of *decline* due to the early effects of *predation* by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the *environment* essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by *vigour*.

Poor Condition Tree is of good habit or *misshapen*, a form that may be severely restricted for space and light, exhibits symptoms of advanced and *irreversible decline* such as fungal, or bacterial infestation, major die-back in the branch and *foliage crown*, *structural deterioration* from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local *environment* that would normally be sufficient to provide for its basic survival if in *good to fair* condition. Deterioration physically, often characterised by a gradual and continuous reduction in *vigour* but may be independent of a change in *vigour*, but characterised by a proportionate increase in susceptibility to, and *predation* by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by *vigour*.

Dead Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms;

Processes

Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves);

Osmosis (the ability of the root system to take up water);

Turgidity (the ability of the plant to sustain moisture pressure in its cells);

Epicormic shoots or *epicormic strands* in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a *lignotuber*);

Symptoms

Permanent leaf loss;

Permanent wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots);

Abscission of the *epidermis* (bark desiccates and peels off to the beginning of the sapwood).

Removed No longer present, or tree not able to be located or having been cut down and retained on a site, or having been taken away from a site prior to site inspection.

Description of Tree Dimensions

Height The distance measured vertically between the horizontal plane at the lowest point at the base of a tree, which is immediately above ground, and the horizontal plane immediately above the uppermost point of a tree.

Spread The furthest expanse of the crown when measured horizontally from one side of the tree to the other, generally through the centre of the trunk. Where the crown is not circular a measurement should be an average of the narrowest and widest diameters and this is dependent upon crown form and to a lesser extent its symmetry.

Crown Cover Percent of the homogenous distribution of foliage across the entire crown based upon that expected for a specimen of that species in good condition and of normal *vigour*, depending on form in situ, e.g. this may be influenced by crown die-back, proximity to other trees or structures, moisture stress, or overshadowing.

Vigour

Vigour Ability of a tree to sustain its life processes. This is independent of the *condition* of a tree but may impact upon it. *Vigour* can appear to alter rapidly with change of seasons (seasonality) e.g. *dormant*, deciduous or semi-deciduous trees. *Vigour* can be categorized as *Normal Vigour*, *High Vigour*, *Low Vigour* and *Dormant Tree Vigour*.

Normal Vigour Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

High Vigour *Accelerated growth* of a tree due to incidental or deliberate artificial changes to its growing *environment* that are seemingly beneficial, but may result in *premature aging* or failure if the favourable conditions cease, or promote *prolonged senescence* if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous *pollarding* practices over the life of the tree.

Low Vigour Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

Dormant Tree Vigour Determined by existing turgidity in lowest order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Poor Vigour See low vigour

Good Vigour See Normal Vigour

Age of Trees

Age of Trees Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown. These increments are Young, Mature and Overmature.

Young Tree aged less than 20% of life expectancy.

Mature Tree aged 20-80% of life expectancy.

Over-mature Tree aged greater than 80% of life expectancy tending to senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Sapling A young tree, early in its development with small dimensions.

Senescent Advanced old age, over-mature.

General Terms

Significant Important, weighty or more than ordinary.

Significant Tree A tree considered important, weighty or more than ordinary. Example: due to prominence of location, or in situ, or contribution as a component of the overall landscape for *amenity* or aesthetic qualities, or *curtilage* to structures, or importance due to uniqueness of taxa for species, subspecies, variety, form, or as an historical or cultural planting, or for age, or substantial dimensions, or habit, or as remnant vegetation, or habitat potential, or a rare or threatened species, or uncommon in cultivation, or of aboriginal cultural importance, or is a commemorative planting.

Substantial A tree with large dimensions or proportions in relation to its place in the landscape.

Excurrent Tree where the crown is comprised of one (1) dominant first order structural branch which is usually an extension of the trunk, erect, straight and continuous, tapering gradually, with the main *axis* clear from base to apex, e.g. *Araucaria heterophylla* - Norfolk Island Pine. Note: some tree species of *typical* excurrent habit may be altered to deliquescent by physical damage of the *apical meristem*, or from top lopping, or from the propagation of inferior quality stock. However, *formative pruning* may be able to correct a *crown* to excurrent if undertaken when a tree is *young*.

Sustainable Retention Index Value (SRIV) A visual method of rating the viability of urban trees for development sites and management, based on general tree and landscape assessment criteria. SRIV© is for the professional manager of urban trees to consider the tree in situ with an assumed knowledge of the taxa and its growing environment and is based on the physical attributes of the tree and its response to its environment considering its age class, vigour class, condition class and its sustainable retention with regard to the safety of people or damage to property and the ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement. (IACA 2005)

Crown Spread Orientation Direction of the *axis of crown spread* which can be categorized as *Orientation Radial* and *Orientation Non-radial*.

Diameter at Breast Height (DBH) Measurement of trunk width calculated at a given distance above ground from the base of the tree often measured at 1.4 m. The trunk of a tree is usually not a circle when viewed in cross section, due to the presence of *reaction wood* or *adaptive wood*, therefore an average diameter is determined with a *diameter tape* or by recording the trunk along its narrowest and widest axes, adding the two dimensions together and dividing them by 2 to record an average and allowing the orientation of the longest axis of the trunk to also be recorded. Where a tree is growing on a lean the distance along the top of the trunk is measured to 1.4m and the diameter then recorded from that point perpendicular to the edge of the trunk. Where a *leaning* trunk is *crooked* a vertical distance of 1.4m is measured from the ground. Where a tree branches from a trunk that is less than 1.4m above ground, the trunk diameter is recorded perpendicular to the length of the *trunk* from the point immediately below the base of the flange of the *branch collar* extending the furthest down the trunk, and the distance of this point above ground recorded as *trunk* length. Where a tree is located on sloping ground the DBH should be measured at half way along the side of the tree to average out the angle of slope. Where a tree is *acaulescent* or *trunkless* branching at or near ground an average diameter is determined by recording the radial extent of the trunk at or near ground and noting where the measurement was recorded e.g. at ground.

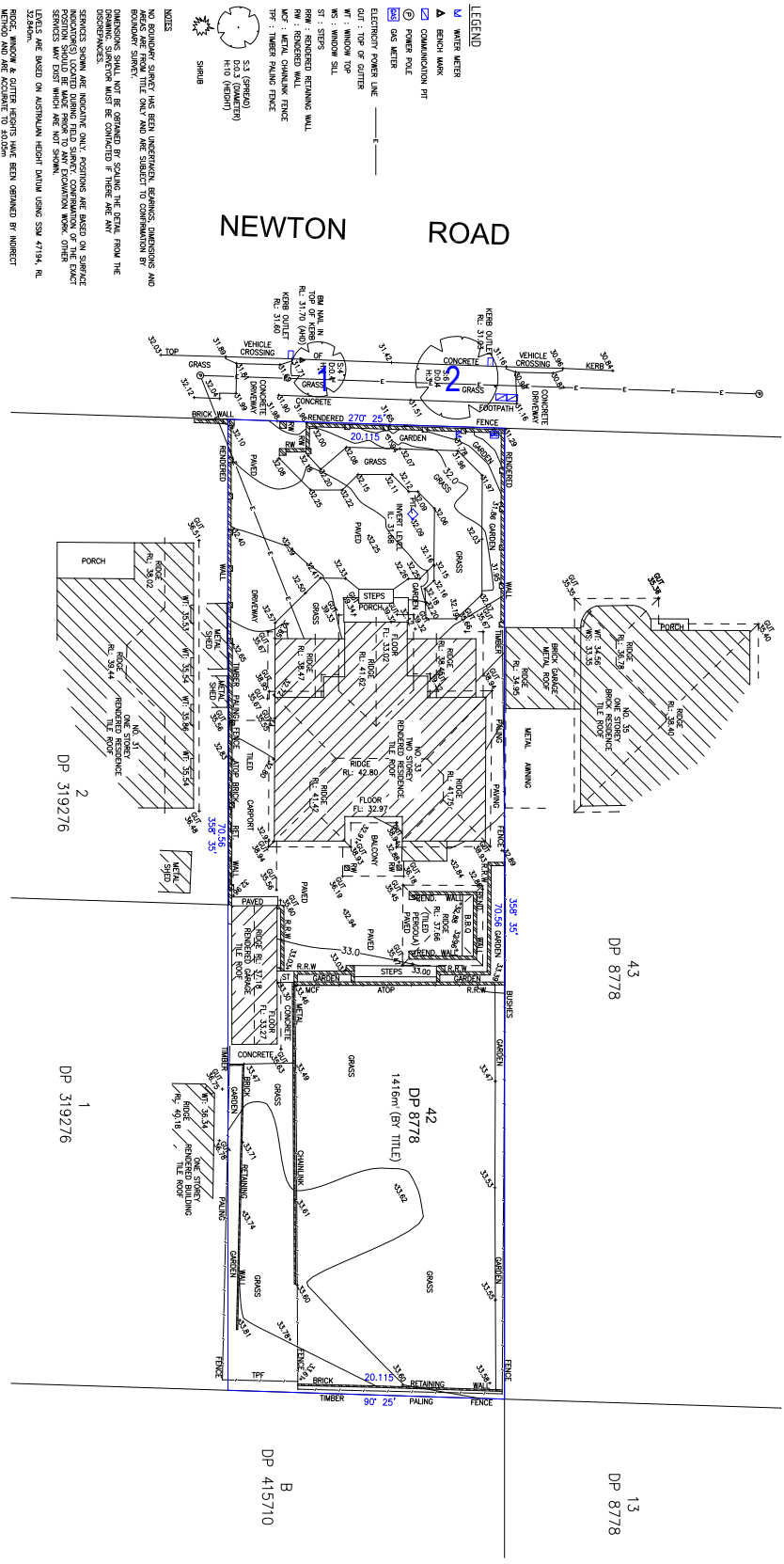
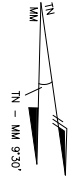
Structural Root Zone (SRZ) The minimal area around the base of a tree, generally circular, required for its *stability* in the ground. The section of *root plate* within this area and subsequent soil cohesion necessary to hold the tree upright against *wind throw*, therefore the entire depth of the *root zone* must be included.

Lopping Cutting between branch unions (not to *branch collars*), or at *internodes* on a *young* tree, with the *final cut* leaving a *stub* or *Palm Over-pruning*

Stress 1. A factor in a plants environment that can have adverse impacts on its life processes e.g. altered soil conditions (compaction, poor nutrition, and reduced oxygen or moisture levels), root damage, toxicity, drought or water-logging. The impact of stress may be reversible given good Arboricultural practices but may lead to plant *decline*. 2. In mechanics, force acting on an object, measured per unit area of the object (Lonsdale 1999, p. 322).

Appendix C

Survey Plan/Tree Locations



LEGEND

- W WATER METER
- ▲ BENCH MARK
- COMMUNICATION PIT
- ⊕ POWER POLE
- ⊕ GAS METER
- ELECTRICITY POWER LINE
- KERB
- GUTTER
- WINDOW TOP
- WINDOW SILL
- RETAINING WALL
- RENDERED WALL
- METAL CHAINLINK FENCE
- TIMBER PALING FENCE
- 0.3 (GROUND) HOLE (QUARTER)
- SHRUB

NOTES

NO BOUNDARY SURVEY HAS BEEN UNDERTAKEN. BOUNDARIES, DIMENSIONS AND DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DETAIL FROM THE DRAWING. SURVEYOR MUST BE CONTACTED IF THERE ARE ANY DISCREPANCIES.

SPRINGS, WELLS, CISTERNS, PITS, AND OTHER STRUCTURES ARE SHOWN AS LOCATED DURING FIELD SURVEY. COORDINATION OF THEIR POSITION SHOULD BE MADE PRIOR TO ANY EXCAVATION WORK. OTHER STRUCTURES ARE SHOWN AS LOCATED DURING FIELD SURVEY. COORDINATION OF THEIR POSITION SHOULD BE MADE PRIOR TO ANY EXCAVATION WORK. OTHER STRUCTURES ARE SHOWN AS LOCATED DURING FIELD SURVEY. COORDINATION OF THEIR POSITION SHOULD BE MADE PRIOR TO ANY EXCAVATION WORK.

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATA USING NSW 41794, RL 324240m.

FENCE, WINDOW & GUTTER HEIGHTS HAVE BEEN OBTAINED BY INDIRECT MEASUREMENTS TO 40.00m.

ADJOINING DIMENSIONS & BUILDINGS HAVE BEEN PLOTTED FOR INFORMATION PURPOSES ONLY.

APPROXIMATE POSITION OF ADJOINING AND SHOULD NOT BE TAKEN AS GUARANTEEING THE ACCURACY OF THE SURVEY.

CONTINUE INTERVALS 0.2m.

4/25/2022 CORRECTION

NO.	DATE	DESCRIPTION
1	04/11/10	INITIAL ISSUE



SCALE	1 : 150 @ A1
LOCAL GOVT AREA	STRATHFIELD
SHAWNS	A.E.
DATE OF SURVEY	02.11.10
HEIGHT ORIGIN	AHD
SHOWN	L.N.
DESIGNED	R.M.
APPROVED	H.I.

CLIENT: ERIC WAI

PROJECT TITLE: 33 NEWTON ROAD, STRATHFIELD

DRAWING TITLE: PLAN SHOWING LEVELS & DETAIL OVER LOT 42 IN DP 8778

CDR REF	C:\201526.dwg
DRAWING NO	201526/001
SHEET	1 of 1
DATE	NEWTON
APP	A



Appendix D Tree Protection Plan/Site Plan

Page 1 of 3 – Construction Constraints

Site & Roof Plan
Scale 1:200

PROPERTY DETAILS
Property Address
Title Reference
Site Area
STRAATHFIELD MUNICIPAL CO

LOCAL ENVIRONMENTAL
Land Zoning
Height
FSR
Min. Lot Size
Heritage
Land Resignation Acquisition
Furniture Building Line
Acid Sulfate Soils
Airport Noise

Construction Constraints (T1)

Tree Protection Zone (TPZ) fencing is to be erected excluding the roar reserve and public walkway in accordance with AS4970-4.3 to provide a physical barrier between the trees and the development works. TPZ signage is to be attached to fencing. See image 3 & 4 page 3 of 3

Any site movement required within prescribed TPZs during construction is to be subject to ground protection as per AS4970 section 4.5.3. See image 2 page 2 of 3.

If fencing requires temporary removal to allow for site movement then trunk protection is to be erected as per AS4970- section 4.5.2. TPZ signage is to be attached to trunk armoring. See image 2 page 2 of 3.

33 Newton Rd, Strathfield - Location Plan

Climatic Site Analysis

Issue	Description	Date
A	Development Application	30.07.2023
B	Consent 80% (Date: 23rd Feb 2021)	18.02.2023
C	80% 20th May 2021	20.05.2023

BLU PRINT DESIGNS

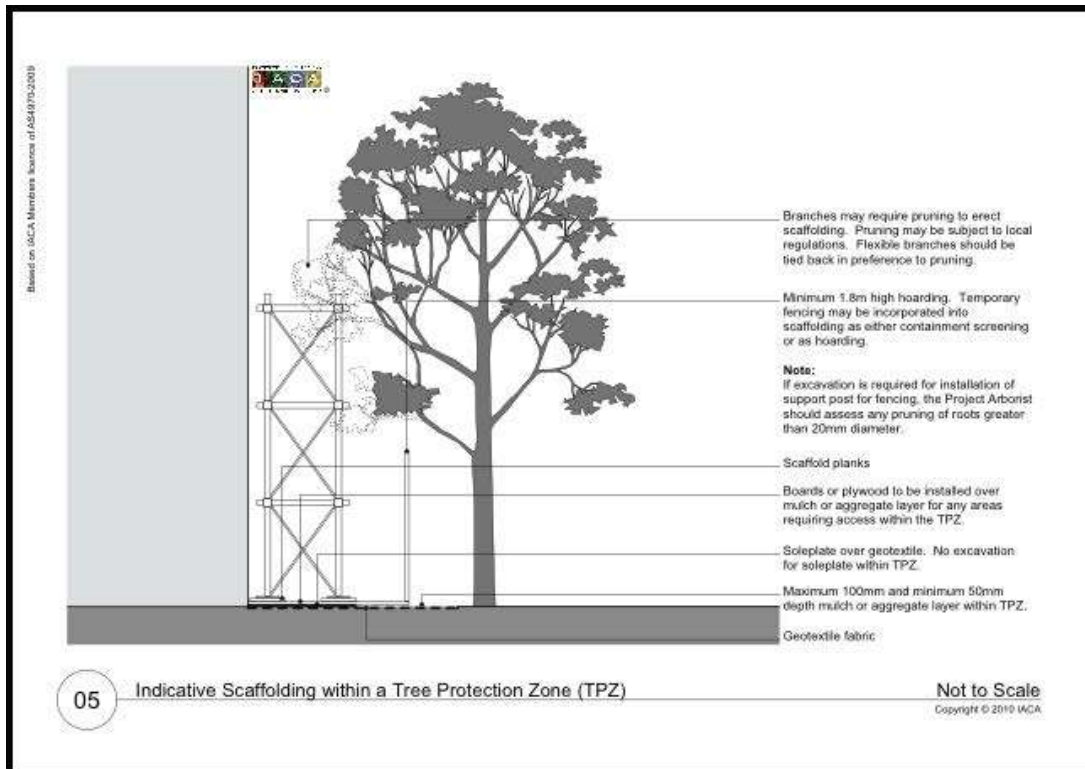
14/11/2023 10:00 AM
14/11/2023 10:00 AM
14/11/2023 10:00 AM

Title	33s Site Plan
Project	33 Newton Rd, Strathfield
Client	146 ECK NW
Date	22nd September 2023
Scale	1:200 @ A3

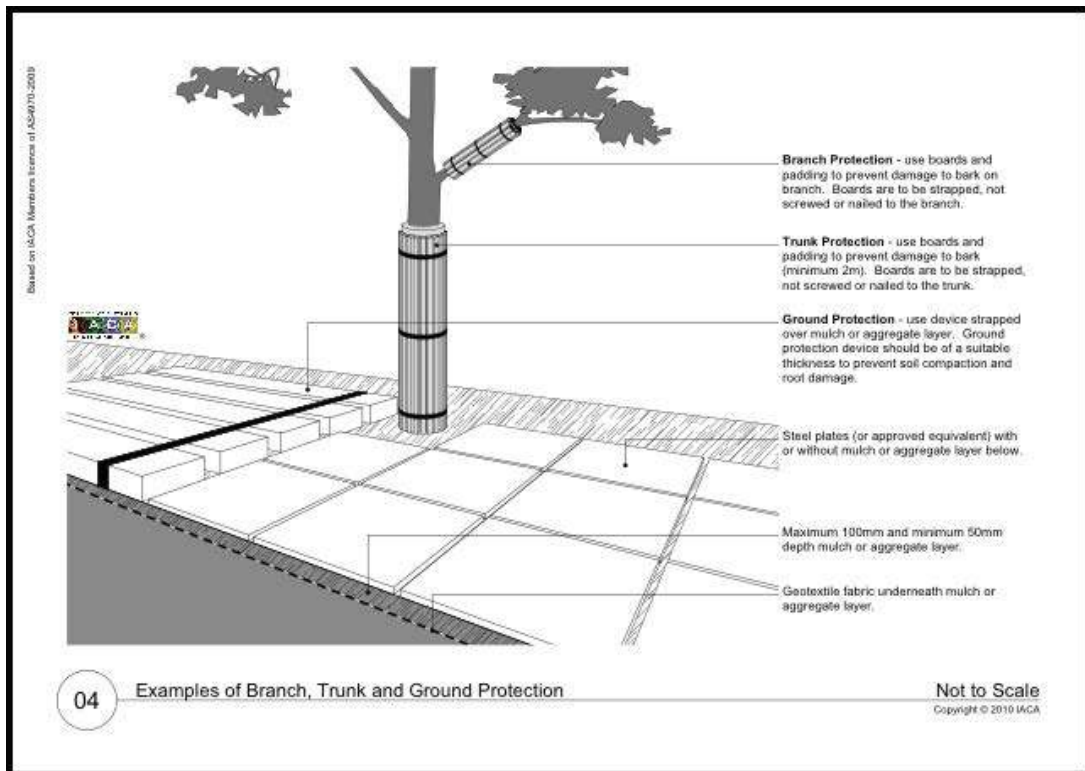
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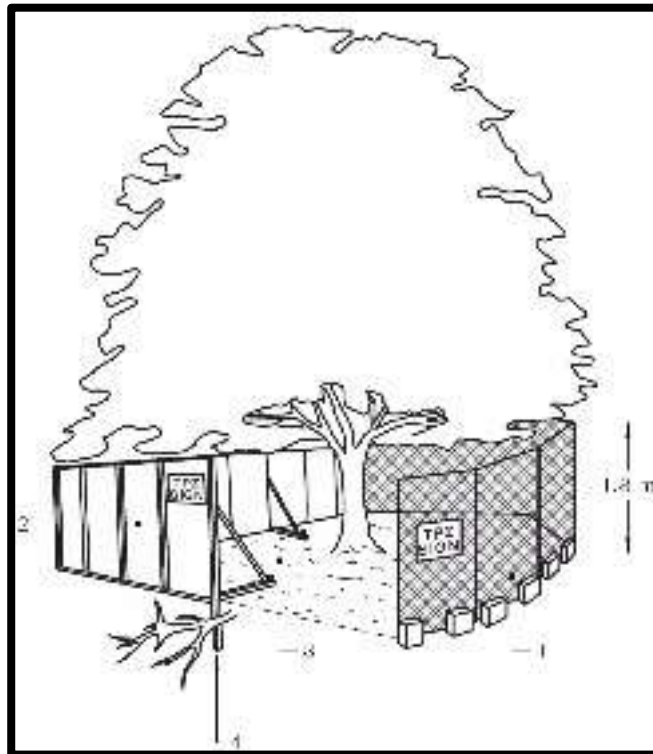
Drawing #1 - Scaffolding Within a TPZ



Drawing #2 - Branch, Trunk and Ground Protection



Drawing #3 - Example of TPZ Fencing



Drawing #4 - Example of TPZ Signage



Appendix E

Extract from Australian Standard AS4970 2009 Protection of trees on development sites

Section 3, Determining the tree protection zones of the selected trees

3.1 Tree protection zone (TPZ)

"The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The TPZ incorporates the structural root zone (SRZ) (refer to Clause 3.3.5)."

3.2 Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

$$\text{TPZ} = \text{DBH} \times 12$$

where

DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

Appendix F

Extract from Australian Standard AS4970 2009 Protection of trees on development sites

Section 3, Determining the protection zones of the selected trees

3.3.5 Structural root zone (SRZ)

"The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when a major encroachment into a TPZ is proposed. Root investigation may provide more information on the extent of these roots."

Determining the SRZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

SRZ radius expressed by the curve is calculated by the following formula,

$$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$$

where

D = trunk diameter, in metres measured immediately above the root buttress.

Appendix G

IACA Rating System for Tree Significance (IACA) 2009 ©

Note: In the development of this system IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

Tree Significance - Assessment Criteria

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of significant age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The growing environment supports the tree to its full dimensions above and below ground without conflict or constraint.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the area,
- The tree is moderately constrained by above or below ground influences of the built environment to reach full dimensions.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree is severely constrained by above or below ground influences of the built or natural environment and therefore will not reach full dimensions - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

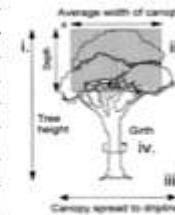
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

Note: The assessment criteria are for individual trees only, however it can be applied to a monocultural stand in its entirety e.g. hedge. The tree is to have a minimum of three (3) criteria in a category to be classified in that group. Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

Appendix H Tree Valuation(T2)

THYER TREE VALUATION 2000b		2018 NSW planting cost = \$20.57	
Simply insert your measures / information in the cells with green text.			
THYER TREE VALUATION WORKSHEET 2000b		File	
		DATE	10/11/21
LOCATION	33 Newton Street Strathfield	VALUER	Peter Richards
SPECIES	Sapium sebiferum (Chinese Tallow Tree)	Tree No.	
SIZE FACTOR (S)	All measurements in metres	Notes:	
I. Height of tree	9.00		
II. Area of canopy (side view)	24.00	Calculations :	
Depth x Spread =	24.00	ii Can. side area : Depth	6.00
iii. Average diameter to dripline	6.00	x avn. width	4.00
iv. Circumference of trunk (girth) at bh	2.88	Dbh	8.20
Dbh x pi = girth :	0.63		
Size Factor :	I + ii + iii + iv =		4.09
	41.88 + (10 + ii /100)		S
AGE FACTOR (A)			
Age Factor :	0.02 x	30	(age of tree in years) + 0.5 A
			1.10
QUALITIES : PHYSICAL AND SOCIAL (Q)			
Qi. Physical. If any score is zero, total the previous scores only and proceed to Qii.			
	0	1	2
Health	Dead or rapidly dying	Surviving only. Treatment may help recovery	Damaged, diseased or restricted growth. Treatment will help
Environmental benefit	Weed species	Restricts desirable plants or of little benefit to fauna	Beneficial to flora or fauna, provides food source, shelter
Life expectancy beyond present	0 - 5 years	5 - 20 years	20 - 50 years
Re-establishment potential of same species on site	Water required at planting time only	Three months maintenance required	Soil improvement and two year maint. required
Rate of growth over first 10 years	> 2000 mm/year	800-2000 mm/yr	400-800 mm/yr
			200-400 mm/yr
			< 200 mm/year
			Addition total of Qi. scores
			8.0
Qii. Social. If any score is zero, total the previous scores only.			
	0	2	4
Social benefit	Dangerous, or totally unsuitable for the site	Hazardous, or outgrown most beneficial size	No special function or some problem characteristics
Form and features	Ugly and not interesting	Ordinary or plain	Attractive or interesting for part of the year
Social Significance	Seldom seen	Seen frequently by private owners or adjacent residents	Seen by neighbourhood residents or passers by
			Special function; screen, flower, fruit, Landscape feature
			Attractive or interesting in all seasons
			Known locally or seen by many passers by
			Tree creates 'Sense of Place'
			Of local historical importance, or known widely
			Addition total of Qii. scores
			10.0
Physical and Social Qualities Factor = Qi + Qii.			Q
			18.0
SIGNIFICANCE INDEX (S x A x Q)			
		81	
PLANTING COST (P)			
Average Landscape industry \$ rate to supply & plant a 5 litre tree on local projects in		NSW JUNE 2018	\$ P
			20.57
TREE VALUE		= S x A x Q x P	\$
			1,666
© 1985 Peter Thyer. Rev. 2000b with 2004 NSW LCA planting cost = \$19.80			



Appendix I

References

REFERENCES

1. IACA (2009), Sustainable Retention Index Value, Institute of Australian Consulting Arboriculturists, www.iaca.org.au .
2. Australian Standard® AS 4373 – 2007 Pruning of amenity Trees.
3. Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.
4. Work Cover NSW 2007, *Code of Practice Tree Work*, New South Wales Government, Australia.