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VISUAL TREE ASSESSMENT

FOR

Bega Valley Shire Council

B.Blair

DATE OF REPORT

11 February 2018

Inspection and report prepared by;

Andrew J Norman, Consulting Arborist

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1.0 Scope of Assessment

A Visual Tree Assessment (VTA) was conducted at Bega st Tathra on all Figs adjacent to foot/bike path construction. For the purpose of the assessment only Ficus (obliqua; syn eugenioides) are included, due to possible detrimental effects of construction on this species. The subject trees form an avenue planted along Bega st on Council managed land. All trees inspected were marked with metal numbered tags and position recorded using GPS coordinates. Failure potential of structural deficiencies is calculated using standard methodology as required by the Australian Arboriculture Association and the International Society of Arboriculture.

Hazard ratings are explained in section 3 of this report and trees returning a score of 8 thru 12 are considered higher than average risk in terms of structure, age , size, failure history or a combination of these factors. Scores of 11 and 12 are identified for removal as are trees that show characteristics that will degenerate and increase failure probability as time passes.

2.0 Risk evaluation tools;

Failure potential of a tree is quantifiable and based on certain observable characteristics. A tree is a living organism that defends itself chemically from other organisms and by accelerated growth in areas of greatest stress when confronted with changes to its growing environment. Visual Tree Assessment, or VTA, refers to the process of inspection and recognition of signs indicating reaction to change. Signs of reaction are studied to provide a value in terms of failure probability and underpin the basis of a hazard rating.

Hazard ratings are derived from cumulative values given to various aspects of the trees condition and its immediate environment. Many factors are considered during this process, with the major components listed as;

- Tree species and genetic predisposition.
- Age category.
- Structure and failure probability of growth characteristics.
- History of failure or pruning.
- External indication of pathogen activity.
- Location and use of the area the tree influences.

Internal examination is conducted where adequate evidence exists of degraded structure and a ‘map’ of the affected area is useful. Resistance drilling will indicate extent of wood decay fungi for example, however ultrasound imaging and GPR - ground penetrating radar- are useful tools also. It is considered that internal intrusive action is only undertaken when a specimen displays outward signs of infection or stress related collapse as drill holes will breach compartmented cells[1].

[1] Compartmentalisation of decay in trees or CODIT developed by Dr Alex Shigo (1990) research into the way trees protect from decay organism intrusion and wounding.

Retention Value, as applied to trees, is now considered in conjunction with the Safe Useful Life Expectancy, or **SULE**, a system of assessment in common use worldwide. Quantified Tree Risk assessment, **QTRA**, is also used to calculate risk in relation to trees. Developed in the UK by Mike Ellison, QTRA applies mathematical equation to the relationship between the "target" and tree condition.

Retention value uses cultural factors including rarity of species, quality of health and vigour, history and relationships within the environment, to ascertain retention criteria. Resulting value can be interpreted by Managers using a direct correlation to risk. A tree with a high retention value but also a high hazard score may not be a candidate for removal and may be worthy of other considerations.

Considerations for retaining hazard trees;

- Specialised pruning to reduce mass and wind resistance.
- Application of mechanical aids such as cable bracing or catching slings.
- Removal of the "target" including closure of public access and relocation of built structures.

Hazard Rating is expressed as a numerical value- with 1, 2,3 and 4 indicating a low risk of failure; 5, 6 7 and 8 places the tree within a moderate risk category and the values of 9, 10, 11 and 12 point to a high level of risk. These ratings are cumulative scores derived from 3 aspects of the perceived risk; Size of the material, type of defect (observed or probable) and the "value" of the target (see endnote[2];)

Management options can vary depending on the retention value placed on the specimen, *however it is agreed that in most cases trees rated at 11 or 12 warrant immediate removal in part or whole to reduce risk to acceptable levels.*

Major components of Tree Failure;

2.1 Decay Organisms;

Wood decay fungi are one of the most common causes of tree failure. Infected trees loose structural integrity as the organism digests wood cells leaving a modified substance that is unable to withstand the loads carried by healthy wood. Very basically the fungi that affect living trees can be divided into two groups; white rot – where lignin is digested and the cellulose fibres are left along with hyphe that appears white in colour - and brown rot , where the cellulose is affected leaving the blocks of lignin. These types of decay are attributed to a group of fungi known as ***basidiommycetes*** in the case of brown rot, and ***phanerochaete*** in the case of white rot. (N.B. there are other genera of fungi that cause rot and are associated with failure, however commonly observed varieties are listed here).

[2] Target value calculates occupation of area of influence; both numbers and time. Although property value is considered, human life remains highest value for the purposes of this report.

Fungi detection can be difficult and even in affected trees the rate of degradation can vary dramatically. Outward signs include *fruiting bodies*– the bracket mushroom or conk- that allow for reproduction and are visible on the bark, within open lesions or at the soil surface. Once detected a map of the affected area can be made and failure potential estimated. Primary decay fungi (i.e. fungi that affect living wood) can co-exist within a living tree for many years without dramatically affecting failure potential; however, one must recognise that all infected trees will have a shortened lifespan and posses a higher level of risk.

Secondary decay organisms will infect wood cells that are dead and they are involved in the breakdown of the cells into basic minerals. Dead trees are regarded as highest risk (i.e.-value 12) because of the inability of the dead tissue to react to this type of decay intrusion. The more moisture available and the higher the average temperatures the faster these organisms work and collapse can occur at any time, particularly from root plate failure.

Any dead tree with public access areas within its drop zone should be removed as part of normal maintenance and hazard reduction procedure. Habitat value is an important consideration and will vary according to management policy although this report will identify such trees as removals.

2.2 Limb Shear;

Defined as the apparently unpredictable loss of scaffold limbs, this phenomena is a major cause of concern for the arborist. Studies have been carried out on all aspects of tree physiology and bio-mechanical formulae with inconclusive results. Chemical changes at cellular level have been recorded and genetic predisposition calculated however during the inspection process it is implied mechanical load stress that constitutes the major diagnostic tool. Limb length to diameter, expressed as a ratio and angle of incline are used to indicate shear potential. A significant reduction in risk can be achieved by the shortening or removal of horizontal limbs recording a length to diameter ratio of 1/50 or greater.

2.3 Dead Wood;

Branch death is generally considered a natural process and healthy tree specimens can carry a percentage of “dead wood”. In a mature tree, dead wood up to 75mm in diameter is acceptable and removal advised as required; dead branches over 75mm in diameter are a cause for investigation and can indicate underlying problems. In most species the branch collar becomes more pronounced as the branch looses vigour and the more pronounced the collar the more 'natural' the decline. Dead branches with less collar development indicate a loss of vigour of the entire tree.

As branch death occurs – as with whole trees – the loss of moisture and leaf area results in reduced load and wind resistance. Recently defoliated trees and branches are potentially ‘safer’ than a leaved specimen. The question to be asked is; why the branch or tree died? And is this a factor for considering further risk analysis. Secondary decay organisms move quickly into the dead tissue. Collapse can occur so rapidly that all dead branches over 35mm in diameter within the public access area, or in the case of high value target (e.g. constant access areas, school facilities and over tables, seating or installations) 20mm in diameter will be recommended for removal.

2.4 Leaning Trees;

Risk Assessment for trees identifies all specimens with an incline of 20 degrees from the vertical (or greater) be considered high risk. Compounding factors are damage to the Critical Root Zone (or CRZ – see appendix 9.0 & 9.1 notes) and decay in the plane of lean. Above ground stress in the form of wind load or gravitational force on the crown is transferred to the roots causing reactive accelerated growth. This reaction is recognised as the development of tension roots away from the direction of lean and compression roots that 'prop' the leaning structure.

Roots under tension act like guy ropes and are able to stretch under the load, these roots are critical to the trees stability. Even minor damage to these, especially within the CRZ area, can have devastating results. 'Decay in the plane of lean' – when added to the inspection notes - indicates the tension root development is compromised or missing. The VTA process looks at reaction wood around the trunk flare that indicates healthy tension roots or fibre buckling at the compression side.

2.5 Mechanical Damage;

Axe wounds, steel pegs, car compaction, flood and fire all have the ability to breach the trees defence system and cause premature death. By far the worst cases of wounding are inflicted during road works or site clearing by heavy machinery and pruning by chainsaw and pole-saw operators.

It cannot be stressed enough that machinery operators understand the limits of their tools and observe protection zones. Earthmovers must avoid root – top damage and chainsaw operators should be conversant with "natural target pruning" and The Australian Standards regarding limb removal.

2.6 Branch Attachment;

The union between new growing points within the trees system establishes the structure; some of these unions are inherently strong and others inherently weak. As the tree matures, growth is directed to areas where a need persists (as in the case of dominance) or as determined by stress. Tip growth becomes a twig, a branch and a limb. These limbs form the scaffold that supports the leaf canopy and contain all the conductive tissue needed to pass nutrient laden fluids up and down the organism.

In a well attached limb the angle of attachment is between 30 and 90 degrees (approximately; this figure is indicative only) and each consecutive growth increment – the tree rings we all use to determine age- interlocks the main stem to the limb. These interlocking cell bundles provide an extremely strong union that extends into the main stem right down to the original growth point. At the union a collar forms that indicates strengthening and contains concentrations of chemicals used for defence and growth.

In a weakly attached limb the angle is more acute and the collar is not developed. These types of unions are referred to as "bark included "or "apressed". Worst case scenario is that the main stem divides and produces co-dominant apical points (bifurcation) trapping bark or even another branch in the expanding union. As these unions grow they force themselves apart and reaction wood forms on the outer edges indicating the level of stress concentrated there.

These unions have a very high failure potential and together with decay organisms form the two major contributors to premature collapse.

VTA identifies unions showing stress. Management options include pruning to reduce load or in limited cases complete removal of a limb, a stem - or tree.

2.7 Soil Fungi;

Fungal activity in the soil layers beneath the tree is absolutely essential for tree health.

Without the action of myriad hyphe breaking down the earth medium into available nutrients for 'higher' plants it is said that none would survive. However; as with most actions in life an opposite is always apparent and not all fungi are beneficial to individual plants. Fungi such as *armillaria sp* and *phytophthora sp* cause root decay and will kill mature trees by starving. As the roots succumb to the parasitic fungi they stop translocating nutrient and the conductive tissue collapses.

Known as root-rot and affecting the below ground portion they are difficult to identify. Most infection is only noticeable by the death of the leaf canopy and this is usually complete and relatively fast. Roots affected will lose adhesive strength (see specifications in appendix) and decay quickly providing a high risk of blow down in affected trees during storm events.

2.8 Climate Change;

As scientific evidence and anecdotal observation mount, it has become clear that global and local weather patterns are changing rapidly. Information is being presented that points to increases in temperatures, increases or decreases in rainfall, changes to ocean currents and changes to weather events. *From the observation of the tree risk manager one thing is clear; storm events are becoming more frequent and of greater intensity.*

Changes to rainfall patterns will have a cumulative affect but this will be slow to evidence in broad scale tree populations. A far greater concern is the likelihood of intense low pressure systems and super storm cells placing extreme loads on the tree structures surrounding public access areas. First line risk abatement would see evacuation implemented (given adequate warnings from BOM) thus significantly reducing risk.

Controlled evacuation would be the preferred method to deal with events of catastrophic weather or fire, however, this is not always practical when dealing with fast developing, localised storm events.

Overall, it may become prudent to increase 'drop zones'- the areas of impact relating to target value, thus increasing the risk value of given trees and creating more removals. Although this would be the least desirable outcome, it may be the easiest to implement. These impact zones are currently within the drip-line of the canopy or, in the case of trees identified as possessing an elevated risk potential, an area equal to the height. The latter applies particularly to trees with a lean bias or subject to exposure from a given direction.

Increasing the zone of impact may take into account windblown debris carrying for greater distances and being larger in size. Plantations or groups of trees could be fitted with catching cables; a device installed to support falling (younger) trees from impacting a specific area. Older trees and those showing signs of decline could be removed to achieve a larger safe zone.

Summary of risk evaluation tools;

The above listed components are the most commonly encountered when visually inspecting trees. Underlying problems can occur within the tree at any point above or below ground that may affect strength or stability. Generally, these problems manifest as a loss of vigour or loss of leaf density and colour and noting these changes is important in the diagnostic process.

As a living organism the "purpose" of the system is to survive, grow and reproduce. And in so doing they resist failure using available resources. Trees with established structural defects that are proven high risk characteristics can stand for many years due to internal changes affecting wood strength or protective elements offered by surrounding vegetation. During periods of high rainfall soil saturation can reach levels that affect holding power of roots and with added wind load the collapse of sound trees can occur. All these factors constitute the nature of trees within the natural environment.

Eliminating all tree related risk is totally impractical for any individual land owner or organisation administering the access and management of public land. However, the careful application of these assessment tools can identify the most obvious elements of tree failure and risk management.

3.0 Visual Tree Assessment Summary;

Inspected at the Tathra site were 27 trees of the species Ficus (obliqua; syn eugenioides) commonly known as the small leaved fig. There is some confusion as to the natural hybridisation and cultivars that are known as the small leaved fig, however growth characteristics and root development are consistent across these varieties.

This species is a tall growing and spreading tree that is resilient in terms of pest predation and environmental stresses. Mature trees can reach 50 metres in height and in some cases can exceed this in spread by the ability to develop aerial roots from points along the major stems and limbs that create props to support lateral weight. Individual trees can attain 500 years or greater in age and are one of the foundation species in forest communities around the world.

Growth rates vary and is dependent on available moisture as well as nutrient levels within the soil substrates. Figs tend to create their own environment within the canopy spread and due to a process of allelopathy[3] and light exclusion they will dominate and suppress other species. Overall they are dominant but slow growing within the forest community and outlive many faster growing species.

In the Tathra streetscape these planted specimens are establishing slowly and have developed extensive root systems consistent with healthy trees in the semi mature age category. At the time of inspection almost all of the trees displayed excellent foliage colour and density and leaf size consistent with prime health. Exception would be tree numbered 13 that displays a lower than average leaf density and colour, indicating damaged vascular tissue and it should be noted that this specimen has a recorded history of complaints regarding intrusion by roots into private property.

A number of specimens have developed crown spread of much greater proportions than others within the group due to greater access to water and nutrients. This may be as a result of ruptured pipes, ingress into waste conduits or access into nutrient rich soils within neighbouring property; whatever the reason the specimens numbered 7, 8 and 9 all display outstanding health and crown size. These larger specimens will require greater care when excavation for the footpath construction is undertaken.

Overall health of this group is considered good, and impact to any individual tree by the proposed construction would be minimal in terms of any loss of stability or failure risk. The assessed risk associated with these trees is low and is listed in the spreadsheet of this report. All other indicators marking problematic outcomes from proposed works is also assessed as low and this is mainly attributable to the age and physical size of the specimens.

There exists a number of other indigenous and exotic plantings along the Bega Street frontage that appear to be replacement plantings from the removal or death of the original Figs. None of these trees display growth characteristics that would require the same considerations as the Ficus species and these are not included in this assessment.

[3] Allelopathic suppression refers to chemical inhibitors excreted by dominant plants to maintain lack of competition.

3.1 Construction impacts;

Detrimental effects from root loss can manifest as reduction in foliar density and accompanying loss of vigour[4]. This commonly occurs when large roots are damaged or when many smaller roots are disturbed and tends to affect the tree relative to the connected portion of the foliage; i.e. in straight grained trees the roots feed a section of the branches directly overhead, mostly.

It can be beneficial to reduce crown size when removing large roots so as to manage impact in some instances. This pruning work is best determined at the time of excavation during construction and an experienced arborist can evaluate the correlation between connective tissue, limbs and roots.

Post construction damage can occur when roots that have been retained under and around the built structure start to expand as they develop greater surface area for nutrient absorption. This phenomena is largely a slow process of incremental seasonal growth -but outcomes will be cracking and lifting of concrete slabs. Usually the remedial action is grinding trip hazards or replacing individual sections as required and the removal of roots in conflict with the structure.

Strategies for minimising root damage are the use of non rigid pavement materials, placing fill over the affected roots before laying rigid pavement or in extreme cases the construction of raised boardwalk.

Root barrier material can be employed to stop ingress or tree roots into a construction area but is best implemented before roots develop. If used in proximity to mature trees (similar to those trees at the Tathra site) root barrier will cause the aforementioned detrimental effects but on a more profound scale as the barrier excludes all access to nutrient and subterranean moisture flow.

3.2 Location and assessment spreadsheets;

Following list is a specific description of individual trees and contains information on size and health. This data is helpful in the monitoring process should concerns arise over post construction effects.

The data is presented thus;

- GPS - location coordinates
- DBH - diameter at breast height is a standard reference regarding tree size and age. Multiple stems are recorded as individual diameters and indicate trees that may have been brocken off or damaged when young.
- Height - approximate in meters.
- Health - good, fair or poor indicates the overall combination of leaf colour, amount of pathogen or insect activity and root damage that exists at the time of inspection.
- Foliage density - expressed as a percentage is an extremely accurate indicator of vitality.
- Hazard rating - 1 thru 4 low risk; 5 thru 8 moderate risk; 9 thru 12 elevated risk.
- Notes - any major points of observation.

[4] Vigour can be summarised as the trees ability to withstand insect or pathogen attack as well as the volume of seasonal growth increments.

Tree Number	GPS	DBH mm	Height	Health	Foliage	Hazard Rating	Notes
1	S36.44092 E149.58513	500	10m	Good	90.00%	6	
2	S36.44088 E149.58521	450	10m	Good	90.00%	6	Trunk and root damage
3	S36.73467 E149.97561	350	8	Good	90.00%	6	
4	S36.73459 E149.97588	400	6	Fair	65.00%	8	Wound at base with some decay
5	S36.73454 E149.97599	450	6	Good	90.00%	6	
6	S36.73451 E149.97611	800	8	Good	90.00%	6	**excavation care recommended**
7	S36.73432 E149.97659	700 +250+250	10	Good	90.00%	6	Low limbs **excavation care recommended**
8	S36.73432 E149.97672	1000	10	Good	90.00%	6	Largest in the street **excavation care recommended**
9	S36.73412 E149.97710	900	8	Good	90.00%	7	Old wound from major limb removal **excavation care recommended**
10	S36.73408 E149.97723	800	8	Good	90.00%	6	
11	S36.73399 E149.97748	400 + 150 +100 +250	8	Good	90.00%	6	
12	S36.73394 E149.97761	400	6	Good	80.00%	6	

Tree Number	GPS	DBH mm	Height	Health	Foliage	Hazard Rating	Notes
13	S36.73390 E149.97774	900	4	Poor	50.00%	8	History of root damage, damage at base, extensive dead wood possible poisoning
14	S36.73381 E149.97799	800	4	Good	60.00%	7	Damaged trunk
15	S36.73372 E149.97825	800	4	Good	90.00%	6	
16	S36.73367 E149.97836	700	4	Fair	60.00%	7	Some decay in trunk
17	S36.73362 E149.97849	700	3	Fair	85.00%	6	Trunk damage
18	S36.73358 E149.97863	750	4	Good	90.00%	7	Opp school
19	S36.73346 E149.97880	400+150+250+300	5	Good	90.00%	7	Opp school
20	S36.73339 E149.97909	500+400+500	8	Good	100.00%	8	
21	S36.73334 E149.97923	400	6	Good	90.00%	7	Extensive root damage\
22	S36.73327 E149.97936	700+300+300	6	Fair	60.00%	7	
23	S36.73324 E149.97948	500+500+400+400	6	Good	80.00%	8	
24	S36.73320 E149.97959	3X700+200+100	10	Good	90.00%	8	Open crutch multi-stemmed
25	S36.73305	550	4	Fair	60.00%	7	

Tree Number	GPS	DBH mm	Height	Health	Foliage	Hazard Rating	Notes
	E149.97995						
26	S36.73301	400+200+200	3	Fair	60.00%	7	Near school crossing
	E149.98006						

4.0 Recommendations;

Proposed construction excavation will not infringe on the CRZ (Critical Root Zone) of any of the Figs identified in this report.

Any roots encountered when excavating should be cut cleanly as close to the edge of the excavated area as practicable.

Under no circumstances should any roots be left torn or split. Any split roots should be cut cleanly through sound root wood as close as possible to the damaged section.

Trees 7,8 and 9 will require specific care when excavating; any roots uncovered that show a diameter of 100mm or greater should be left in situ until inspected by ACG or a suitably qualified arborist.

Under no circumstances should any damage occur to overhead branches and any required pruning should be referred to a qualified arborist.

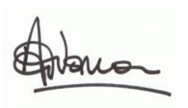
No proprietary applications are recommended as cut wood treatments and cleanly cut roots should be covered with soil to minimise further disturbance.

Toxic elements such as fuel, oil, contaminated water, excess concrete or concrete treatments should not be allowed to leach into soil or root zones. Any spills should be cleaned and the area flushed with fresh water as soon as possible.

If these simple guidelines are adhered to there should be no observable detriment to these trees identified within the report.

For any further information including site visits to determine safe work procedure with tree roots please contact the undersigned on the listed number.

Yours sincerely



Andrew Norman.

Ph; 0409530832

5.0 Illustrations;

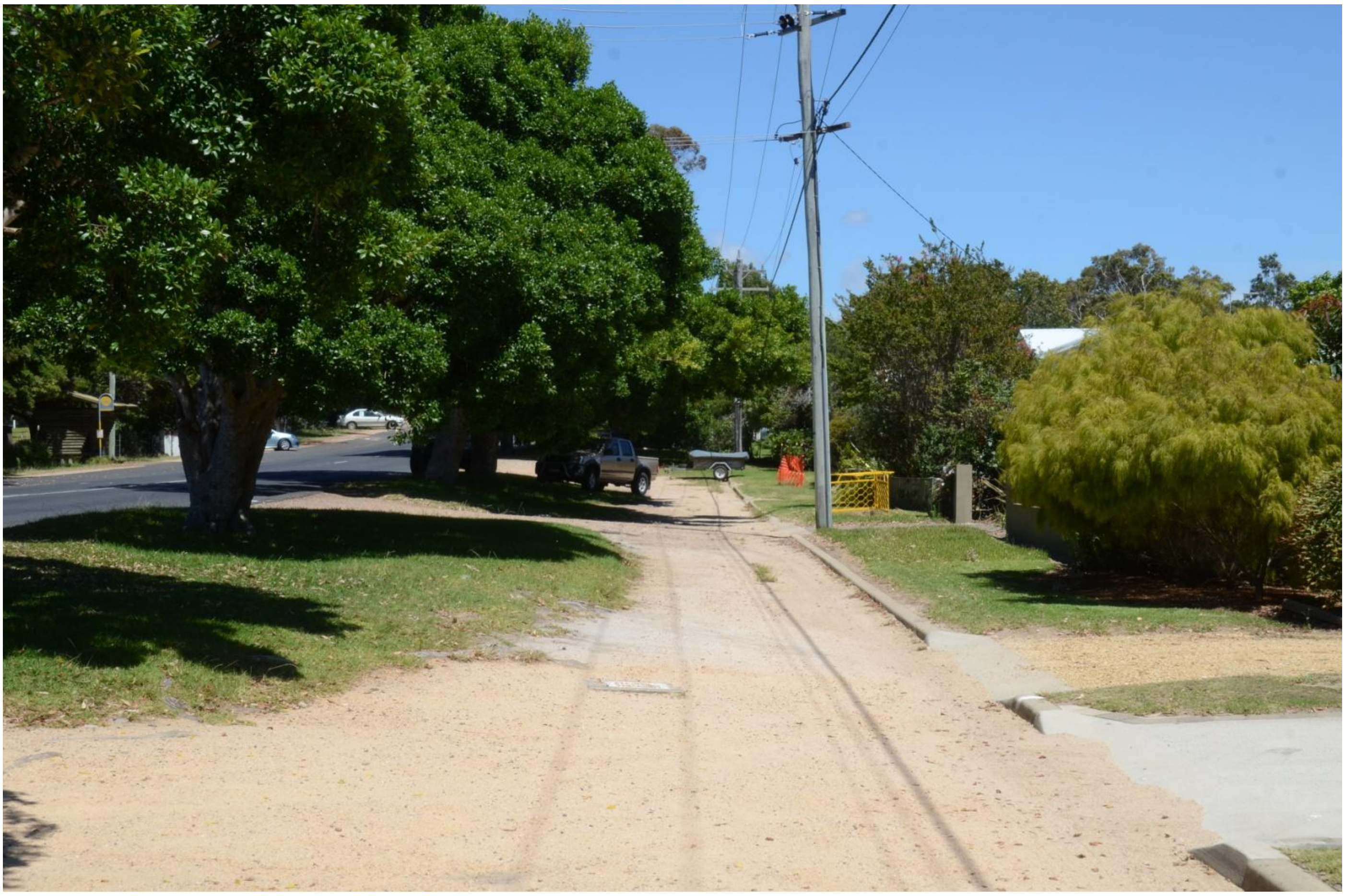


Figure 1; View of trees 11 and 12 showing the typical canopy spread. Note the proximity of high voltage conductors that will require future pruning as the canopy enters clearance zones.

Figure 2; typical root damage.

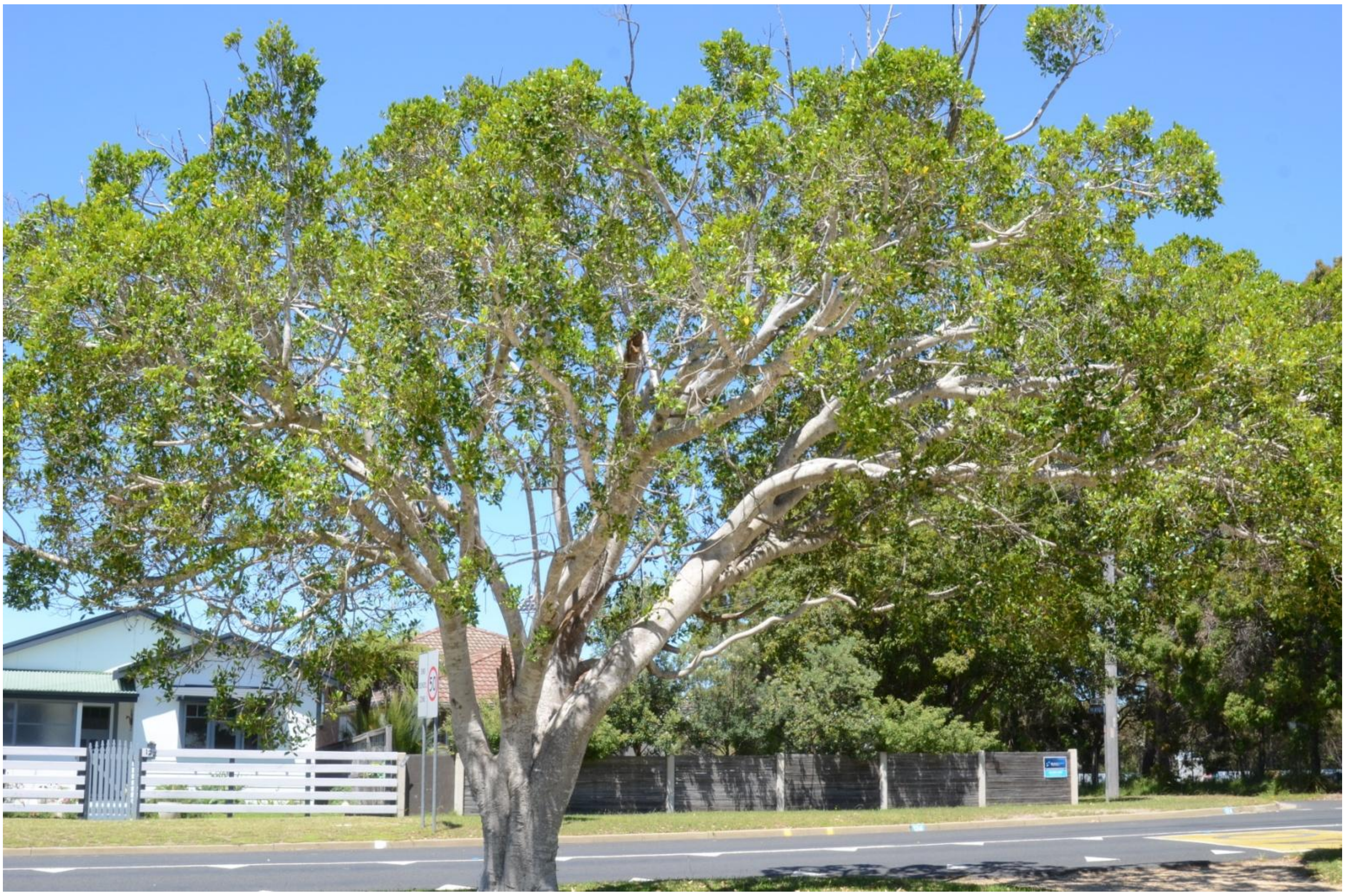


Figure 3; tree 13 showing the lower density leaf cover and lighter colour associated with a tree in poor health.

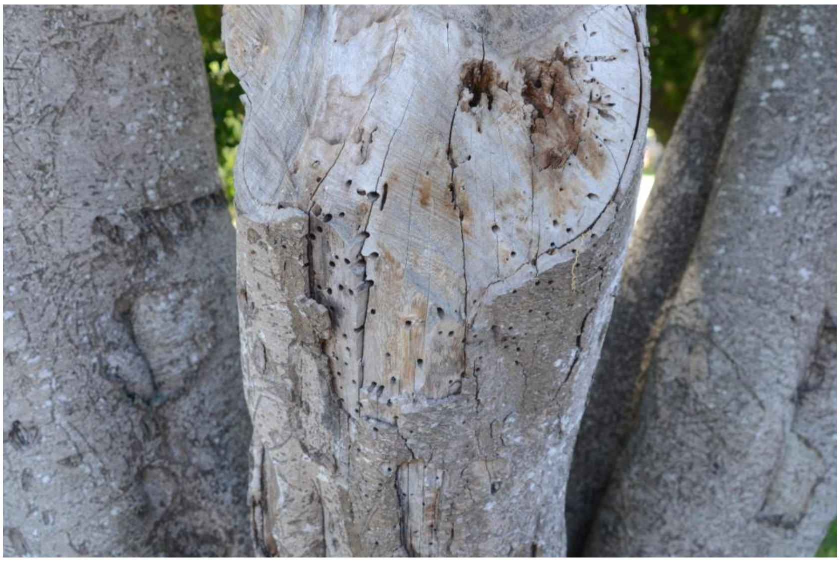


Figure 4; indication of insect attack found in the dead timber directly associated with pruning cut. The healthy wood of a living stem is able to resist borer attack however, as die-back occurs and vitality drops these predators are able to gain access.

APPENDIX A

DISCLOSURE STATEMENT

Assessments and vegetation species identification are undertaken with the use of all resources available to ACG at the time of inspection. Trees are living organisms that possess variable genetic qualities and react to their environment in many ways, therefore, it must be understood that the degree of accuracy can be accordingly variable.

Failure potential can be quantified using accepted methods of assessment, but prediction of when and if a tree will fail is difficult to guarantee. Environmental, biological and meteorological factors may increase a trees failure potential.

Factors beyond the control of ACG must be recognised when interpreting any assessment.

Trees provide a degree of risk by their nature; this factor must be taken into account within the context of the proposed use of the land occupied by the vegetation. ACG bases a trees hazard rating on information provided at the time of request. Hazard ratings should be used as a guide only when interpreting the report.

TERMS AND CONDITIONS

1. Assessments are valid for a period of 4 months from the inspection date recorded in the report.
2. The report document is for the exclusive use and benefit of the person/s or company named in the report.
3. Non-payment of assessment fees within the invoice terms renders the report invalid.
4. Any further inspection of the site listed in the report for the purposes of updating the report or re-assessing vegetation will incur a fee.
5. That the report is read in conjunction with the terms and conditions, specifications and recommendations and that these are understood and recommended works carried out.
6. A.C.G. shall not be liable for any act of any other person or party;
    a. Contracted to carry out any works in relation to the report;
    b. Determined not to have carried out said works as prescribed in the report.
    c. Carried out any works not to a standard acceptable under AS4373/1996 pruning of amenity trees.

APPENDIX B

REFERENCE, STANDARDS AND METHODOLOGY

Reference material includes, but not limited to, published works:

Mattheck & Breoloer 1994/1996;

Shigo 1989/1994/1995;

Schwarze 1998;

Lonsdale 1997; Hyam & Pankhurst 1995;

Mattheck & Bethge 2000;

Beckett 1978;

Coder 2006.

Standards in gathering information and compiling reports:

Andrew and Rebeccah Norman

- Have no affiliation with any enterprise concerned with or practicing commercial tree work.
- Offer an unbiased and ethical assessment service.
- Adhere to and require all prescribed works to be performed to Australian Standard –2007 4373"Pruning of Amenity Trees".
- Operate within the guidelines laid out in the appropriate Work Cover Authority Code and OHS standards applicable to the tree industry.
- Respect and require all prescribed works to be in compliance with the appropriate Local Authority Regulations and Tree Management Policies.

Data collection methods:

- All field data is collected following accepted methods prescribed by The International Society of Arboriculture and the Australian Arborists Association. Equipment used includes, but is not limited to, Nylon hammer, inclinometer, chainsaw, diameter tape, resistance measuring device, increment borer, digital image recording device, binoculars and distance tape.

- Data is recorded in field notes or on a standardised Hazard Rating pro-forma, to be collated and included in final reports. In the case of trees assessed to determine the cause of failure detailed examination of cross sectional segments may be necessary.

- Root system failure may require site excavation to establish the nature of the subterranean portion of the tree.

APPENDIX C

Glossary of Terms

Abnormal vigour	Accelerated growth of a tree due to changes in its environment such as applications of fertilizer, irrigation or waste material.
Acute crotch	A union formed when two or more dominant stems of equal diameter grow from a single stem. Sometimes referred to asco-dominant stems.
Apressed	Pressed up against another object but not united with it.
Bark included	An acute crotch that has developed to a point where the bark is crushed and enclosed within the crotch.
Branch Collar	Is a point of attachment to enable the support of the branch framework , growing in increments it extends into the trunk.
Branch Protection zone	A store house of energy to defend against the spread of pathogens & decay at the base of the branch collar.
Callus	Is the first tissue produced by the cambial zone after an injury.
Cambium	Is a thin layer of cells under the bark containing vessels that produce additional wood & food-conducting (phloem and xylem) tissue.
Co-dominant	Stems or crown, of equal height and/or proportions; competing for dominance.
Compartmentalisation	The defence process within a tree consisting of chemical & physical barriers of which there are four. CODIT.
Crown Spread	A two dimension linear measurement of the crown from North- South and East-West.
DBH	Is the Diameter at Breast Height of a tree trunk, or multiple trunks.
Decorticating	Bark peeling/shedding.
Decurrent	Crown shape usually open-crowned trees, branches droop downwards.
Endemic	when the natural distribution of a species is restricted to a certain defined area.
Excurrent	Crown shape upward, erect branches, through to an apical point.
Exotic	Is endemic to another country.

Kino	Kino is resins created by angiosperms & deposited in pockets within heart wood & evident as exudates often associated with wounding.
Lesion	Open wound usually elongated caused by environmental factors.
Lignin	Is the substance that makes cell walls rigid and resilient.
Limb Shear	The loss of a branch or branches through mechanical/natural forces. i.e. wind, drought; involving chemical reactions within the tree.
Lopping	Removal of some or all scaffold limbs usually to an inappropriate point not corresponding to the natural target.
Mature	In relation to trees. Trees aged between 50% - 80% of life expectancy.
Native	Does not naturally occur within the area the species is growing but is endemic somewhere within Australia.
Natural Target	Making a pruning cut at a point where the trees natural defences are utilised; Pruning to visible branch collars.
Pollarding	Is the practice of cutting trees back to just above the same point annually to maintain a smaller crown.
Retention Value	Refers to the added value in the landscape and includes historical significance, form, species rarity or any other significant factors.
Scaffold Limbs	The larger main limbs of a tree that make up the framework for the crown.
Semi- mature	In relation to trees. Trees aged between 20% & 50% of life expectancy
Senescent	At the end of lifespan showing dead wood and low vigour
SULE	Is an estimated Safe Useful Life Expectancy of vegetation particularly in the assessment of trees.
Symmetrical (sym)	In reference to the crown aspect, the centre of the crown resides over the root crown.
Trunk flare	Is a swelling around the base of a trunk where it emerges from the soil
Wound wood	Is created when callus becomes infused with lignin, creating a barrier zone that separates tissue present at the time of the injury from new wood.
Young	In relation to trees. Trees aged less than 20% of life expectancy.

APPENDIX D

ENVIRONMENTAL STATEMENT

Paper:

As an environmentally aware entity, ACG Tree Management endeavours to source paper products manufactured from recycled or non-tree related fibres.

Australian forest species, and in particular the eucalypts, are used to manufacture high quality paper including computer printout paper. The majority of this fibre is directly from old growth forests in areas of Australia that can least afford to sustain this harvest. Old growth is an ecosystem that represents every aspect of biodiversity and harbours trees of all age categories, fragile understorey and fauna communities.

The use of these forests for saw log extraction is not disputed; however, the use of this resource for pulp wood fibre is rejected.

Plantation wood products are used and encouraged where the source plantation fibre is generated from reclaimed marginal land previously cleared for farming practices. "Regeneration" sourced fibre and fibre from plantations installed immediately after old growth forest destruction is not encouraged and use of this product actively contributes to the degradation of Australia's limited forest resource.

Alternatives currently include sugar cane fibre and Indian hemp fibre as well as recycled fibre from waste.

Retention of urban trees:

The urban areas and established rural communities of Australia contain an increasingly rare and precious resource of indigenous and exotic tree species. In many cases trees retained or planted around our homes and parklands are isolated from devastating pathogens and climactic change that can decimate wild communities. In assessing individual trees ACG Tree Management endeavours to balance risk management with tree retention by encouraging passive and alternative land development and use.

Weeds:

ACG Tree Management recognises individual trees and vegetation communities for their intrinsic amenity value and contribution to habitat, not in terms of nominated invasive weed species. The ‘purpose’ of a plant organism is to survive and reproduce, many of which do so extremely successfully and find opponents to this success in the form of those resisting change. Not all successful plants are completely beneficial to individual communities; however one must recognise and accept a beneficial quality on a broader scale than often contained within a bias judgement.