Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Sub-division Tree Survey

Bathurst Regional Council
197 Limekilns Road Kelso
Version #1
20/07/17

Prepared by
Consulting Arborist Gregor van Emmerik
Agile Arbor Pty Ltd

Prepared for
Aaron McDonald
Infrastructure Development Engineer
Bathurst Regional Council
158 Russell Street Bathurst 2795

Consulting Arborist
Gregor van Emmerik
Dip.Hort
Dip.Arb L5
0419 979 653
gregor@agilearbor.com.au

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

20/07/2017

Aaron McDonald
Infrastructure Development Engineer
Bathurst Regional Council
158 Russell Street
Bathurst 2795

Dear Aaron,

RE: Sub-division Tree Survey at property 197 Limekilns Road Kelso, 2795

As per my site visit on Thursday 29th June 2017 at 197 Limekilns Road, Kelso here is the final version of the sub-division tree survey of the existing tree on property 197 Limekilns Road completed 20 July 2017 as requested.

The location of the sub-division on the north eastern town boundary of Kelso has been used as an orchard in the past with a second use of town water supply tank reservoir LOT 1003 (refer to Google site map n pg. 6, under observations). The reservoir dominated the landscape at the highest point of the sub-division. The farm house located on property 197 Limekilns Road has a collection of introduced trees mainly consisting of *conifers* around the old building. The tree scape has evolved as a result of the use of an orchard and more recently water supply tank location. The boundaries have mature *Pinus radiata* planted as a wind break and there are more recent plantings around the reservoir of *Eucalyptus goniocalyx.* On the southern boundary three grove plantings of *Pinus radiata* and *Casuarina cunninghamiana.*

It is recommended that the impact of the sub-division limits the long term survival of the existing trees and therefore my recommendations is to remove all trees, to be replaced with the Bathurst Regional Council street scape roll-out and recreational areas. Three trees identified with potential to fall on neighbouring property to be removed as soon as possible

An important consideration to remove all existing trees is based on the long term survival and risk management. The replacement with suitable species that can be established to provide amenity values and evolve with the new cultural conditions of the new sub-division will represent a long term solution for the sub-division.

I thank you for the opportunity to present you with Agile Arbor's Sub-division Tree Survey. We feel sure, that it will assist you in managing the trees within the sub-division footprint, including the complex and specialised areas of tree amenity value, tree health, tree risks, treescape planning and management.

You're sincerely

Gregor van Emmerik
Director
Agile Arbor Pty Lt

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Contents

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Summary:

The main findings of the survey is that the rural windbreak of *Pinus radiata (GROUP 1)* approximately 60 years old is the dominate tree scape of the sub-division. The *Pinus radiata* windbreak has 20% decline from drought stress of the recent drought periods. The three grove plantings (GROUP 2) are over planted and will need thinning by 80% in order to be retained. All of the trees within the sub-division footprint will be severely affected with the changing of soil levels, services and roadworks. It is not advised to retain individual trees as they will be vulnerable to the newly created climatic changes such as wind and hydrology factors. The sub-division will benefit from the Bathurst Regional Council tree scape management roll-out and offset plantings within the designated recreational areas. There are three areas of recent excavations in GROUP 1 within the structural root zone (SRZ) consisting of *Pinus radiata* (Red zone A, B and C). Red zone C has three large *Pinus radiata* trees that have potential to fail from the root plate and reach the residential boundary. There is no evidence of hollows or habitat trees within the sub-division area.

Introduction:

The tree survey report on all the trees at property 197 Limekilns Road, Kelso was commissioned by Infrastructure Development Engineer, Aaron McDonald from Bathurst Regional Council. The site was inspected by Level 5 Arborist and Diploma in Horticulture Gregor van Emmerik, on Thursday 29th June 2017. This tree survey will identify the existing trees, their condition, size and location (refer to Google site map, pg. 6 and Survey map, attachment 1). The sub-division impact from roads, services, boundaries and hydrology clearly impacts on the long term survival of the existing trees.

Aim:

The aim of this report is to:

- Identify the trees in groups
- Evaluate the viability of the trees and cultural conditions
- Establish the health and condition of the trees
- Amenity values of trees
- Recommend either to remove the tree or any remedial treatments

Limitations:

- This survey does not include threatened or endangered species of Flora and Fauna
- The tree Protection Zones (TPZ) has not been measured and identified as part of this survey
- Additional information such as topography maps, excavations and services maps are supplied for the purpose of retaining trees

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Method:

A tree risk assessment uses a ground based Visual Tree Assessment VTA method. The VTA system is based on the theory of tree biology, physiology and tree architecture and structure and is a method used to identify visible signs on trees that indicate health and potential hazards. The systems are in accordance with industry best practice (ISA) and impact assessment are based upon the Australian Standards AS4793-2009, Risk Management AS/NZS ISO 3100-2009 and American National Standard ANSI A300 (part9) Tree Risk Assessment.

Trees were identified from leaves, seeds, buds and physical characteristics. The height and DBH (diameter at breast height) were measured with diameter tape and Electronic Clino / Height Meter. Hollow sounding with rubber mallet hammer.

The collection of data is performed in the field by an AQF Level 5 arborist who with a walk through the site and summarise the species number and tag the trees, summarise the trees heath and structural condition, hazards and risk.

Observations:

Google Site Map:
Location – 197 Limekilns Road, Kelso 2795

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

GROUP 1: INCLUDES RED ZONE A, B AND C

Part of the windbreak, consist of mature *Pinus radiata* trees
20% decline from drought stress. The trees are an estimate of 60 years old with a canopy of approximately average height of 25mtrs. The amenity value is currently medium to high as they are visible from the southern town boundary.

The Red zone A, B and C have been excavated within their structural root zone (SRZ). There are no cavities or hollows visible.

Figure 1

Figure 2:

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Figure 3:

Figure 4:

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Figure 5:

Figure 6:

Red zone A

Structural root plate compromised

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Figure 7
Red zone B

Figure 8:
Red zone C

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Figure 9:

Figure 10:

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Figure 11:

GROUP 2: SCREENING TREES (GROVE PLANTINGS)

Consisting of immature *Pinus radiata* and *Casuarina cunninghamiana* trees.
These three young grove plantings are closely planted as a temporary screening for the reservoir.
The trees are too closely planted.

The *Casuarina cunninghamiana* trees are approximately 8mtrs tall and are overshadowed by the single row of *Pinus radiata* trees that stand approximately 12mtrs tall.
Amenity value of the *Casuarina cunninghamiana* is low
Amenity value of the *Pinus radiata* trees is medium

Figure 12:

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Figure 13:

Figure 14:

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

GROUP 3: HOMESTEAD TREES

Consist of *Cupressus macrocarpa*, *Cedrus deoadara*, *Cupressus macrocarpa 'aurea'* and *Fraxinus raywoodi*

All of the *conifers* have suffered from drought stress. Average canopy height is approximately 10mtrs and represent a low amenity value. The only tree in good condition is the *Cedrus deodara*

Figure 15:

GROUP 4: ROADSIDE TREES

Consist of *Eucalyptus Nicholii* and *Casuarina cunninghamiana*
The mature *nicholii* trees have evidence of recent storm damage and are in poor condition. The canopy height is approximately 18mtrs and represent a medium to low Amenity value

The *Casuarina cunninghamiana* are in fair condition and have a canopy height of approximately 18mtrs and represent a medium Amenity value

Figure 16:

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

GROUP 5: WATER TANK RESERVOIR SCREENING TREES

Consist of seedlings of Pinus radiata trees. The canopy height is approximately 12mtrs and represent a medium to high Amenity value

Figure 17:

Figure 18

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Discussion:

The *Pinus radiata* windbreak (GROUP 1) dominates the tree scape, and represents a high Amenity value for the locality. They are mature, stand twenty five meters tall and have an average trunk diameter at breast height (DBH) of 800 mm. The age is approximately 60 years old. There is a decline from Drought stress throughout the windrows of approximately 20%. The decline is marginally higher in the western boundary. Recent activity on the site has removed pipelines and the excavations have interfered with the SRZ (structural root zone) and TPZ (tree protection zone). Please refer to Survey map, attachment 1.The depth of the excavations varies. The root loss has potential to destabilise the trees in strong wind and wet conditions. This is relevant for three trees (*Figure 8:* **Red zone C**) near the southern boundary. They can reach the rear yards of residential areas. The excavations have also a detrimental impact on the trees.

The trees located on the southern boundary (GROUP 2) are a more recent planting. The three grove plantings consist of three closely planted tree rows consisting of one row of *Pinus radiata* and two rows of *Casuarina cunninghamiana*. The formal planning may have been planted to screen the concrete reservoir located on the top of the hill, dominating the landscape. The trees are young, vigorous and stand between 8 and 12mtrs tall with an average DBH of 350mm-450mm for the *Pinus radiata* trees and an approximate DBH of 150-200mm for the *Casuarina* trees. The *Pinus radiata* dominates the *Casuarina* and represent a medium to high amenity value to the established residential area.

The tree planting established around the old homestead (GROUP 3) consists of *Cupressus macrocarpa*, *Cedrus deoadara*, *Cupressus macrocarpa 'aurea'* and *Fraxinus raywoodi*. Predominantly *conifer* rows are all in poor condition from drought stress. They represent a low Amenity value.

The trees located on the roadside (GROUP 4) are predominantly mature *Eucalyptus nicholii* trees and have a history of branch failures and have included bark regions in trunks.

The reservoir has a recent planting of *Eucalyptus goniocalyx.* There are several young *Pinus radiata* seedlings amongst this group originating from the mature *Pinus radiata* windrow around the orchard. The Eucalyptus trees are screening the tank and represent a high Amenity value. They are in good condition.

The development foot print will have a severe impact on the long term survival of the established trees within the subdivision footprint and will be adversely affected due to changes of hydrology, soil, excavations, root loss, services and road

Conclusion:

In conclusion, the impact of the sub-division limits the long term survival of the existing trees.
The subdivision area will benefit from the Bathurst regional council tree scape roll-out and offset planting in the plant recreational area.

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Recommendations:

I highly recommend that all trees within Group 1, Group 2, Group 3 and Group 4 are removed in order to provide a newly planted street scape that can evolve from the newly cultural conditions.

The endemic trees, *Eucalyptus goniocalyx* within Group 5 are to be retained and *Pinus radiata* seedlings to be removed and additional native vegetation to be planted in order to screen the water tank.

The three trees identified in *Figure 8:* **Red zone C**, Group 1 with the potential to fall on neighbouring property to be removed as soon as possible

References:

- The principals of tree hazard assessment and management by David Lonsdale
- Mattheck, C Updated Field Guide for Visual Tree Assessment, Karlsruhe Research Centre: 2007
- C. Mattheck, K. Bethge K. Weber The body language of trees

Glossary:

Crown: The width of the foliage in the upper canopy of the assessed tree to the four cardinal points.

Agile Arbor Pty Ltd
344 Limekilns Road
BATHURST NSW 2795
Ph: 6334 2544
Fax: 02 6334 2511
Mobile: 0419 979 653
Email: info@agilearbor.com.au

Crown lifting means the removal of the lower branches of the tree

Crown thinning means the portion of the tree consisting of branches and leaves and any part of the stem from which branches arise.

DBH/Diameter: Diameter of trunk at 1.4meters in height of assessed tree.

Dead wooding means the removal dead branches from a tree.

Dieback: Tree deterioration where the branches and leaves die.
Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.

Genus/ Species: The Genus and species of each tree has been identified using its scientific name. Where the species name is not known the letters species is used. The common name for trees may vary considerably in each area of geographical differences and so will not be used in the field survey.

Height: Height has been estimated to + / - 2 meters.

Maturity: Tree maturity has been assessed as over mature (last one third of life expectancy), mature (one third to two thirds life expectancy) and semi mature (less than one third life expectancy).

Remedial (restorative) pruning: includes: Removing damaged, deadwood; trimming diseased or infested branches. Trimming branches back to undamaged tissue in order to induce the production of shoots from latent or adventitious buds, from which a new crown will be established.

SRZ- Structural Root Zone: An area within the trees root zone in which roots stabilize the tree. Roots cut in this zone can cause instability and lead to anchorage loss.

Structural Integrity: Describes the internal supporting timber. (Substantial to frail)

Tree Age: Trees have either been assessed as mature, immature or semi-mature.

Tree Numbering: All trees listed in the tree survey have been numbered and plotted.

SULE- Safe Useful Life Expectancy: An estimation of the trees useful life expectancy using appropriate industry methods with an inspection regime.

Vigour: This is an indication of the tree health. Trees have either been assessed as Good Vigour, Normal vigour or Low vigour.

CONSULTANT		REV	DESCRIPTION	INITIALS	DATE
		A	ISSUED FOR DA APPROVAL	AM	18/05/17
CHECKED	APPROVED				

SCALES (A1)

1:10	0 0.1 0.2 0.3 0.4 0.5 Metres	
1:20	0 0.2 0.4 0.6 0.8 1.0	
1:50	0 0.5 1.0 1.5 2.0 2.5	
1:100	0 1 2 3 4 5	
1:200	0 2 4 6 8 10 Metres	
1:500	0 5 10 15 20 25	
1:750	0 7.5 15 22.5 30 37.5	
1:1000	0 10 20 30 40 50	

SURVEYED	CE/BP
DRAWN	AM
DESIGN	AM
DATE	18/05/2017
DATUM	MGA55 AHD

CHECKED

TECHNICAL SERVICES MANAGER

DIRECTOR ENGINEERING SERVICES

BATHURST REGIONAL COUNCIL

PROJECT: SUNNYBRIGHT ESTATE STAGE 1 RESIDENTIAL SUBDIVISION

DESCRIPTION: TREES LAYOUT

JOB No.	DWG No.	SHEET No.	REV.
####	EN11450	05	A