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Marlborough District Council

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# Arboricultural Assessment

**Site Address:** 42 Lakings Rd

**Affected Trees:** One *Quercus phellos* and one *Quercus palustris*

**Commissioned by:** Robin Dunn, Parks and Reserves, Marlborough District Council

**Date of Report:** 5 August 2019

**Report Compiled by:** Tim Lovejoy

## Executive Summary

David James Tree Services Limited has undertaken an arboricultural safety inspection of trees located on the berm outside number 42 Lakings Rd

The trees assessed are in good health, although they are in a restricted growing environment for such mature trees.

There are no structural defects in the canopy observable to a ground based observer or any indication that would require a climbing inspection.

There are no signs or symptoms of pests or disease.

There are no visible root plate problems.

**Site Location:**

The following aerial map indicates the location of the two trees:



Fig 1. Light green T1, *Quercus phellos*, Dark green T2, *Quercus palustris*



## 1.0 Introduction

1.1 Robin Dunn of the Parks and Reserves Department, Marlborough District Council has requested David James Tree Services Ltd Limited to prepare an arboricultural hazard assessment of two Council (Oak, *Quercus sp.*) street trees outside 42 Lakings Rd.

1.2 This report contains:

- Ground based observations and measurements of the two trees made during a site visit on Monday 1<sup>st</sup> July.
- An assessment of the general location and growing conditions of the site
- Assessment of tree health, structure, and form
- Identification of any existing or potential defects that may affect hazards and risk
- Discussion of the effects of observed defects and problems in terms of hazards and risk
- Options for mitigation and any residual risk
- Recommendations

1.3 The purpose of this report is to assess hazards associated with the two trees and level of risk of damage or injury to people and property. Risk is assessed for a period of three years and is based on the conditions present at the time of assessment.

1.4 Please refer to the photographs within Appendix A of this report

1.5 Approximate tree measurements are contained in the main body of this report. Tools used include: a TruPulse laser; tape measure and sounding hammer.

1.6 In the context of this report a hazard is defined as any agent or situation that could cause harm or damage to people or property. Risk is defined as the likelihood of a negative effect arising from a hazard.

In general there can never be no risk from large trees such as the two Oaks subject of this investigation.

1.7 A site visit was made on Monday 1<sup>st</sup> July. The day was cool and overcast with a moderate breeze.

1.8 Investigation Limitations. This is a level 1 ground based visual inspection.

## 2.0 Site Overview

**2.1** The trees are situated on the berm with an underplanting of *Agapanthus* adjacent to the south boundary fence at #42 Lakings Rd, Blenheim

**2.2** The trees are in a restricted growing environment between the asphalt foot path and the fence. The area is flat with a garden area beyond the fence out to the dripline of the canopy to the north. The area to the south is predominantly sealed footpath or road surface to beyond the canopy dripline.

**2.3** The two Oaks subject to this inspection are in fact the middle trees in a group of four trees that have grown as a co-dominant canopy (i.e. a single canopy over four stems). There is a Beech (*Fagus sp.*) at the west end that is suppressed by T1 (*Q. phellos*) and a third Oak (*Quercus sp.*) on private property (#40) at the east end.

**2.4** This group of trees are open grown and could be expected to be well adapted to the frequent high wind events common to Marlborough. This is reflected in the fact that the evidence of past failures appears to be confined to small (<50mm diam) to medium (<100mm diam) branches in the upper canopy. Most of these are dead wood and are part of normal growth processes. The co-dominant nature of the canopies gives mutual benefits to the individual trees in terms of wind tolerance.

**2.5** Special Value: This group of trees provide some significant landscape value for this area of Blenheim. In addition such large trees provide important environmental, social and ecological services that are increasingly under pressure and difficult to replace, particularly in urban areas. In particular the Willow Oak is an uncommon species not widely planted and with no other examples of this stature in Marlborough known to this author.

### **3.0 Arboricultural Assessment**

#### **3.1 T1**

- Common Name: Willow Oak
- Botanical Name: *Quercus phellos*
- Height: 29.6m
- Spread: N/S 22.7m E/W 13.3m
- DBH: 950mm

#### **3.2 T2**

- Common Name: Pin Oak, swamp Spanish Oak
- Botanical Name: *Quercus palustris*
- Height: 31m
- Spread: N/S 21.5m E/W 15.5m
- DBH: 880mm

#### **3.3**

- Maturity: Both trees are mature specimens.
- Age Class: Both trees are estimated to be 50 plus years old.
- Structural Character: In both trees there is a single trunk with the first major scaffold branch at approximately 8m. Both trees have an open branched decurrent (spreading) crown with no structural defects on either tree visible to a ground based observer. There is a live canopy to trunk ratio of approximately 50% for both trees.
- Health: Both trees are in generally good health with no significant signs or symptoms of pests or disease visible to this author. Sounding of the trunk of the trees showed no variation in tone that might indicate internal decay nor were any fungal fruiting bodies present.
- Form: Decurrent spreading form with open well branched crowns.
- Pruning History: Crown lifting and removal of major deadwood only.
- Root Zone: Approximately 40% Garden bed/lawn and 60% sealed footpath/drive/road surface. Since the root plates of the two trees are largely obscured by underplanting and the sealed areas it is not possible to visually determine any stability issues or otherwise. No issues were observed in the lawn area of the root zone north of the fence. It may be possible to determine the extent of the underground structures of these trees by higher level technical examination such as sonic tomography or ground mapping LiDar but this is beyond the scope of this report.
- Protection: As far as this author can determine neither of the two Oaks subject to this inspection are listed on the Marlborough District Council District Plan. The English Oak at #40 Lakings Rd is identified as a Heritage listed tree I.D. # 145.

**3.4** For clarification of the risk assessment that follows please see risk matrices in Appendix B. This assessment is made for a period of three years.

**3.5** The main issue of concern identified for these trees is the restricted growing environment, root disturbance and soil compaction (**2.2**).

Where roots have been disturbed and compaction has occurred (either during or subsequent to construction activity) the availability and ability of the trees to process nutrients, water and oxygen are reduced.

This can have a significant effect on a tree's general health and vigour and the ability to adapt to the changed growing conditions but particularly the ability to deal with pathogens (pests and disease) through compartmentalisation and adaptive growth to compensate for poor structure or physical damage.

It can often take several years for adverse effects of compaction/root disturbance to become apparent, particularly for trees with a naturally long life expectancy such as these.

There is no proven effective remedy for soil compaction. However given time many trees will successfully adapt to changed growing conditions. This would appear to be the case with these two trees which are showing no adverse effects of their confined circumstances.

Additional factors that may affect whole tree stability are discussed in section **4.0** below.

**3.6** In the event of whole tree failure targets within one and a half tree lengths would include:

- Pedestrians on the footpaths along Lakings Rd and dwelling occupants
- Vehicles using Lakings Rd
- Dwellings and other built infrastructure at 40 and 42 Lakings Rd
- Power distribution lines on the south side of Lakings Rd and service lines to the dwellings on the north side of the road

Whole tree failure based on my observations during this inspection is assessed as improbable for the three year period.

Accordingly risk is assessed as low.

**3.6** A secondary issue of concern is branch or limb failure. There are no visible signs of defects in the branch structure of either tree.

As mentioned above (**2.4**) evidence of past failures is of small to medium mostly dead wood. This is most likely to occur in high wind events. Given the regularity of such events in Marlborough it is probable that such failures will continue to occur.

In the event of branch or limb failure failure targets within one and a half tree lengths would include:

- Pedestrians on the footpaths along Lakings Rd and dwelling occupants
- Vehicles using Lakings Rd

Target occupancy is assessed as occasional (there is more often no target present than otherwise).

Likelihood of impact is assessed as low, likelihood of failure and impact is unlikely.

Accordingly risk is assessed as low.

Other branch or limb failures are discussed in section **4.0** below.

## **4.0 Discussion**

**4.1** There has been some recent attention given to the phenomenon of Sudden (or Summer) Branch Drop (SBD).

This is a very rare, poorly understood (many theories with little definitive research) phenomenon where a tree may shed a limb or branch for no apparent reason.

There are three criteria that are always present in such cases.

- Large mature or senescent trees
- In the afternoon immediately after heavy rain during a prolonged (several weeks) hot dry period.
- No other defects or causes (e.g. wind, decay, structural weakness)

Other features observed but not always present have included:

No prior or post event visible indicators; transverse failure occurs near but not at unions; no warning (other than a cracking noise), large long or over long branches with a horizontal attachment; more than one occurrence in a single tree.

Since there is presently no way to assess the likelihood of failure from SBD it is beyond the scope of this assessment. It is nevertheless addressed in the recommendations.

**4.2** Another factor affecting branch or limb failure is overextension where a scaffold branch or leader may extend beyond the general outline of the canopy. In conjunction with developing end-weight through new growth this can lead to a separation of the branch or limb changing the wind forces and increasing the load on the individual branch. This may in turn lead to partial (torsion or shear cracks) or total failure.

**4.3** As mentioned above (**3.3**) the live canopy to trunk ratio is approximately 50%. It is generally preferable to have a higher ratio (>60%). This is because greater wind speeds at height exert more leverage and can increase load on a defective stem. Since there is no observed defect in either tree the assessment of improbable whole tree failure remains valid. Again regardless this issue is addressed in the recommendations below.

**4.4** One final point for discussion is the trunk lean on T2 (*Q. palustris*). (Fig 2.) Given that there is no evidence of root plate heave or other instability issue and that the top part of the trunk and canopy show normal gravitropism and phototropism response I consider that the lower trunk lean occurred when the tree was much younger and normal growth processes have resulted in its current form. This is not in my opinion therefore an issue of concern.

## **6.0 Recommendations**

**6.1** Since the risk is assessed as already low and given that there can never be no risk from such large trees there is no practical pruning that will lower the risk.



The following current best practice pruning options are offered for extra mitigation of SLD and wind tolerance.

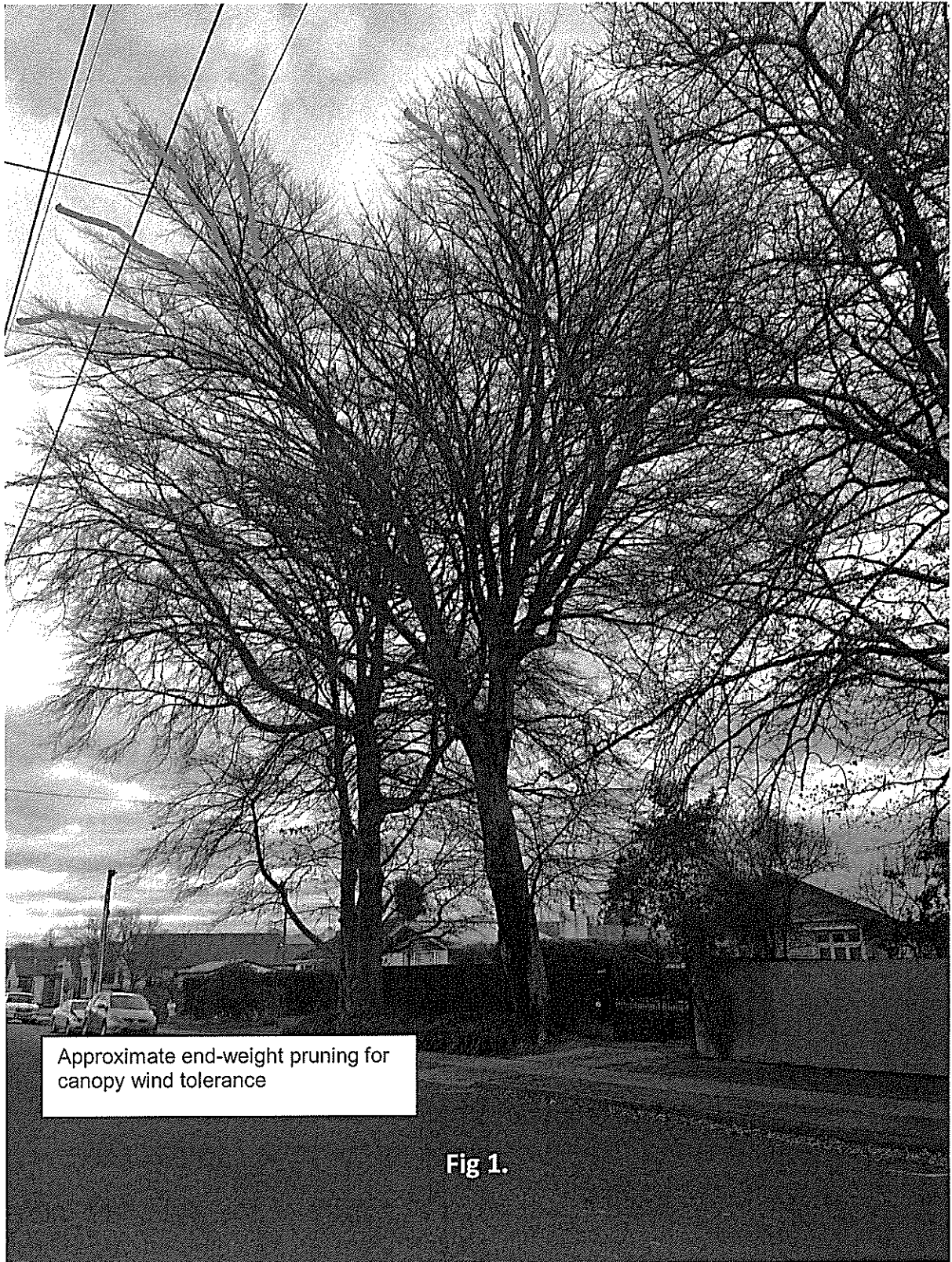
My recommendations are as follows:

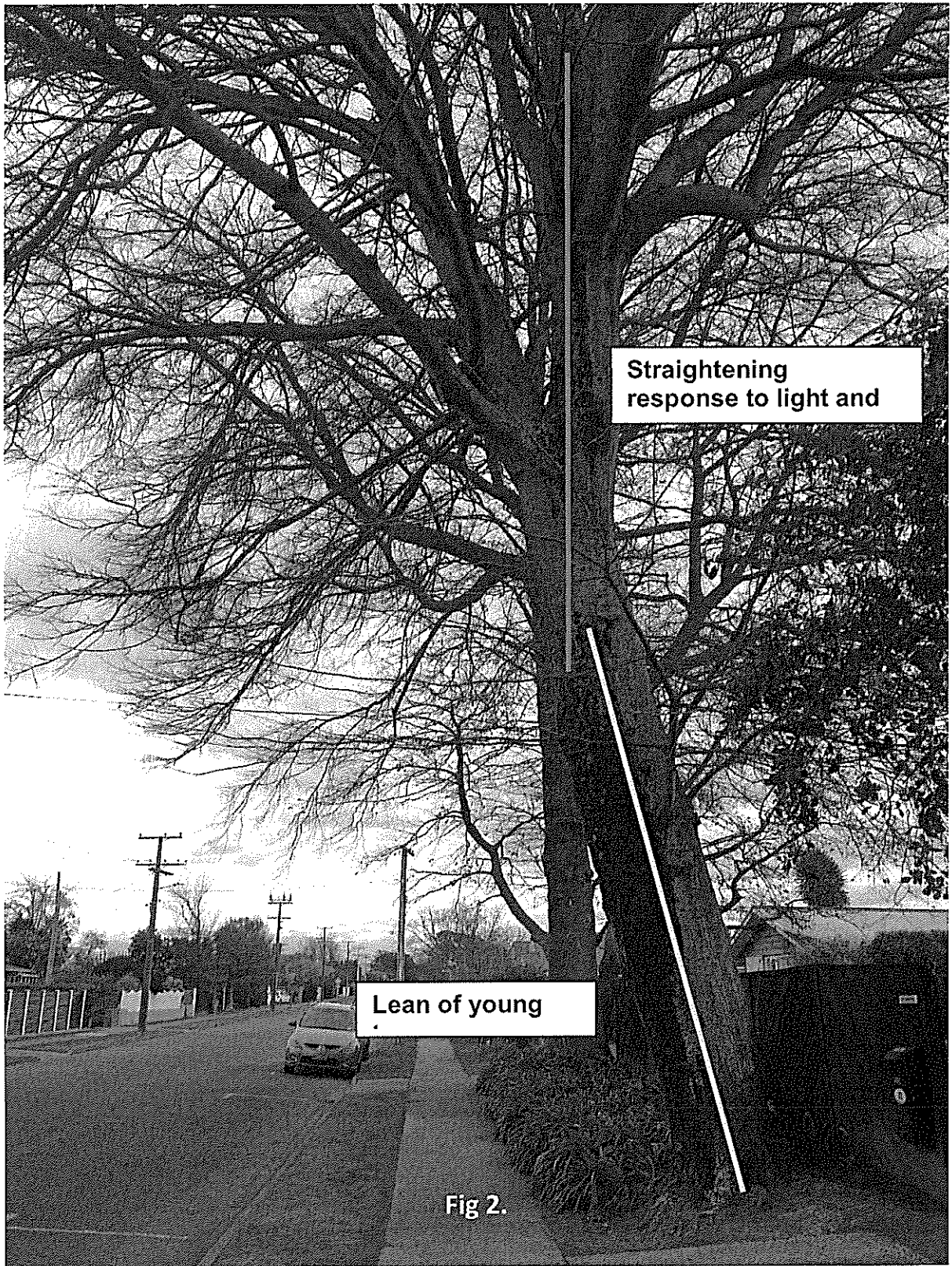
That a 10% end-weight reduction be considered of scaffold branches where over extension (beyond the general canopy, Fig 1.) is likely to result in increased wind load, and also of large horizontally attached scaffolds as mitigation of SLD.

This pruning may be done if and when desired as resources allow or as need arises due to monitoring.

Also that the trees be monitored by a suitably qualified arborist for branch and limb failure as resources allow but not less than annually and after prolonged hot dry weather followed immediately by rain events, as well as strong wind events exceeding 80kph.

## APPENDIX A PHOTOGRAPHS





## APPENDIX "B" RISK MATRICES

**Likelihood  
of Failure**

**Likelihood of Impacting Target**

**Very  
Low**

**Low**

**Medium**

**High**

**Imminent**

Unlikely

Somewhat  
likely

Likely

Very  
Likely

**Probable**

Unlikely

Unlikely

Somewhat  
likely

Likely

**Possible**

Unlikely

Unlikely

Unlikely

Somewhat  
likely

**Improbable**

Unlikely

Unlikely

Unlikely

Unlikely

**Likelihood  
of Failure  
& Impact**

**Consequences  
of Failure**

**Negligible**

**Minor**

**Significant**

**Severe**

**Very  
Likely**

Low

Moderate

High

Extreme

**Likely**

Low

Moderate

High

High

**Somewhat  
likely**

Low

Low

Moderate

Moderate

**Unlikely**

Low

Low

Low

Low