

Gristwood & Toms Tomograph Decay Investigation Report

**T001: Mature Oak
St Marys Car Park
Hayling Island
PO11 9BY**

15th April 2024

**Author: Jim Mead Tech Cert (Arb) FdSc (Arb)
MArborA.**



Gristwood&Toms
Managing Great Britain's Trees

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T001: English Oak (*Quercus robur*)

1: Summary

This report involves the close inspection of 1 No. Common Oak tree (*Quercus robur*) located within a public car park on Hayling Island PO11 9BY (See Fig 1).

Following an inspection of the tree by the local authority appointed Arboriculturist, the tree was identified as being potentially decayed. Due to the tree's location and observed defects, it was felt that appropriate decay investigation systems should be utilised to assess its condition and structural integrity.

2: Introduction

2.1 Instruction

I have been instructed by Mr Damian Pearson of Norse South East, to inspect the subject tree. I am to carry out appropriate decay investigations and visual inspections, and provide a summary of my findings, including recommendations for the tree's immediate and future management.

2.2 Qualifications and Experience

I have based this report on my site observations and investigations, and I have come to conclusions through my experience, interpretation of test results and technical knowledge in arboriculture.

2.3 Documents and Information Provided

I have been provided with acceptance of our cost proposal from Damian Pearson dated 12th March 2024, constituting instruction to proceed with investigation works.

2.4 Report limitations

Any recommendations made in this report are based on the results of the tomographic test in conjunction with the independent arboricultural opinion of the author with specific regard to:

- Interpreting the results
- An assessment of the physical and physiological condition of the tree
- An assessment of its location

They do not constitute direct management instruction in any way, and they may not always align with the opinion or decision of the recipient. Tree management decisions can be led or constrained by other factors, such as organisational tree management strategies, resource/finance availability, appetite for risk, legal constraints, or overarching policies/procedures to which the author has no knowledge or influence. This report is only concerned with the tree identified below and its location is shown in Fig. 1.

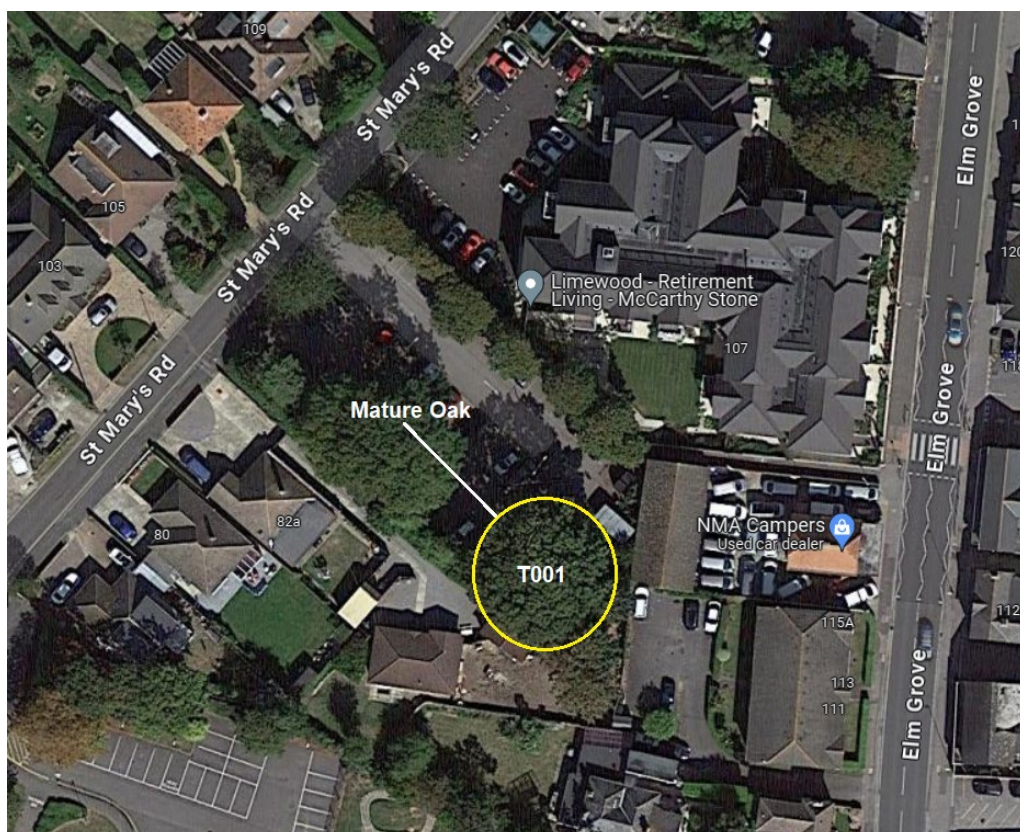


Fig. 1: Location of the tree in this report.

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The author shall not be responsible for events that happen after the date of the report due to factors that were not apparent at the time. Healthy trees, or parts of healthy trees, may fail when affected by unusually high winds, drought, land slip, subsidence, heave, or storms and as such the consequences of such conditions cannot be accounted for in the scope of this report.

No soil analysis was undertaken, any possible underground conditions or conflict were investigated as far as a surface visual inspection would allow. Detailed background information concerning the history of the location, its hydrology or geology was not known at the time of the inspection.

This report relates specifically to the condition of the subject tree on the day of inspection and remains valid for a period of 12 months from the date it was undertaken.

The acceptance of this report constitutes an agreement with the limitations and terms listed above.

3: Inspection Information

3.1 Site Visit

I carried out an unaccompanied site visit on 9th April 2024. The weather at the time of inspection was overcast and cold, visibility was good. All observations were from ground level, and all measurements were estimated unless otherwise specified.

3.2 Site Description

The subject tree is located within the southern corner of a busy and well treed public car park. Collectively, the trees in this location contribute significantly to the amenity and ecology of the area, and their retention is desirable. However, it is essential to ascertain the tree's structural integrity and assess any significant threat to people or property.

4: Tree Inspection

4.1 Methodology

I visually inspected the tree and carried out decay tests and observations from ground level, with the use of probes and binoculars where appropriate. All dimensions were measured unless otherwise indicated*.

5: Observations

5.1 Tree Assessment

T001: Pedunculate Oak (*Quercus robur*)

- Height: 18m*
- Spread: 21m* (N/S)
- DBH: 91cm

Large, mature tree. The tree has a maiden crown, and has not been subjected to any significant containment pruning, other than historic removal of large diameter low branches etc.

The tree grows within a relatively small area of vegetation, approx. 25m by 6m, within which there are numerous other trees and vegetation, although this is by far the most mature and dominant specimen in this part of the park. There are numerous other mature trees within different sections of the car park.

Compared to the other Oak trees in this location, T001 has poor vigour, and sparse new foliage appearing. The crown contains considerable deadwood and die-back in some extremities.

Mallet sounding of the trees stem confirms extensive bark delamination and necrotic cambial tissue throughout the southern elevation, exceeding 1.5m wide at ground level and extending up to in excess of 2.5m. There are small areas of dark staining/exudation, consistent with colonisation by *Armillaria* spp. (Honey Fungus) decay pathogen, along with significant frass, from boring insects colonising the dead bark.

Removal of an area of the dead bark to the tree's southern quadrant, exposed significant necrotic cambial layer along with Rhizomorphs and Mycelial layers. The exposed heartwood was all confirmed to be solid. Probing into the soil around the base of the tree did not indicate the presence of any subterranean decay, or basal cavity.



Fig. 2: T001 viewed from the northeast.



Fig. 3: T001 viewed from the north.



Fig. 4: T001 viewed from the northwest.

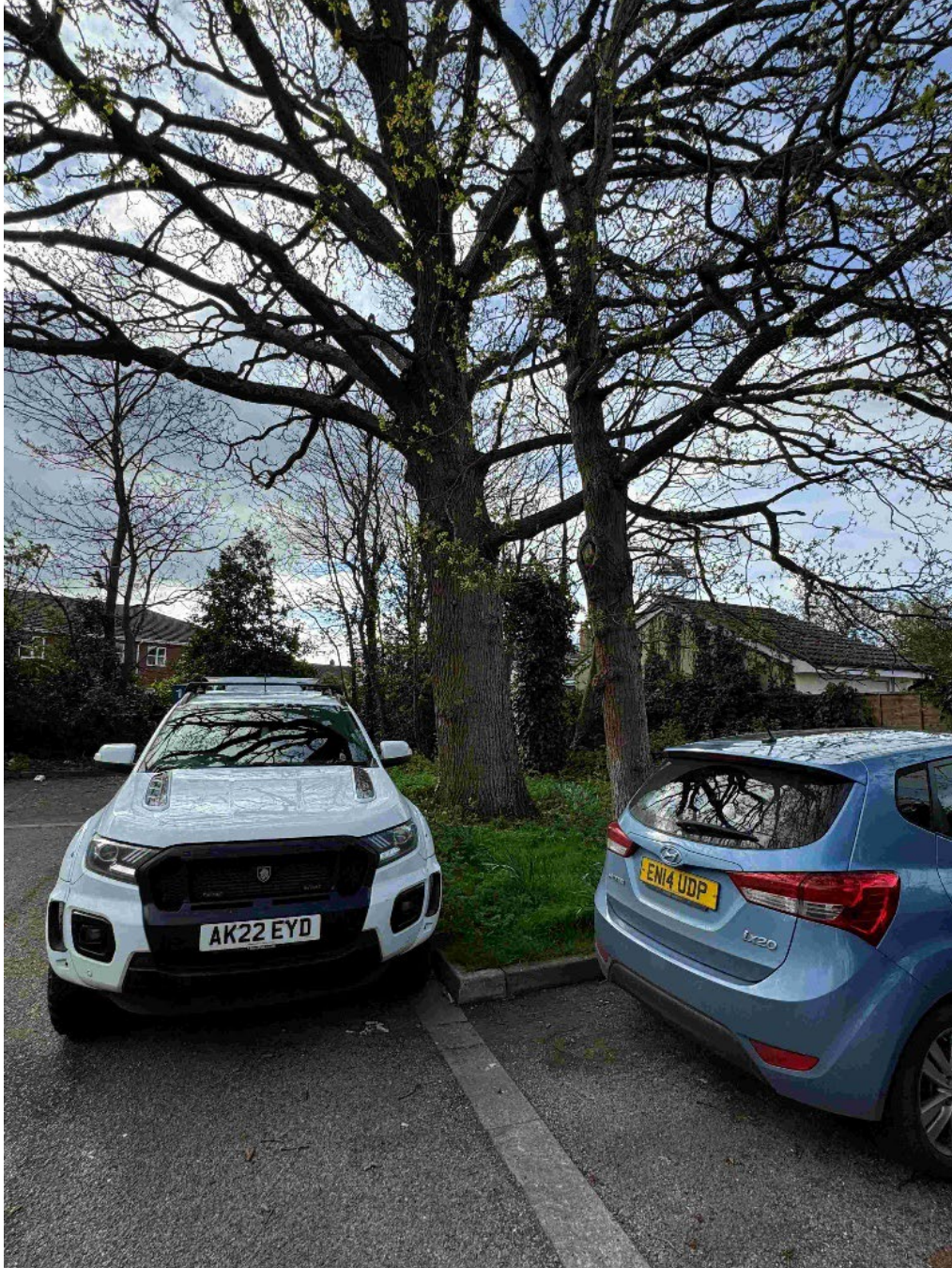


Fig. 5: T001 viewed from the northwest.



Fig. 6: T001 Stem viewed from the east.



Fig. 7: T001 Stem viewed from the southeast.



Fig. 8: T001 Stem viewed from the southeast.

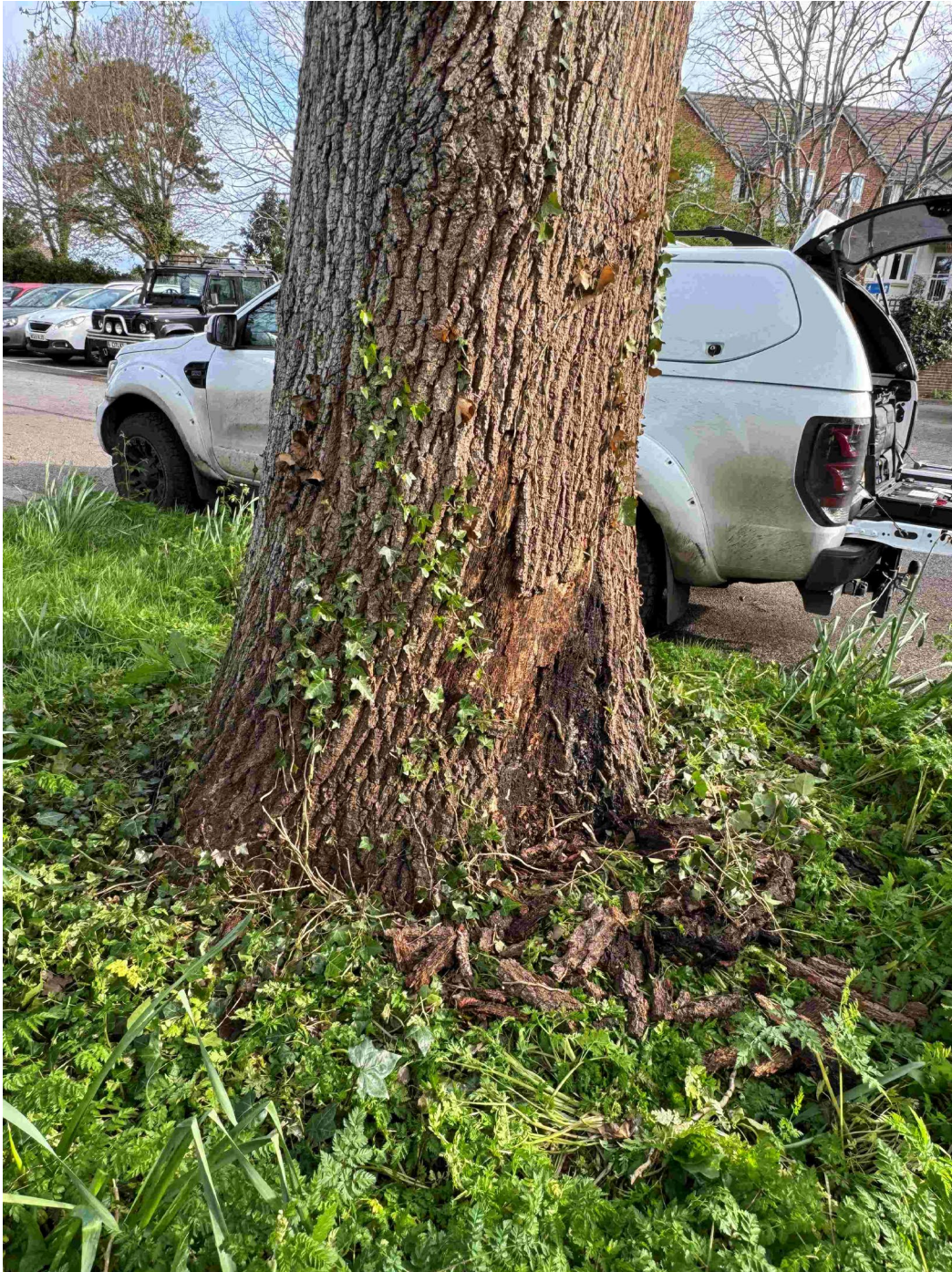


Fig. 9: T001 Stem viewed from the south.



Fig. 10: T001 Stem viewed from the west.



Fig. 11: T001 Area of removed dead bark.



Fig. 12: T001 Northern elevation stem showing test levels.



Fig. 13: T001 Western elevation stem showing test levels.



Fig. 14: T001 Southern elevation stem showing test levels.



Fig. 15: T001 Southeastern elevation stem showing test levels.



Fig. 16: T001 Eastern elevation stem showing test levels.

5.2 Picus Tomograph

This method of decay detection is based on the principle that solid wood is a better sound wave conductor than wood that is decayed or structurally damaged. The Picus system consists of a set of sensors that are strategically placed around the area of the tree identified as potentially having decay or a structural fault.

Each sensor is connected to a nail, which is tapped through the bark into contact with the wood. This process is virtually non-invasive to the tree's system. The sensors are connected by a data cable to a power supply and laptop computer. Each nail is tapped in turn and the sound wave flight paths are measured by each of the sensors. This results in a dense network of sound velocities through a cross section of the tree.

The velocity of sound through wood depends on the degree of elasticity and density of the material. Tree damage, such as white rot, brown rot, soft rot, cavities, and cracks, reduces the elasticity and density of the wood.

The data from the sensors is translated by the computer software into a full colour tomogram of the cross section of the tree. This tomogram gives information about the presence of decay, cavities and faults in the tree.

This report relates to the tree at the time of inspection and its internal stem condition may change at an unpredictable rate.

It is recommended that where an inspected tree is retained, its condition should be reassessed by a competent person within any recommended timescale and that there should be scheduled periodical visual inspections, particularly after periods of severe weather and/or if the use of the target area is likely to change or increase.

Dark colours on the tomogram, such as black and brown, indicate areas of the trunk's cross section where the sound waves travel without distortion, this can be indicative of areas of solid or sound wood.

Green indicates areas which are of lower substrate density in comparison to black or brown areas, this can be indicative of areas where dysfunctional tissues or the decay of woody tissues is present.

Violet, blue or white areas on the tomogram indicate areas that sound travels relatively slowly, indicating dysfunctional tissues or established decay.

Violet indicates greater desiccation than green, blue or white indicates minimal or no wood density being present.

The tomograph cannot differentiate between extensive decay and a cavity, a follow up inspection using a Resistograph can confirm whether a cavity has developed internally in a specific area if required.

Colour	Condition of Wood
	No distortion/Sound timber
	No distortion/Sound timber
	Dysfunctional tissues/Incipient decay
	Dysfunctional tissues/Decaying wood
	Decayed/Extensively decayed wood
	Extensive decay/Cavity

The axis scales at the left and bottom of the tomogram represent the extent of the examined cross section.

The numbered red points around the tomogram denote the sensor positions. For the purposes of this report, sensor number 5 denotes the north position unless stated otherwise.

6: Findings

Two tomograph readings were taken:

- T001: @ 10cm above GL: 395cm diameter.
- T001: @ 25cm above GL: 365cm diameter.

T001 : Common Oak (*Quercus robur*) :

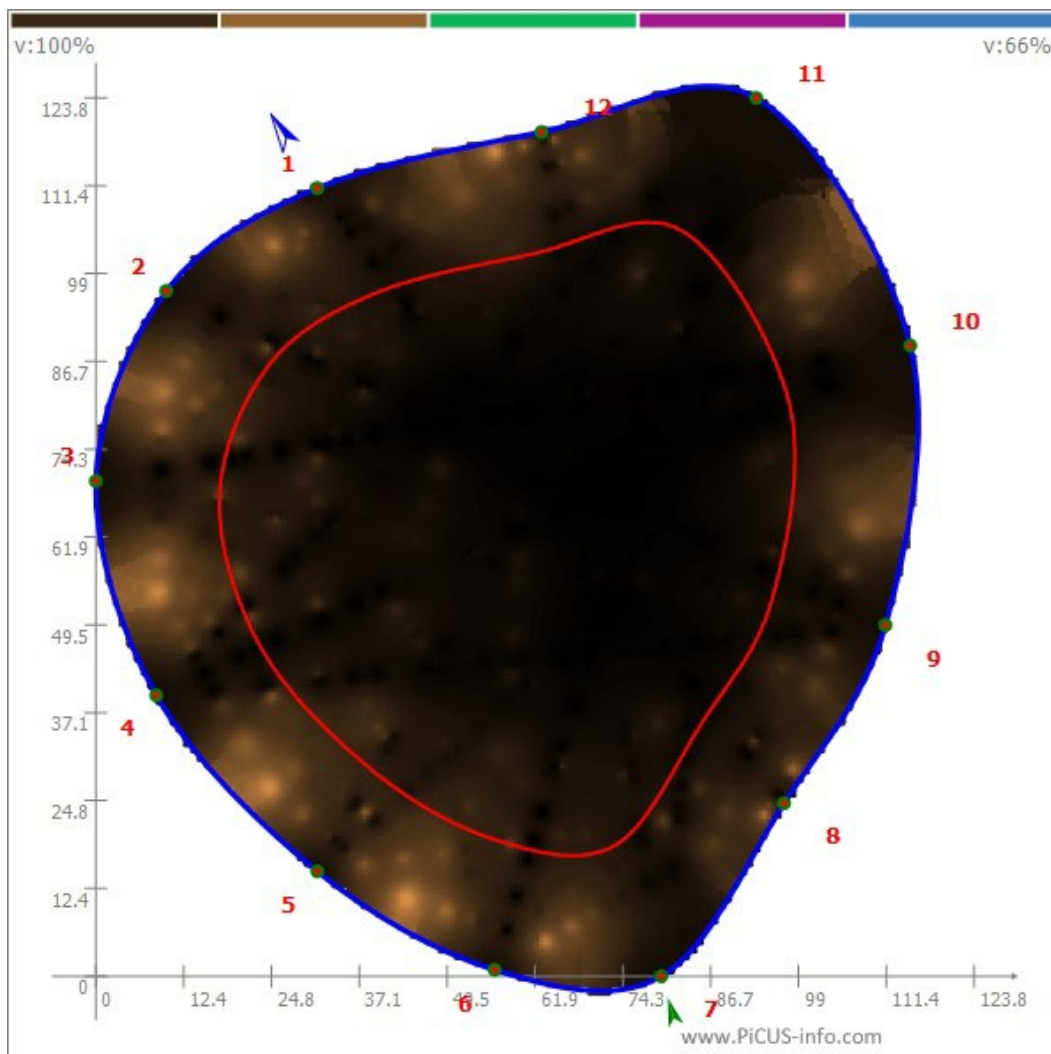


Fig. 17: T001 Tomograph at approx. 10cm above GL.

T001 : Common Oak (*Quercus robur*) :

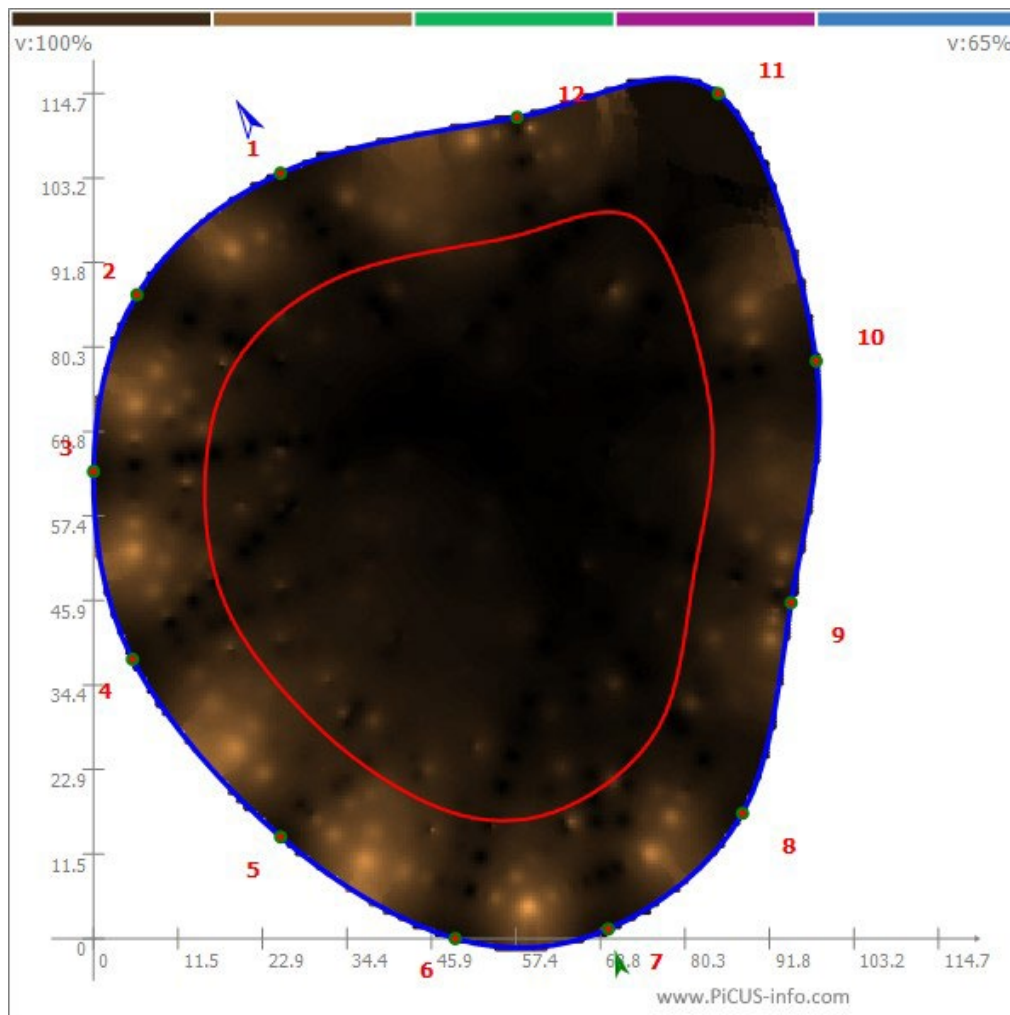


Fig. 18: T001 Tomograph at approx. 25cm above GL.

Neither of the subject tree's test levels depicted any discernible decay, and I saw no evidence to suggest that further Ultra-Sound and or Micro Drill testing would be of benefit. The acceptable residual wall thickness is intact throughout the stem radii at each level, with no indication of compromised structural integrity due to decay.

Analysis

All of the trees in this location have high amenity value, are in a notable location, and their retention is desirable.

T001 is in poor condition and most likely in advanced stages of degradation through colonisation by the decay pathogen *Armillaria* (probably *mellea* (Honey Fungus)) the decay strategy of this pathogen is known to be aggressive on most *Quercus*, and often leads to complete destruction of the host trees lateral rooting system.

It is not practicable to modify the usage of this site, retaining the use of the existing parking, one way system, and adjacent recycling facilities, to accommodate this tree in its present unstable condition.

Significant crown modification of the tree, to try to minimise the stem and root plate loading and stabilise its failure potential, would remove the trees amenity and ecological value; and due to the stressed condition of the tree, it is highly likely that the extent of pruning required, would exacerbate the demise of the tree.

7: Conclusions & Recommendations

Urgency	Colour	Timescale (in Line with Good Arboricultural Practice)
1 – High	Red	Health and Safety – within six months
2 – Moderate	Amber	Within one year
3 – Low	Green	Planned maintenance

T001	A mature specimen in poor condition with limited future potential, in an area of high value and frequency targets:	Remove tree completely
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7.1 Tree Management Recommendations

All permitted or approved tree work should be carried out by suitably qualified and experienced professional arborists in line with best practice as recommended in BS3998 (British Standard for Tree Work – Recommendations) or as modified by more up to date research/recommendations as appropriate. All tree work must also take into consideration The Wildlife and Countryside Act 1981 (as amended), the Conservation (natural habitats etc.) Regulations 1994 and the Countryside and Rights of Way Act 2000 protected species of flora and fauna.

8: Other Considerations

8.1 Trees Subject to Statutory Controls

Before any future work is undertaken, the legal status of the subject tree/s must be ascertained. It may be protected by a Tree Preservation Order or located in a conservation area and as such notification of any works recommended must be submitted to the Local Authority before commencement.

8.2 Tree Work Methodology

It is feasible to use mobile aerial access equipment to minimise the risks associated with rope access and work positioning systems.

9: References

- F Schwarze, J Engels & C Mattheck, (2004) Fungal Strategies of wood decay in trees.
Lonsdale, D. (1999) Principles of Tree Hazard Assessment and Management
- Schwarze, F.W.M.R. (2008) Diagnosis and Prognosis of the Development of Wood Decay in Urban Trees