

# HARRAWAY TREE SERVICES

*Tree Management and Training*

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*Member of the Expert Witness Institute*

## TREE INSPECTION REPORT

**Client:** Tree Solutions, for clients  
**Location:** St. Nicholas's Churchyard, Hurt, Berkshire  
**Date of inspection:** 27 October 2008  
**Inspected by:** J.Harraway FArborA, MICFor

### Instructions received:

I am instructed by Stephen Arnold of Tree Solutions, on behalf of his clients, to inspect a mature tree within the grounds of St. Nicholas's' Churchyard and report on the structural of its lower stem.

**Tree number/identification:** The tree is identified by species and location only.

**Our reference:** TIR/1108/5

**Tree species:** Lime *Tilia spp.*

### General description:

The tree is 23.6 metres in height (assessed with a clinometer) and situated on a small mound, immediately adjacent to a winding road through the village of Hurst. The tree stands opposite the car park of a public house. The vitality of the tree appeared satisfactory at the time of inspection, with no major deadwood or dieback evident. Multiple crown stabilisation cables have been installed in the crown and a cavity was evident in a large old pruning wound on the south side of the stem, at height of approximately 2.5 metres.

Recent removal of thick sucker growth around the base of the stem has revealed the presence of a black crust-like fungal fructification, on the north side; this undoubtedly indicates infection with *Kretzschmaria deusta*, an organism not infrequently present in mature trees of this genus. See photos on page three of the report.

### Method of inspection:

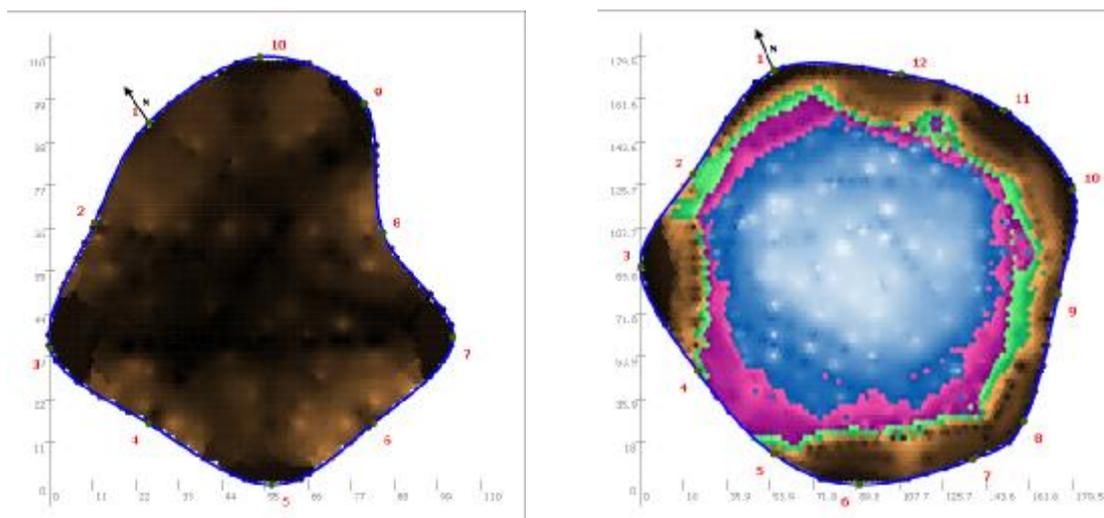
Following ground level visual inspection, the lower stem was further assessed using a Picus sonic tomography unit at two levels, close to ground level and at 1.5 metres (below the deteriorating stem wound). Additionally, a Resistograph F300 decay detecting drill was used in four locations around the base of the stem.

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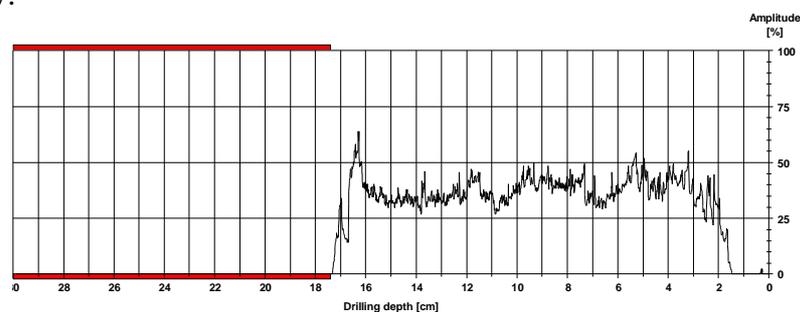
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*Document reference: TIR/1108/5*

The Picus uses the relative velocity of sound waves induced across the stem to compose a colour-shift image. Dark areas correspond to higher velocities and, hence, denser wood. Decay results in lower sound speeds and a shift to lighter colours (with red and blue/white indicating more significant decay). Examples of a sound tree and one with decay are shown overleaf:



The Resistograph F300 measures the drilling resistance of a very fine drill bit (to a maximum depth of 30cm). Significant drops in drilling resistance can be indicative of decay. See example below:



Resistograph in  
use at the base of a  
Cedar tree



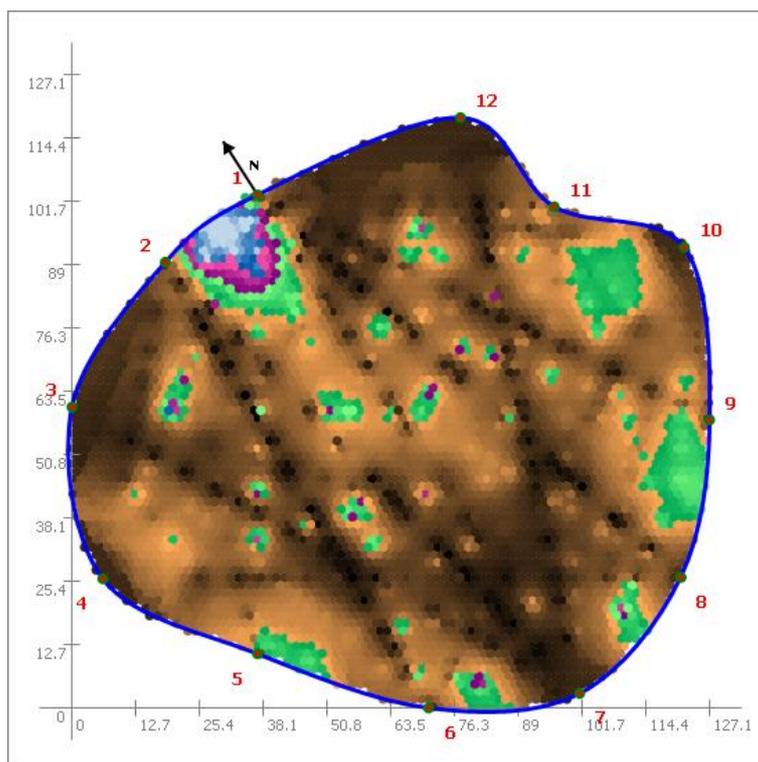
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### Results of inspection:

The first Picus investigation, at a height of approx. ten centimetres above ground level, produced the following tomogram. Twelve measuring points were used, with sensor 1 placed on the north side of the stem.



A small area of established decay is indicated clearly on the north side of the stem, between sensors 1 and 2 (coloured blue/red). Other green mottled zones are dispersed across the stem. The inference of these is covered in the next section of the report. Photos of the fungal fructifications are shown below:

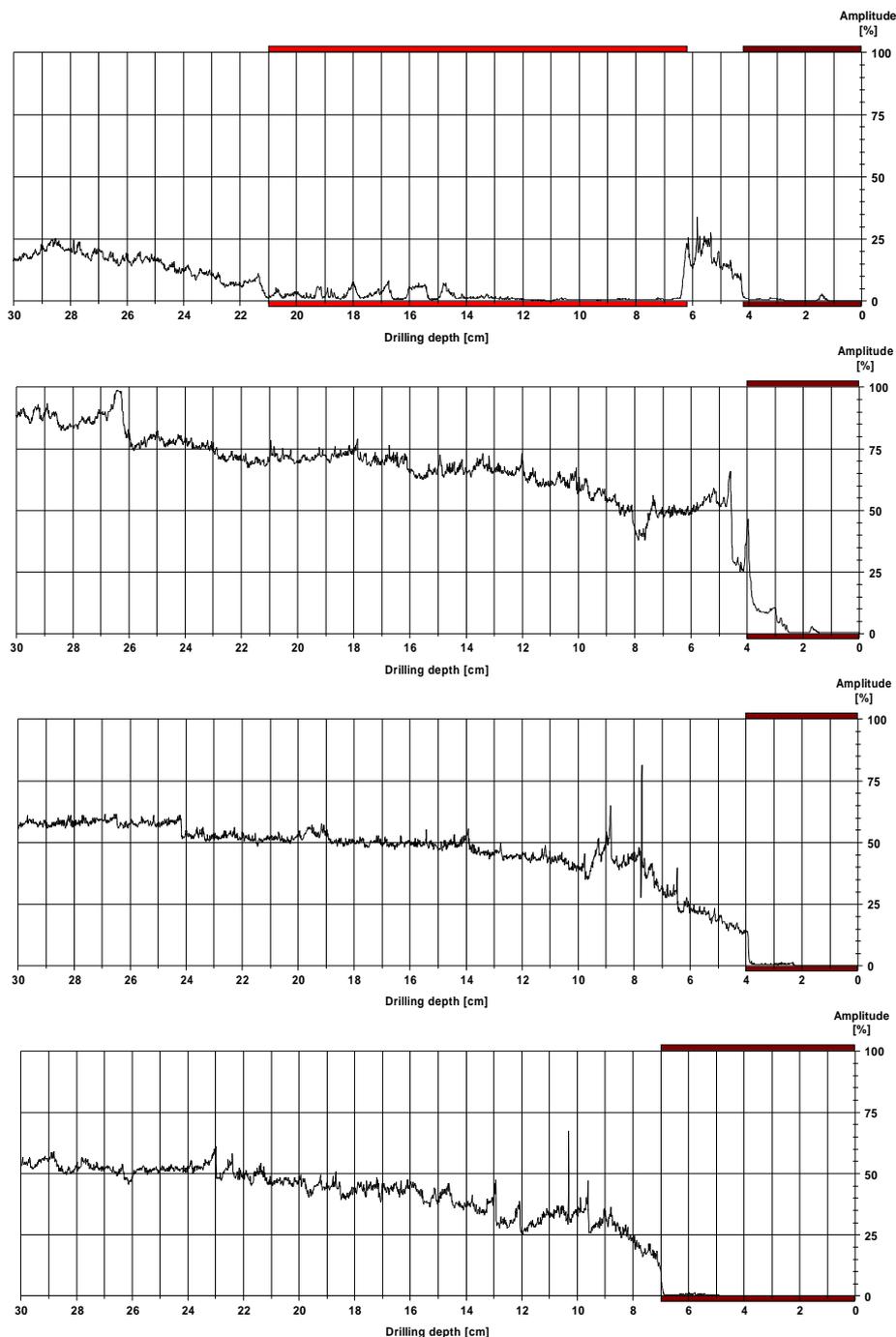


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To provide additional information about the condition of the lower stem, the Resistograph was used at the same level as the Picus, in the following locations: adjacent sensor 1, between 5-6, 8-9 and adjacent 11. The drill traces recorded are shown below in this order:



**BROWN:** bark layer and instrument offset from stem surface

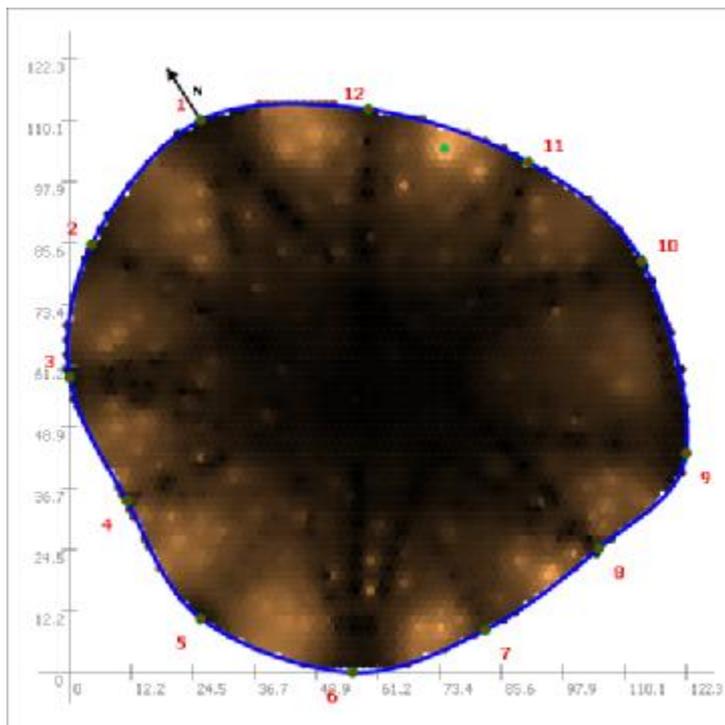
**RED:** significant reduction in drilling resistance due to decay

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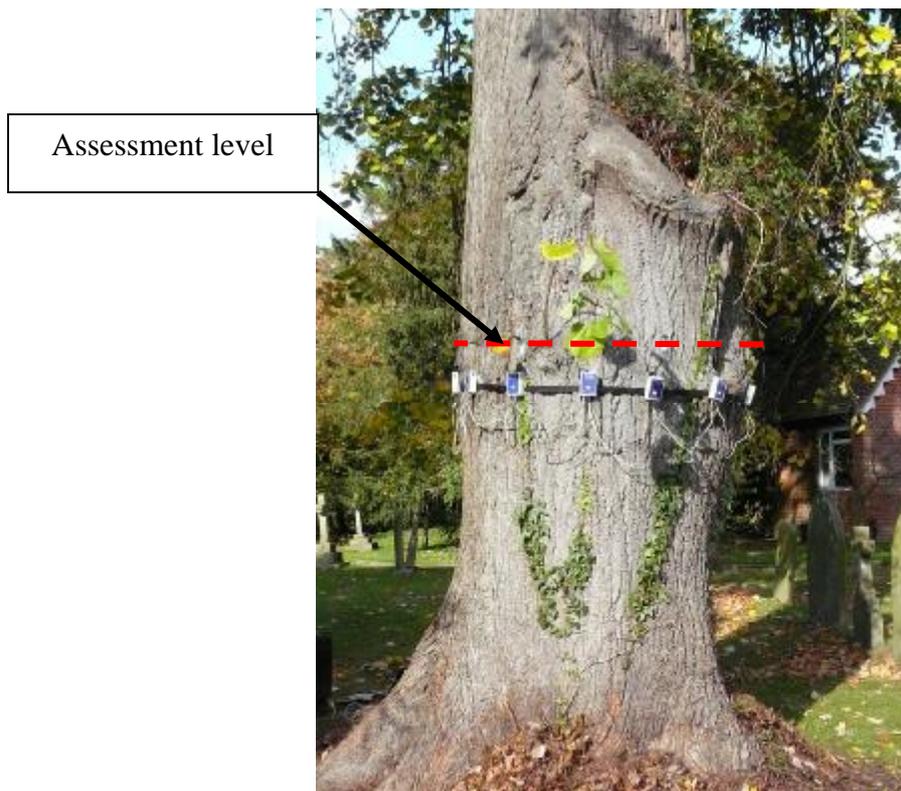
*www.hts.gb.com*

*Document reference: TIR/1108/5*

The Picus was also used beneath the large stem wound at 2.5 metres, to assess whether decay extended beyond the visible extent in the cavity.



No decay is indicated at this level. A photo of the wound and assessment level is shown below:



**Observations:**

The fungus identified at the base of the stem, *Kretzschmaria sp*, causes a brittle decay that is notoriously difficult to detect and evaluate, even using modern technologies. The fungus can lead to sudden breakage of the stem, in extreme cases, without any external growth response by the tree (the presence of decay can, in some instances, cause trees to produce extra wood around weakened areas to compensate for loss of strength).

The tomogram at the base of the stem appears to indicate an area of decay between sensors 1 and 2, on the north side of the stem; this corresponds to the position of the fungal fruiting bodies. This indication is also represented on the first Resistograph drill trace, which records low drilling resistance to a depth of some 20cm. In actual fact, the fungus is developing from an area of compressed bark between root buttresses and I consider it likely that it is this zone of included bark that has led to the results.

The small green zones dispersed across the stem are perhaps more significant. These result from lowered sonic velocities between a number of different measuring points, but are not concentrated in one area, as has occurred in the small zone on the north of the stem. This affect has been noted by many users of the Picus instrument when *Kretzschmaria* is present, although the reason for the effect is not fully understood.

I have sought the opinion of two other colleagues, Frits Gielissen and Dr. David Furner, who are both engaged in research into decay and its detection (in the Netherlands and Germany respectively). I sent the Picus data to them for analysis and comment (with all details of location and client removed) and received a reply which suggests that they consider the tomogram indicates the presence of deterioration due to the fungus.

Apart from the first drilling position, none of the Resistograph drillings records any distinct drop in drilling resistance. This is not anomalous to the presence of this type of decay.

The second tomogram, at a higher level on the stem, shows no indication of decay across the stem. Accordingly, I consider that any decay in the old pruning wound is relatively confined at present.

*The tree has great visual value and is likely to be a popular feature of the street scene in the village. However, should failure occur at the base of the stem, significant harm is likely to occur. Reduction of the crown would reduce mechanical stresses on the base, but due to the tree's pendulous form, it would be technically difficult to achieve the necessary containment without significant loss of visual appeal.*

It is highly likely, in my opinion, that the presence of the fungus will eventually cause the tree to become unstable, but exactly when that time is reached is difficult to judge; it could be many years, it could be the next major storm that causes collapse. It is accepted by arboriculturists that lime trees have much less resistance to this fungus than, say, beech, due to the lack of effective barrier zones in the wood, and it would seem to be good management to remove the tree before it becomes hazardous. However, this action is likely to be unpopular with many local residents and visitors alike whenever it is carried out.

**Conclusions and recommendations:**

- *The investigation with the Picus has provided some evidence that Kretzschmaria is present across the stem, but the results do not evaluate its significance or predict when failure may occur*
- *It would be prudent to significantly reduce the crown of the tree as soon as practicable, and monitor its condition, or remove and replace it*

If the tree is covered by a tree preservation order or is situated within a conservation area, application should be made to the local planning authority and written consent obtained before any action is carried out.

**Signed:**

**Date:**