

**Decay Testing of a Singe Oak Tree, Alderbury,
On Behalf of Alderbury Parish Council.**

10th December 2024



wrc
trees

**ARBORICULTURAL
CONSULTANTS**

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1. Introduction

- 1.1 WRC Trees were instructed by Liz Holland, Clerk to Alderbury Parish Council, to undertake decay testing on a common oak (*Quercus robur*) growing in Priory Close, Alderbury and produce a report of the findings.
- 1.2 The principal reason for the inspection was the presence of desiccated fungal fruiting bodies around the base of the tree.

2. Scope of the Report

- 2.1 The purpose of this inspection and report is to determine the stability and safety of the oak tree and make any recommendations for work.
- 2.2 The tests were undertaken by Stephen Woollard and Dan Sheppard, both licensed users of the Quantified Tree Risk Assessment (QTRA) methodology and holders of the LANTRA certificate for Professional Tree Inspection qualification.
- 2.3 The tests were undertaken close to ground level employing an IML PiCUS 3 Sonic Tomography System to measure and map any decay present at those levels. Results are presented in Appendix 1. No climbing inspection or soil analysis was undertaken.
- 2.4 Further testing was undertaken by an IML-RESI PD400 Microdrill at measuring points 2, 6, 10 and 12 to measure the thickness and strength of residual wood, and to verify the tomograph results. Results are presented in Appendix 2.
- 2.5 Trees are dynamic, living organisms whose physiological and structural condition will change over the course of time in response to variables such as disease, weather events, climate, excavations and alterations to their local environment.
- 2.6 The conclusions of this report relate to conditions observed at the time of inspection and the results of testing with the IML PiCUS 3 Sonic Tomography System and the IML-RESI PD400 Microdrill. Any significant changes to the condition of the tree, or to the use of the surrounding land, will necessitate a reassessment of the tree. Where other invasive procedures or soil analyses are considered necessary, they will be recommended in the report.

3. PiCUS Sonic Tomography Explanatory Notes

- 3.1 The PiCUS tomograph measures the time taken for sonic stress waves to pass through the wood of a tree between 8+ sensors that are placed at a predetermined level around the tree stem.
- 3.2 The differing velocities of these waves help determine the wood density of a cross section of the tree (sonic waves generally travel faster through sound wood than through decayed wood).

These velocities are then calculated and interpreted to produce a colour image of the internal decay patterns.

- 3.3 PiCUS images created by tomography indicate cavities (coloured blue), advanced decay (coloured purple) and early incipient decay (coloured green). Sound wood is indicated by brown areas on the tomogram, with dark brown representing the strongest wood. The yellow lines on the tomogram are where the software predicts there could be cracks.
- 3.4 The interior red line indicates the t/R ratio. This is based on Mattheck and Breloer's (1994) method for calculating the safety margin of hollow/decayed stems. It is the ratio between the thickness of sound residual wall remaining (t) and the radius of the cross section (R). For a central cavity this ratio should be no less than 0.3 to 0.35 (or 30-35% of the radius). If the ratio is less than this, then remedial work should be undertaken. This calculation is provided as a baseline safety factor and should not be used alone when assessing risk of stem failure.
- 3.5 The red numbers around the tomogram indicate the position of the sensors.
- 3.6 The graph axis indicates the dimension of the cross-section in centimetres.
- 3.7 The tomogram represents a cross-section of the tree at the point of measurement only. Decay levels may differ above or below the point of measurement.

4. PiCUS Sonic Tomography Assessment: Methodology

4.1 The following steps are carried when taking a PiCUS sonic measurement:

1. The measuring level, number, and positions of measuring points are determined. The measuring level is determined according to visual assessment of the tree, which will consider fungal growth, cracks, cavities, damaged bark, etc. The number of measuring points used (typically between 8 and 30) and their position will be dependent on the size and architecture of the stem.
2. The geometry of the measuring level is measured.
3. Equipment is mounted on the tree.
4. Sonic measurement is carried out.
5. Calculation and interpretation of the tomogram (including, for example, use of Mattheck's t/R ratio).

6. Dismantling of the instrument and removal of nails - after tomogram interpretation.

5. **Microdrill Explanatory Notes**

5.1 The microdrill is a portable device with a 400mm x 1.5mm needle and 3mm drill tip. The system is based on the principle of measuring the drilling resistance of wood. The drilling needle is driven into the wood under constant drive and the energy required along the drilling depth is measured and electronically recorded.

5.2 The PD400 measures both the drill resistance (shaft friction) and force required to push the needle into the wood. The captured data is evaluated and processed to deliver a measuring curve, which is presented as a digital line graph.

5.3 Interpretation of these measurement profiles not only helps to determine variations in wood density and condition but also the ratio of sound wood to decayed wood.

5.4 The microdrill measures wood quality at specific drilling points only. Decay levels may differ above or below the points of measurement.

6. **Site and Surroundings**

6.1 The tree stands in a circular turning area at the bottom of the cul-de-sac at the western end of Priory Close, Alderbury. The road, several cars and domestic properties are all within striking distance of the tree.

7. **Statutory Protection**

7.1 A check of the Wiltshire Council Planning Explorer indicated that the oak tree is protected by Tree Preservation Order S/ALDE/TPO29.

7.2 Under the Town and Country Planning Act 1990 all trees protected by a Tree Preservation Order (TPO) require written permission from the Local authority, following a formal, written application, to be felled or pruned. It is an offence to do otherwise, or to damage a tree protected by a TPO.

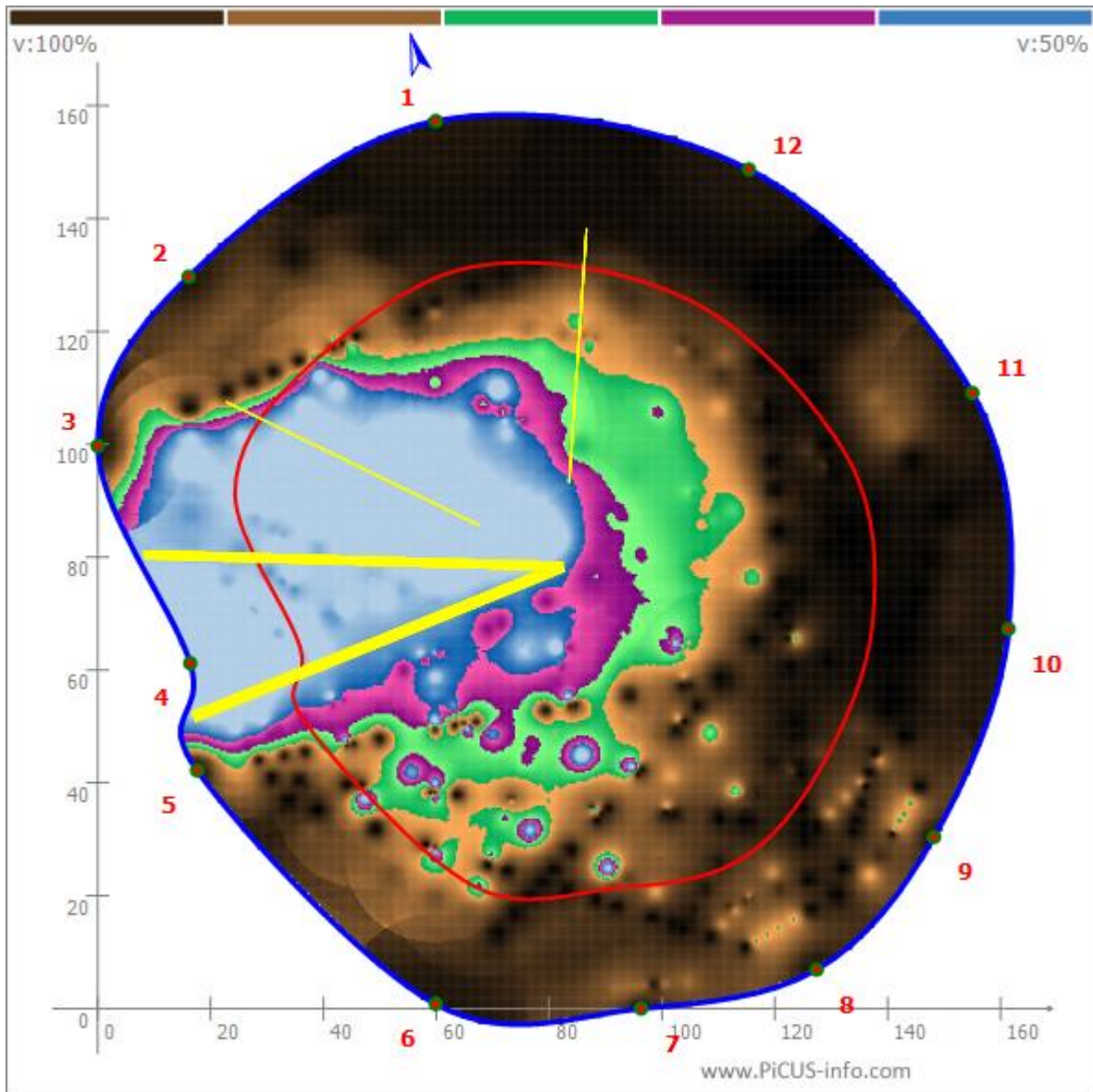
8. Observations

- 8.1 The tree is a large, mature specimen. The area in which the tree is growing has several cars parked beneath it which have caused soil erosion and compaction.
- 8.2 Soil compaction is particularly detrimental to tree health and growth as it removes airspaces between soil particles, thus preventing roots from respiring, penetrating the soil and taking up water and nutrients. This poor rooting environment is likely the cause of the crown dieback observed in the tree. This reduced vitality makes it harder for trees to co-exist with decay pathogens, such as the unidentified desiccated fungal fruiting bodies at the base of the tree.
- 8.3 The tree is multi-stemmed at approximately four metres with good unions. There is minor and medium dead wood throughout the crown, not entirely typical of species and age.
- 8.4 There are numerous historic pruning wounds, including one very large, almost completely occluded wound at approximately 1.8 metres on the west side. Other wounds have responded less favourably and have bark wounds and dysfunctional wood extending down the branch.
- 8.5 Sonic tomography results showed decay at the level of testing (circa 20cm above ground level) on the western side of the stem. The decay is largely localised and most extensive at the western part of the base, reducing as it extends towards and beyond the centre of the tree. Further testing was undertaken by an IML-RESI PD400 Microdrill at measuring points 2, 6, 10 and 12, to measure the thickness and strength of residual wood, and to verify the tomograph results.

9. Conclusions and Management Recommendations

- 9.1 The results of the sonic tomography verified the microdrill, indicate that the tree has localised basal decay which is not yet considered to be advanced. There is sufficient sound residual wood for the tree to be retained.
- 9.2 As the decay advances in the future, it is likely that the tree will be required to be reduced in height and spread to enable safe retention. For the tree to be able to cope with the loss of photosynthetic material in this operation, and to compartmentalise pruning wounds, its vitality must be improved. If cars continue to park beneath the tree causing further compaction, vitality will not improve. It is therefore recommended that a low-level post and rail fence is constructed or large rocks placed at the grass edge to prevent parking. The protected area should then be mulched to a depth of 100mm with partially rotted woodchip (not in contact with tree trunk). This should be completed at the earliest opportunity.
- 9.3 Dead wood with a diameter greater than 25mm or longer than one metre should be removed from the crown within three months of the date of this report.
- 9.4 The tree should be inspected and tested for advance of decay every two years by a suitably qualified and experienced arboriculturalist.

Appendix 1. Sonic Tomography



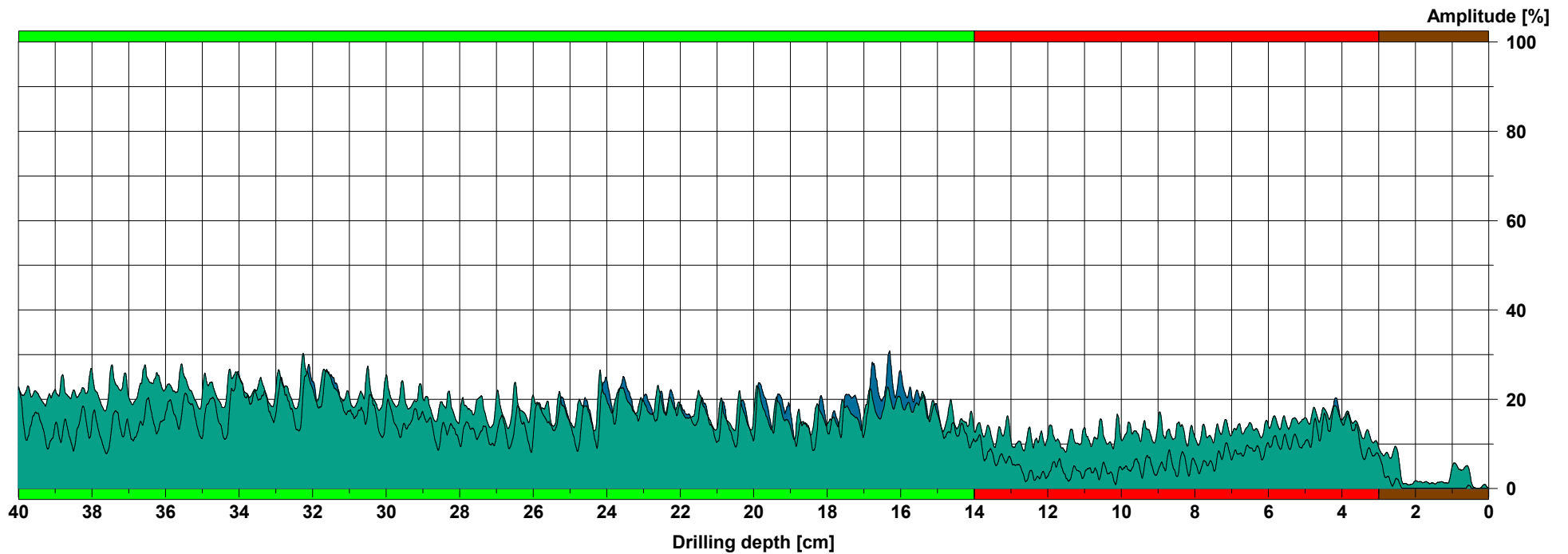
Results of PiCUS tomography at circa 30cm above ground level.

Appendix 2. Microdrill Results






Measuring / object data

Measurement no.:	1	Speed	: 2500 r/min	Diameter:	
ID number	: MP2	Needle state:	---	Level	: 20cm
Drilling depth	: 40,14 cm	Tilt	---	Direction:	MP2
Date	: 12.11.2024	Offset	: 101 / 364	Species	: Oak
Time	: 13:28:02	Avg. curve	: off / off	Location	:
Feed	: 50 cm/min	Name	: APC		



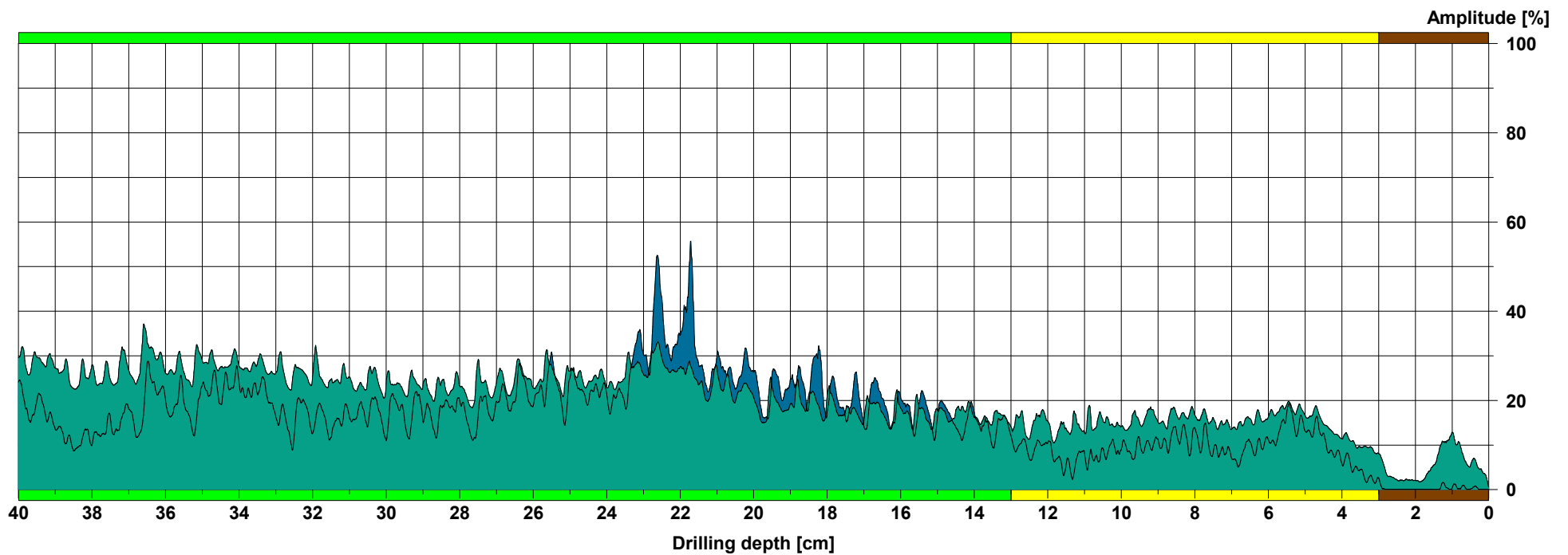
Assessment

	From 0,00 cm to 3,00 cm : Bark
	From 3,00 cm to 14,00 cm : Decay
	From 14,00 cm to 40,00 cm : Sound Wood

Comment

Measuring / object data

Measurement no.:	2	Speed	: 2500 r/min	Diameter:	
ID number	: MP6	Needle state:	---	Level	: 20cm
Drilling depth	: 40,15 cm	Tilt	---	Direction:	MP6
Date	: 12.11.2024	Offset	: 99 / 296	Species	: Oak
Time	: 13:30:59	Avg. curve	: off / off	Location	:
Feed	: 50 cm/min	Name	: APC		



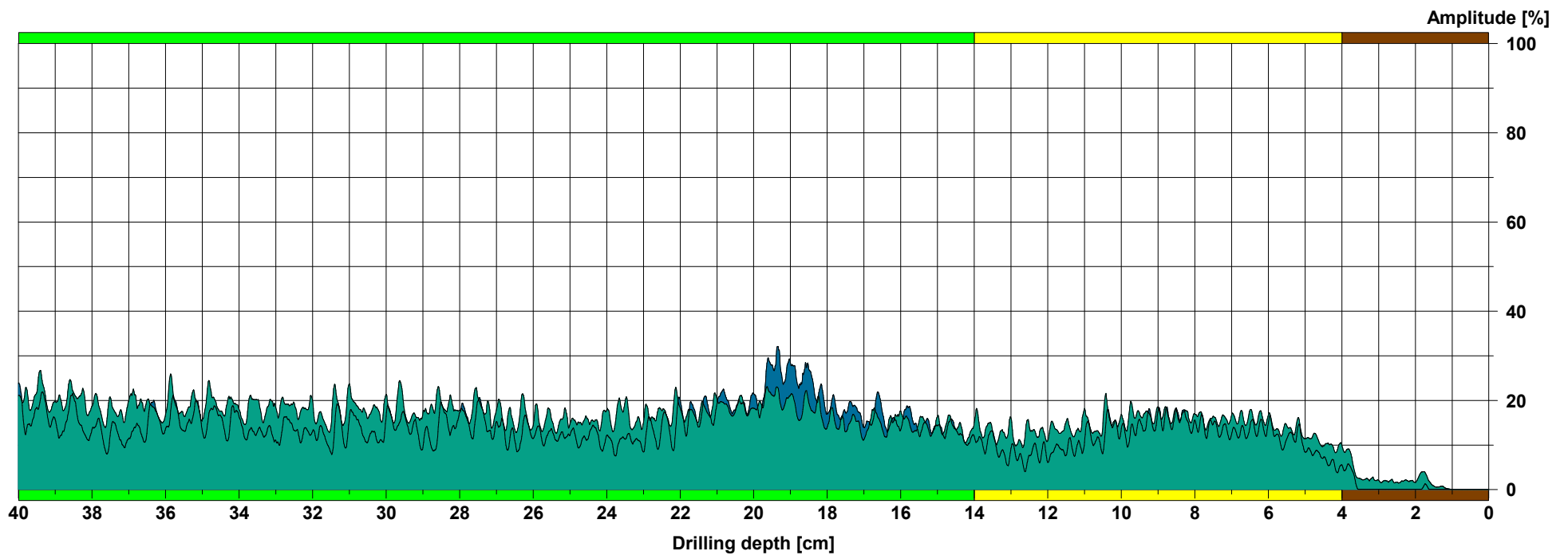
Assessment

■	From 0,00 cm to 3,00 cm : Bark
■	From 3,00 cm to 13,00 cm : Low Resistance
■	From 13,00 cm to 40,00 cm : Sound Wood

Comment

Measuring / object data

Measurement no.:	3	Speed	: 2500 r/min	Diameter:	
ID number	: MP10	Needle state:	---	Level	: 20cm
Drilling depth	: 40,15 cm	Tilt	---	Direction:	MP10
Date	: 12.11.2024	Offset	: 83 / 300	Species	: Oak
Time	: 13:32:45	Avg. curve	: off / off	Location	:
Feed	: 50 cm/min	Name	: APC		



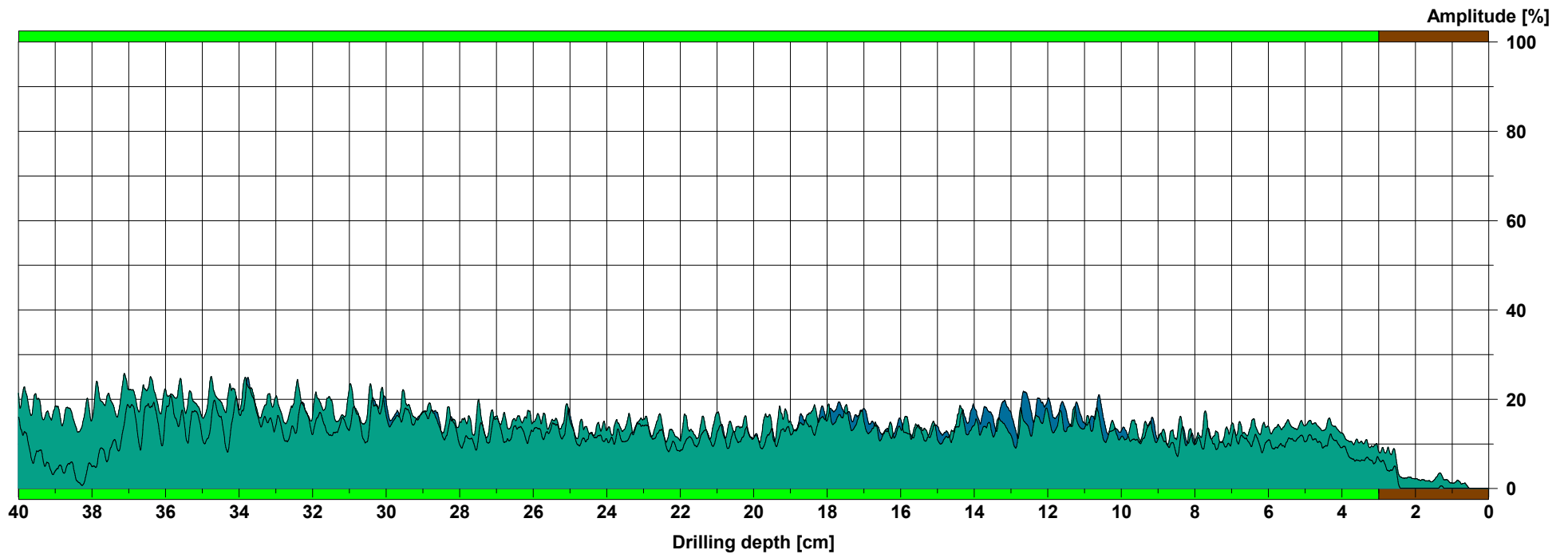
Assessment

■	From 0,00 cm to 4,00 cm : Bark
■	From 4,00 cm to 14,00 cm : Low Resistance
■	From 14,00 cm to 40,00 cm : Sound Wood



Comment

Measuring / object data

Measurement no.:	4	Speed	: 2500 r/min	Diameter:	
ID number	: MP12	Needle state:	---	Level	: 20cm
Drilling depth	: 40,15 cm	Tilt	---	Direction:	MP12
Date	: 12.11.2024	Offset	: 81 / 290	Species	: Oak
Time	: 13:36:14	Avg. curve	: off / off	Location	:
Feed	: 50 cm/min	Name	: APC		



Assessment

	From 0,00 cm to 3,00 cm : Bark
	From 3,00 cm to 40,00 cm : Sound Wood

Comment