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Tree Condition and Decay Assessment

Prepared for

71 Avenue Road
St John's Wood
London
NW8 6HP

Prepared by
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Date: 23rd January 2022

Version: 1

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Client:	Mr Gareh	Ref:	AK/ 398/200122
Location:	71 Avenue Road St John's Wood London NW8 6HP		
Date of site Inspections:	11th January 2022		
Survey Inspector(s):	Aran Kimberlee BSc (Hons) Arboriculture M Arbor A, PTI.		
Report Author:	Aran Kimberlee BSc (Hons) Arboriculture M Arbor A, PTI.		
Signature:	[redacted]	Date:	20th January 2022

The statements made in this report do not take account of extreme climate, vandalism or accident, whether physical, chemical or fire. The author cannot therefore accept any liability in these factors, nor where prescribed work is carried out in an incorrect and/or unprofessional manner in accordance with current good practice. The authority of this report ceases at any stated time limit within it, or if none is stated after two years from the date of the survey or when site conditions change, or pruning or other works unspecified in the report are carried out to, or affecting, the subject tree(s), whichever is sooner.

1.0 Instruction and Purpose of Report

1.1 I have been verbally instructed by Mr Gareh to carry out a tree safety inspection and decay assessment of the mature Lime tree growing in the front garden of 71 Avenue Road, St John's Wood in London.

1.2 The purpose of my inspection was to assess the structural integrity of the tree on-site using decay testing equipment, from these results assess the level of risk the tree might pose to persons and property and to give appropriate recommendations, if any, for management of the tree. If significant defects are observed in relation to targets then the risk of harm will be assessed using the Quantified Tree Risk Assessment (QTRA) system. The method of which is detailed below in section 4.0 of this report.

1.3 In addition, give appropriate recommendations, if any, for management of the tree in report format.

2.0 Report Methodology & Limitations

2.1 I carried out the survey and decay assessment on the 11th January 2022. The weather was fine and the visibility good.

2.2 The inspection process consisted of a general ground based visual assessment, followed by a decay assessment Investigating the internal parts of the tree using a PiCUS Tomograph and IML Resi-F Resistograph (micro-drill).

The Resistograph is an invasive method of assessing the structural quality of the wood in the internal parts of a tree. The drill has a testing depth of 400mm, and the test is generally carried out in quadrants or in three locations on the main trunk around the decayed area/s to ensure the test does not miss any significant decay.

The PiCUS Tomograph measures the velocity of sound waves in wood in order to detect decay and cavities in standing trees noninvasively. The acoustic velocity depends on the modulus of elasticity and the density of the wood itself. Most damage and disease cause fractures, cavities, or rot and reduce the wood's elasticity and density. The sketch displays the basic working principle, in that sound waves cannot take a direct path through the wood if there is a cavity between the transmitter and receiver. The acoustic waves are created manually with a small metal hammer and sonic sensors (receivers) record the signals. Little pins are used for coupling the sensors to the wood. Number and positions of the test points are critical to the accuracy of the scan. By using both acoustic travel-time information and geometry data of the measuring level the software calculates tomograms that show the apparent sonic velocities, the so-called sonic tomograms acoustic

tomograms. The speed of sound in wood correlates with wood quality and is therefore a measure for the breaking safety of the trunk. The PiCUS sonic tomogram shows the residual wall thickness. Using this information, where deemed appropriate, the calculations on the website www.treecalc.com can show the breaking safety of the trunk (Source: argus-electronic gmbh). Treecalc has not been used for this assessment on this occasion.

2.3 The assessment consisted of an above ground inspection only and soil type has not been ascertained on site. Therefore, this report makes no reference to the possible effects of tree roots and shrinkable soils, and any possible effects on building foundations or underground services.

2.4 Unless otherwise specified in the recommendations, this report is valid for 12 months from the date of site inspection. The condition of trees can change due to the effects of pests and disease or following severe weather conditions or other abiotic factors. The report is valid only for typical weather conditions. Healthy trees or parts of healthy trees may fail in unusually high or unpredictable winds or violent storms and, as the consequences of such weather phenomena are unforeseeable, the author of this report cannot be held liable for any such failures.

2.5 The conclusions of this report will remain valid for 12 months from the date of the inspection, but any alteration or deletion from this report will invalidate it as a whole.

2.6 The trees on site have not been tagged.

3.0 Site Details

3.1 Access to the site is from 71 Avenue Road, St John's Wood in London. The decay assessment was carried out on a mature Small Leaved Lime (*Tilia cordata*) tree, located in a small strip of front garden adjacent to the footpath and Avenue Road. A number of small Yew (*Taxus baccata*) trees are also present growing under the tree and another lime tree previously failed close by.

3.2 The Site appeared to be moderately sheltered to the prevailing west south-westerly winds.

3.3 Soil type on-site has not been ascertained. The site appeared to be moderately sheltered to the prevailing south westerly winds.

3.4 It is my understanding that the tree is subject to a Tree Preservation Order – TPO-H38 (1957).

4.0 Condition of Tree

4.1 T1 is a large mature Small Leaved Lime (*Tilia cordata*) growing close to the main road along Avenue Road in St John's Road, London. The tree is multi-stemmed with three main stems which arise at approximately 2 metres from ground level. The unions between the stems appear to be included with no signs of instability, cracking, or decay. Prior to the survey a companion lime tree failed at the base and fell onto Avenue Road (May 2020), the cause of which was attributed to the presence of fungal decay in the main trunk (*Kretzschmaria deusta*). As the tree did not appear to exhibit any signs of this fungus prior to its failure, it was advised that T1 should be assessed for decay using a PiCUS tomograph and a Resistograph.

Photograph 1: T1 Lime with included union and reactive growth at base.

4.2 The lime tree appeared to have moderate vigour in the crown and no signs of fungal fruiting bodies or decay present at the base of the tree or within the crown. Furthermore, there was no evidence of the fungus *Kretzschmaria deusta* at the base

or on the main trunk of the tree. The lower and mid crown has been substantially crown raised (lower branches removed) up to approximately 9-10 metres from the ground level and the upper crown thinned.

Photograph 2: T1 Lime tree street view

4.3 The presence of the included unions and significantly crown raised canopy would most likely increase the risk of failure of the stems at the main unions. The presence of any decay in the main trunk would further increase the risk of the stems failing. The findings of the decay assessment are detailed in section 5.0 below.

4.4 The risk associated with unpredictable branch loss due to factors such as summer branch drop cannot be quantified. Should these trees lose additional, relatively healthy and structurally sound branches within the period covered by this report, I

advise that these trees would then require re-assessment as soon as possible after the event.

5.0 Decay Assessment Findings

5.1 The PiCUS Tomograph and the Resistograph (micro-drill) have been used in order to ascertain the level of decay within the main trunk up to approximately 0.1m from ground level on the tree. The readouts for both tests can be found in Appendix 3 of this report. The following details were observed when testing the trees:

Resistograph observations

- The first test was carried out at the base of the northern side of the main trunk. This test showed good resistance drilling through the tree until reaching 320-340 mm and 360-380 mm depth where the resistance drops rapidly. The drop in resistance may indicate the drill passing through an included union between stems or possible decay.

- The second test on the eastern side of the tree was drilled and showed a good resistance throughout the test to the full depth of 400 mm.

- The third drill test carried out on the southern side of the trunk indicated good resistance throughout the test with a slight drop in resistance at depths of 320 and 350 mm. This could be where the drill passed through an included union between the stems.

- The fourth test was carried out on the western side of the main trunk and showed good resistance throughout the test to the maximum depth of 400mm.

PiCUS Tomograph observations

- A PiCUS assessment was undertaken to ascertain the extent of decay in the main trunk and in order to assess the risk of failure from the base of the tree. The imagery (Appendix 2) indicates that at the point of the decay test there is approximately 97% of sound wood recorded. The PiCUS tomograph imagery showed no evidence of dysfunctional wood/decay with the trunk of the tree where the decay test was carried out. Areas on the tomograph showing up as green and pink colours and normally associated with dysfunctional wood or areas of decay are most likely attributed to included unions and deep inward buttresses.

6.0 Tree Risk Assessment

6.1 The Quantified Tree Risk Assessment (QTRA) system applies established and accepted risk management principles to tree safety management. Firstly, the targets (persons and property) upon which trees could fail are assessed and quantified, thus enabling tree managers to determine whether or not and to what degree of rigour a survey or inspection of the trees is required. Where necessary, the tree or branch is then considered in terms of both impact potential (size) and the probability of failure. Values derived from the assessment of these three components (target, impact potential and probability of failure) are combined to calculate the probability of significant harm occurring.

6.2 The system moves the management of tree safety away from labelling trees as either "safe" or "unsafe", thereby requiring definitive statements of tree safety from either tree surveyors or tree managers. Instead, QTRA quantifies the risk of significant harm from tree failure in a way which enables tree managers to balance safety with tree value and operate to a predetermined limit of reasonable or acceptable risk.The QTRA system also require an allocated target range; mapping of land use by road classification; estimated levels of pedestrian occupation; and estimated structure values. Whilst surveying I only saw a brief glimpse of site usage on the site and therefore, I advise that my target appraisal is considered against the knowledge of site managers or users.

6.3 The target ranges can vary from each site. The ones used during the risk assessment are as follows:

- Target 1: Estimated pedestrian usage 720-73 per hour; property repair or replacement cost £2 000 000 – £200 000 and/or 47000 – 4800 vehicles per day at 30 mph.

6.4 Should the client consider this estimate to be inaccurate he should report back to Dartforest Tree Works so that the risk assessment can be refined.

6.5 QTRA Advisory Thresholds

Thresholds	Description	Action
1/1 to 1/1000	**Unacceptable** Risks will not ordinarily be tolerated	• Control the risk
1/1000 to 1/ 10 000	**Unacceptable** (Where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Review the risk
1/ 10 000 to 1 000 000	**Tolerable** (Where imposed on others) Risks are tolerable if as low as reasonably possible (ALARP)	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at reasonable cost • Review the risk
1/ 1 000 000 or less	**Broadly Acceptable** Risk is already as low as reasonably possible (ALARP)	• No action currently required • Review the risk

Source: Quantified Tree Risk Assessment User Manual V5.1.3

6.6 The risk of harm from and has been calculated at 1/400 000 which is within the Tolerable threshold (Where imposed on others) Risks are tolerable if as low as reasonably possible (ALARP). At this risk level the owners of the tree should consider the costs required against the benefits of risk control.

7.0 Recommendations

Tree No.	Species	Observations	Recommendations	Work Priority
T1	Small Leaved Lime	• 3 stems arising at approximately 2 metres from ground level. • Included unions which appear to be stable with no signs of cracking. • Tall drawn up stems which have had previous pruning/ crown thinning and raising throughout. • Minor reduction to laterals branches growing towards property. • No signs of fungal fruiting bodies or decay at base. • Previous companion lime failed over main road. • PiCUS and Resistograph decay test carried out	• Reduce via thinning in height by approximately 2-3 metres by removing dominant leaders. • Install flexible bracing system (4 tonne) between main stems at a height of approximately 9-10 metres	**Medium - Works recommended within 6 months**

6.1 In the event of any new defects, concerns or the occurrence of seasonal fungal fruiting bodies on any of the trees with high targets, Dartforest Limited should be contacted as soon as possible in order to re-assess the tree/s and update this report.

6.2 All tree works should be undertaken to BS3998:2010 Recommendations for Tree Works. It is strongly recommended that any tree surgery works are undertaken by highly skilled and qualified contractors.

End AK/ 398/ 200122

8.0 Bibliography

British Standards Institution (2010) British Standard Recommendations for Tree Work -BS 3998:2010

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Lonsdale D. (1999) Principles of Tree Hazard Assessment and Management TSO

Matheny N. P. and Clark J. R. 1994 A photographic guide to the evaluation of hazard trees in urban areas, Second Ed. *International Society of Arboriculture*

Mattheck C. and Breloer H. 1994 The Body Language of Trees: A handbook for failure analysis *TSO*

Matteck C and Bethge K 1998 The Structural Optimization of Trees *Springer-Verlag, Naturwissenschaften*

Mitchell A (1974) Collins field GuideTrees of Britain and Northern Europe *Harper Collins Publishers*

QTRA Tree Safety Management (2014) Quantified Tree Risk Assessment User Manual Version 5

Schwarze F.W.M.R (2008) Diagnosis and Prognosis of the Development of Wood Decay in Urban Trees *ENSPEC*

Appendix 1: Individual Tree Risk Survey

APPENDIX 2: INDIVIDUAL TREE RISK SURVEY

Site:	71 Avenue Road, St John's Wood, London, NW8 6HP	**Surveyor:**	Aran Kimberlee
Client:	Mr Gareh	**Assessment Date:**	11th January 2022
Brief:	VTA Assessment of significant trees growing within the boundaries of the site listed above	**Viewing Conditions:**	Good
		Job Reference:	

Tree no.	Species	Age Range	Height (m)	Stem dia. (mm)	Vitality	Targets and Comments	Management	Target Range	Size Range	Prob Range	Risk Index	Inspection Frequency
T1	Small Leaved Lime	M	28	1140	M	• 3 stems arising at approximately 2 metres from ground level. • Included unions which appear to be stable with no signs of cracking. • Tall drawn up stems which have had previous pruning/ crown thinning and raising throughout. • Minor reduction to laterals branches growing towards property. • No signs of fungal fruiting bodies or decay at base. • Previous companion lime failed over main road. • PiCUS and Resistograph decay test carried out	• Reduce via thinning in height by approximately 2-3 metres by removing dominant leaders. • Install flexible bracing system (4 tonne) between main stems at a height of approximately 9-10 metres	1	1	6	400K	1

KEY-
HEADINGS & ABBREVIATIONS

REF:	TREE REFERENCE NO.
AGE RANGE:	Y= YOUNG, SM= SEMI MATURE, EM= EARLY MATURE, M = MATURE, PM = POST MATURE
STEM DIA:	STEM DIAMETER MEASURED AT A HEIGHT OF APPROXIMATELY 1.3 METRES
VITALITY:	A MEASURE OF PHYSIOLOGICAL CONDITION. G= GOOD, M= MODERATE, P= POOR, MD = MORIBUND, D= DEAD,
QTRA RISK RATING:	RISK OF SIGNIFICANT HARM , 1,000 = RISK INDEX (E.G. RISK INDEX 20 = RISK OF SIGNIFICANT HARM 1 IN 20,000)

INSPECTION FREQUENCY: PERIOD (IN YEARS) TO NEXT INSPECTION BY COMPETENT PERSON

Appendix 3: PiCUS and Resistograph Decay Test Results

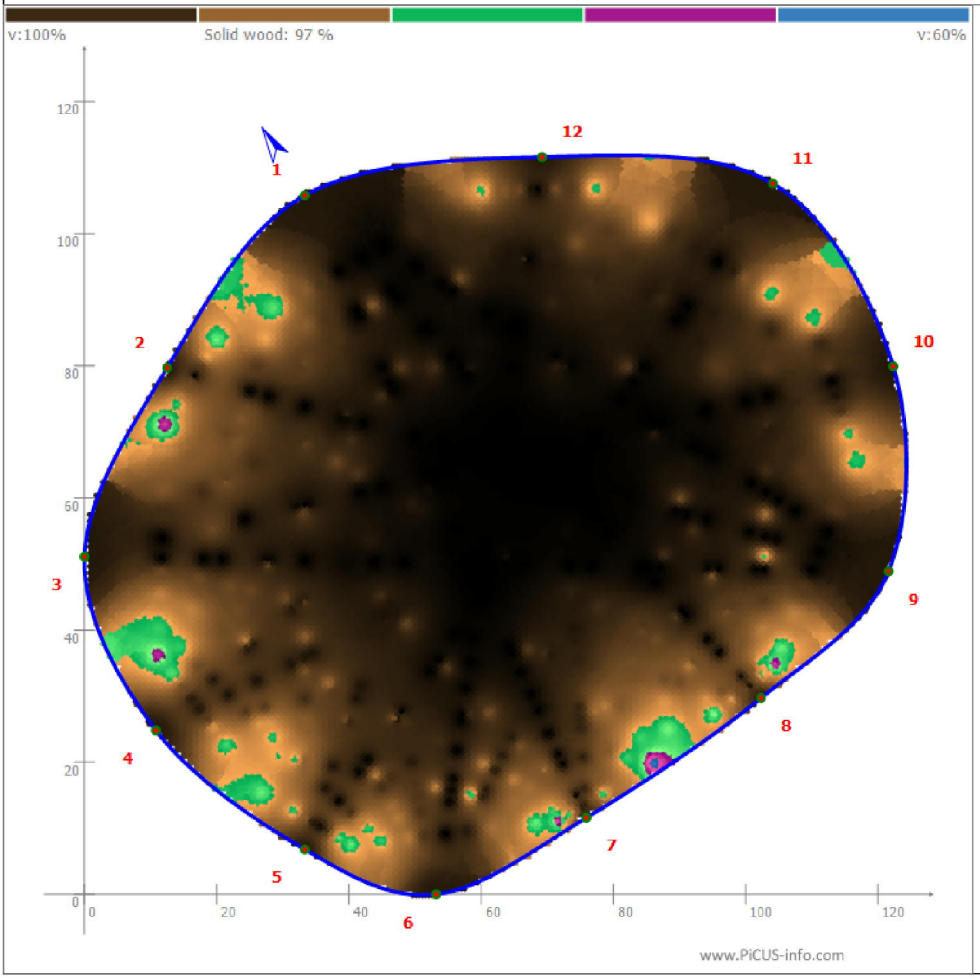
Picus:

Client:

Tree Expert:

[redacted]

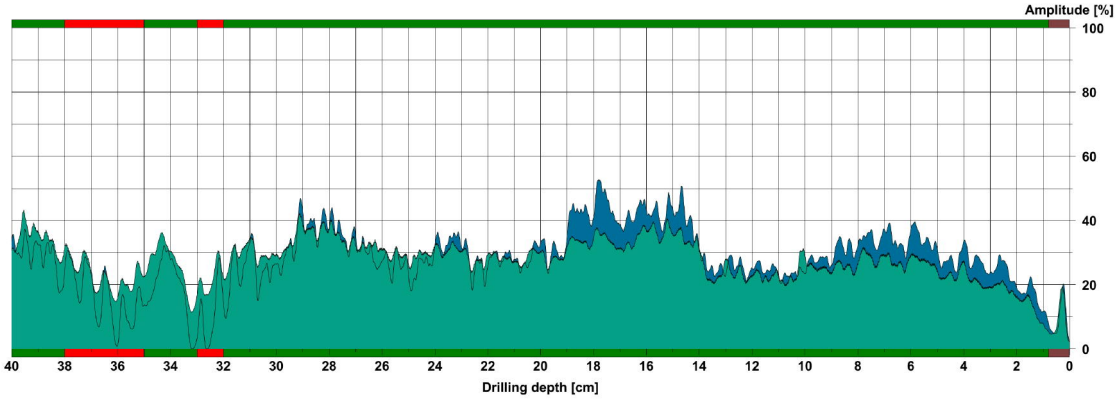
Tree species:		Tree height [m]:	25
Town:		North at measuring point:	1
Neighbourhood:		Crown spread [m]:	
Road:		Position of measuring point 1:	0
		Trunk circumference (130cm height)[cm]:	
Number of tree:	1	Tomography level at height [cm]:	50
Measure date:	1/11/2022 8:59 AM		



Comments:

Measuring / object data

Measurement no.	1	**Speed**	2500 r/min	**Diameter**	114,00 cm
ID number	T1 Small Leaf Lime	**Needle state**	---	**Level**	0.5m
Drilling depth	40,00 cm	**Tilt**	---	**Direction**	North
Date	11.01.2022	**Offset**	130 / 298	**Species**	Tilia cordata
Time	09:13:32	**Avg. curve**	off / off	**Location**	72 Avenue Road
Feed	200 cm/min			**Name**	Lime



Assessment

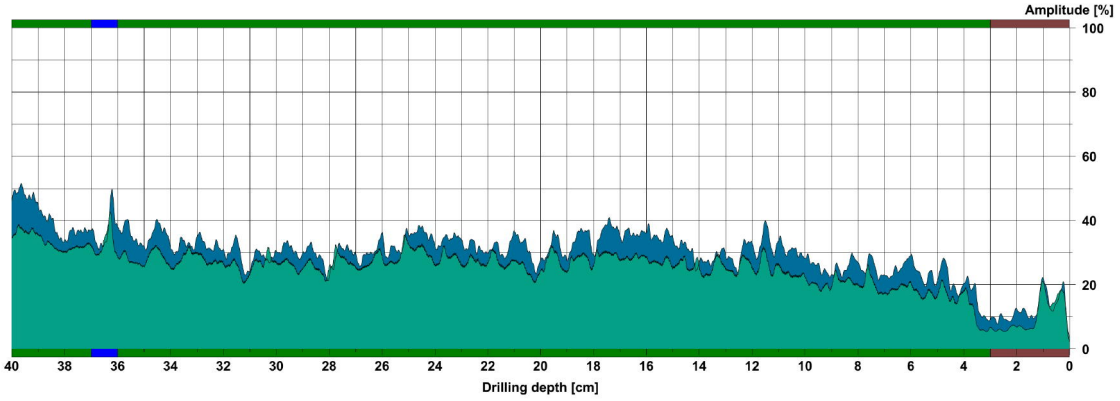
From	0,00 cm	to	0,80 cm	: Bark
From	0,80 cm	to	32,00 cm	: Sound wood
From	32,00 cm	to	33,00 cm	: Decay
From	33,00 cm	to	35,00 cm	: Sound wood
From	35,00 cm	to	38,00 cm	: Decay
From	38,00 cm	to	40,00 cm	: Sound wood

Comment

71 Avenue Road 0.5m N

Measuring / object data

Measurement no.	2	**Speed**	2500 r/min	**Diameter**	114,00 cm
ID number	T1 Small Leaf Lime	**Needle state**	---	**Level**	0.5 m
Drilling depth	40,00 cm	**Tilt**	---	**Direction**	East
Date	11.01.2022	**Offset**	117 / 336	**Species**	Tilia cordata
Time	09:15:47	**Avg. curve**	off / off	**Location**	72 Avenue Road
Feed	200 cm/min			**Name**	Small Leaf Lime



Assessment

From	0,00 cm	to	3,00 cm	: Bark
From	3,00 cm	to	36,00 cm	: Sound wood
From	36,00 cm	to	37,00 cm	: Reaction Wood
From	37,00 cm	to	40,00 cm	: Sound wood

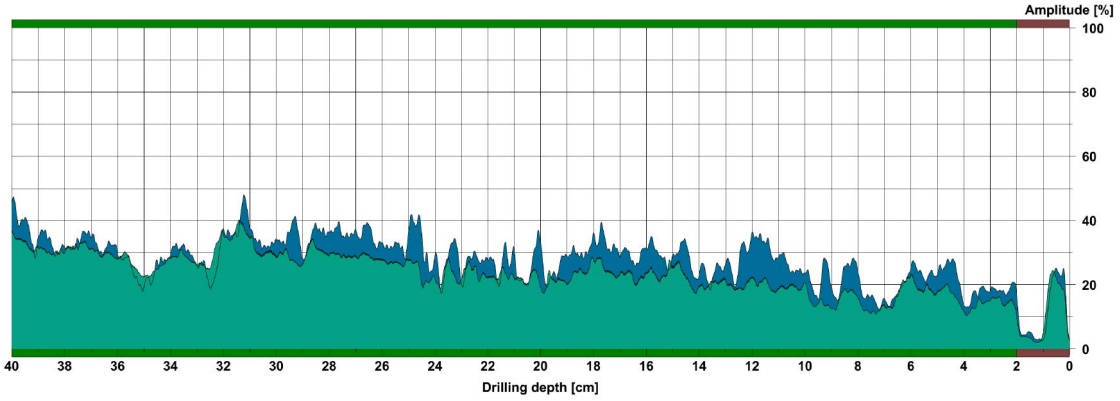
Comment

71 Avenue Road 0.5m E

East Resi test_LimeL230122.rgp

Measuring / object data

Measurement no.	3	**Speed**	2500 r/min	**Diameter**	114,00 cm
ID number	T1 Small Leaf Lime	**Needle state**	---	**Level**	0.5
Drilling depth	40,00 cm	**Tilt**	---	**Direction**	South
Date	11.01.2022	**Offset**	110 / 350	**Species**	Tilia cordata
Time	09:16:45	**Avg. curve**	off / off	**Location**	71 Avenue Road
Feed	200 cm/min			**Name**	Small Leaf Lime



Assessment

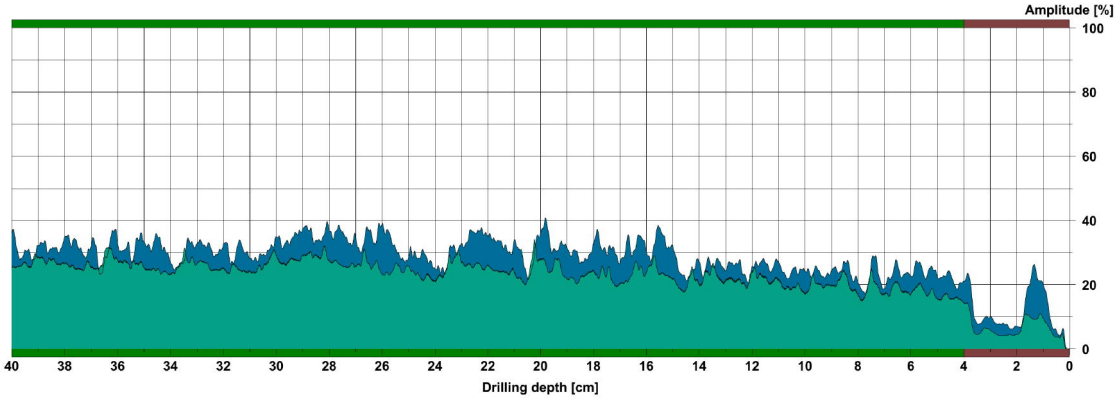
From	0,00 cm	**to**	2,00 cm	: Bark
From	2,00 cm	**to**	40,00 cm	: Sound wood

Comment

71 Avenue Road 0.5m S

Measuring / object data

Measurement no.	4	**Speed**	2500 r/min	**Diameter**	114,00 cm
ID number	T1 Small Leaf Lime	**Needle state**	---	**Level**	0.5 m
Drilling depth	40,00 cm	**Tilt**	---	**Direction**	West
Date	11.01.2022	**Offset**	103 / 289	**Species**	Tilia cordata
Time	09:17:54	**Avg. curve**	off / off	**Location**	71 Avenue Road
Feed	200 cm/min			**Name**	Small Leaf Lime



Assessment

From	0,00 cm	**to**	4,00 cm	: Bark
From	4,00 cm	**to**	40,00 cm	: Sound wood

Comment

71 Avenue Road 0.5m W