TIM MOYA ASSOCIATES

Decay Detection Investigation

PiCUS / RESI PD

Bedford Square
Fitzrovia
London
WC1B 3DR

April 2019

160523-DID-02

Project	160523-DID-02 – Bedford Estates
Report Type	Decay Detection Investigation
Checked by	Tim Moya
Date Checked	17/04/2019

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1 EXECUTIVE SUMMARY

1.1 The conclusion of this report is that some remedial tree works are required. Please see below and Appendix A for details.

2 INTRODUCTION

2.1 We received instructions from Bedford Estates Bloomsbury Ltd to attend site and inspect selected trees at Bedford Estates. Following the inspection we are instructed to prepare a report of our findings and make appropriate recommendations to manage the risks assessed.

2.2 We have previously surveyed the trees as part of a wider tree survey of Bedford Estates and the recommendations for detailed investigations arises from observations made during this survey.

2.3 The scope of this investigation is: to visually inspect[1] the identified trees from ground level and record relevant features; to inspect the trees' stems for decay using sonic tomography and/or a decay detecting drill (as considered appropriate); and to provide a report of our findings including recommendations for works where required and additional inspections where necessary. These decay detection methods are further explained at Appendix B of this report.

2.4 Trees are dynamic living organisms that change significantly over time. The observations and recommendations in this report can only be considered valid for a period of up to 2 years and all trees should be re-inspected within this time period or immediately following storm force winds which may increase the likelihood of structural failure.

2.5 All tree owners have legal duty of care regarding their trees under the Occupiers Liability Acts. Various guidance is available on how tree owners can meet their duty of care. A list of key guidance is attached at Appendix C.

1 - Matthek, Updated field guide to visual tree assessment, ISBN-13: 978-3923704590

3 TREE INSPECTION

Inspection details

3.1 My name is James Chambers; I am a principal arboricultural consultant dealing with trees in relation to all forms of human activity including built development. I have a National Diploma in Arboriculture, I am a LANTRA qualified professional tree inspector, a registered Quantified Tree Risk Assessment (QTRA) user, a Technician member of the Arboricultural Association, an Associate member of the Institute of Chartered Foresters and I have extensive experience as a local authority tree officer and consultant.

3.2 I inspected the trees as arranged with Bedford Estates Bloomsbury Ltd on 28th March 2019 and the findings of my investigation are set out below and in the attached appendices.

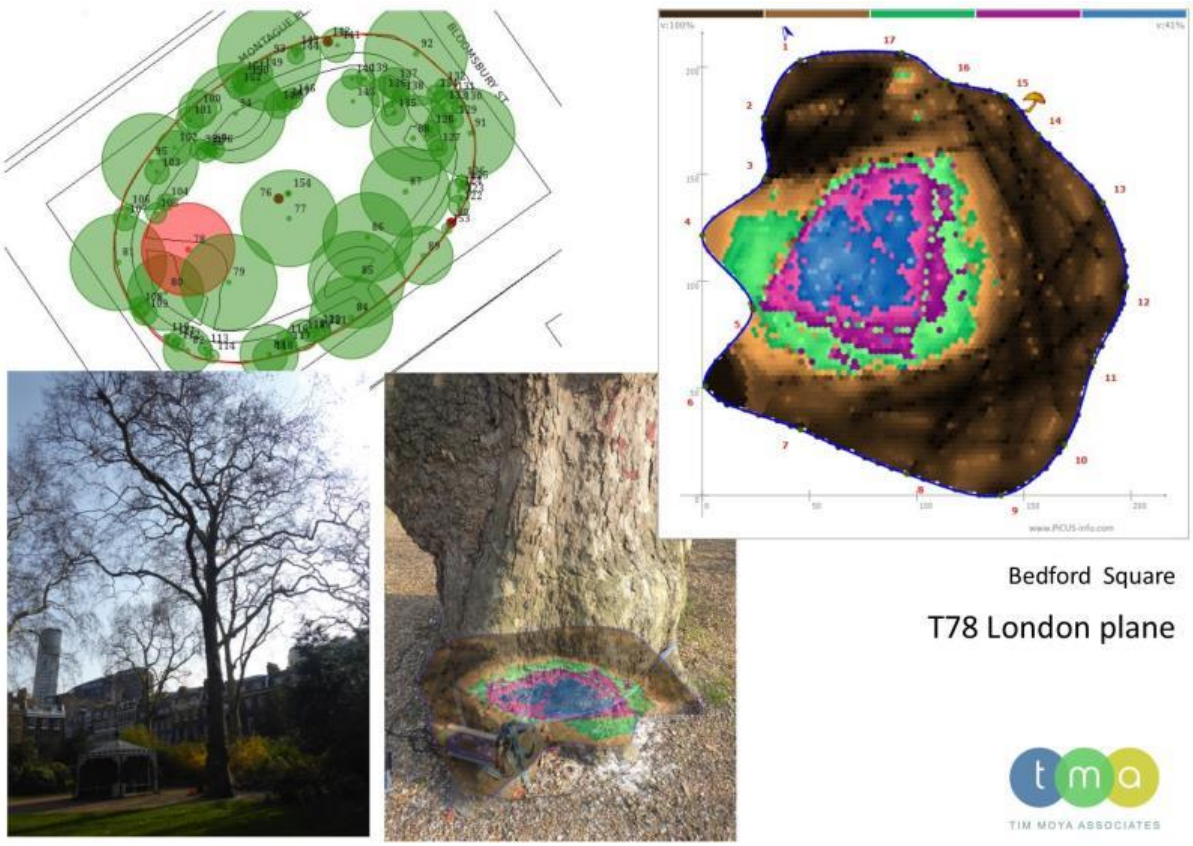
3.3 The details and condition notes for all the trees inspected are attached in the schedule at Appendix A. This schedule also contains recommendations for works and/or further inspections as appropriate. Where tree work recommendations have been made they have been given a time based priority and it is strongly recommended that these recommendations are carried out within the time limits stated.

3.4 As the trees are growing within a Conservation Area (CA), it is necessary to give notice to London Borough of Camden detailing the proposed works prior to any works being undertaken. Unauthorised work to protected trees could lead to prosecution, resulting in enforcement action such as fines or a criminal record.

Decay investigation

3.5 The trees are situated within a private garden above internal and public footpaths and within falling distance of seats and public highways.

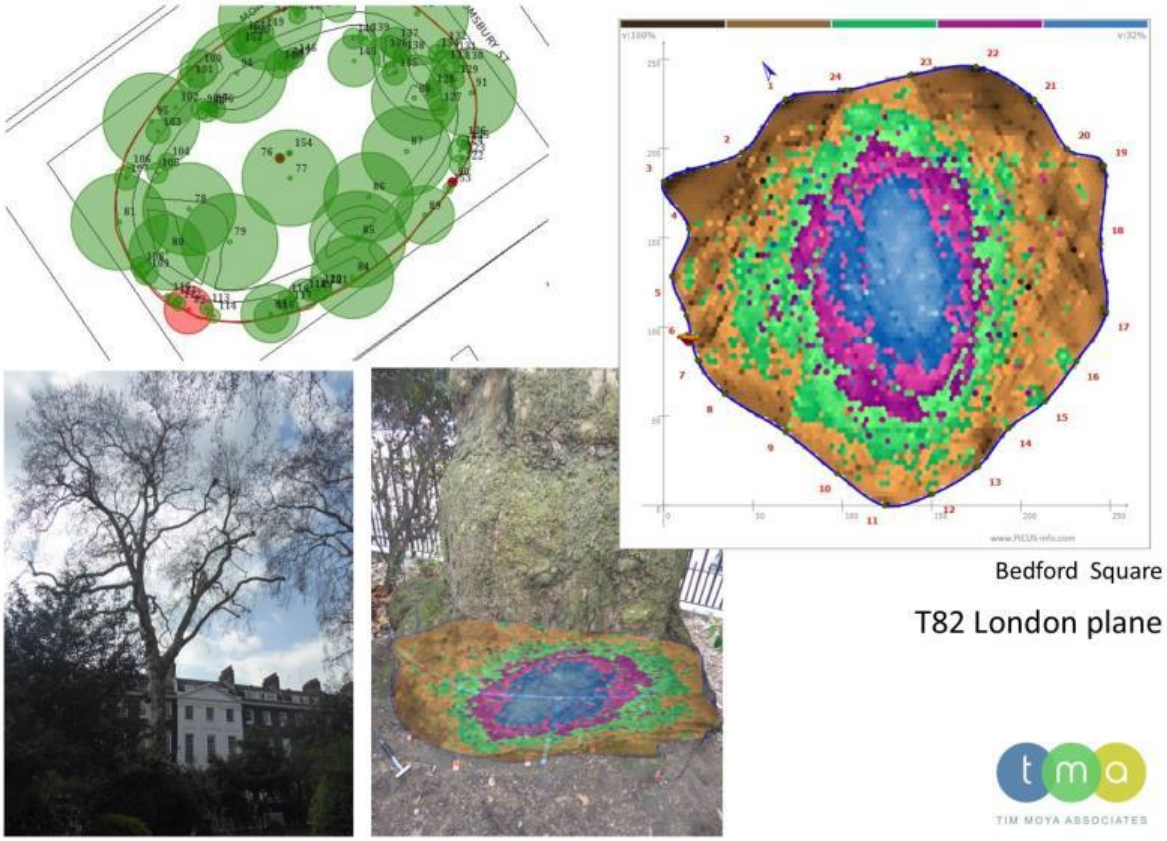
3.6 The trees are regularly inspected and maintained, and have undergone various pruning and crown reduction works in the past. Each of the tested trees was in fair physiological condition at the time of the inspection.



Bedford Square T78 decay detection: clockwise from the top left, map, tomogram, superimposed on tree, tree

3.7 The tomogram reveals a considerable area of decay (blue, pink) which is developing (green, yellow, light brown) with an acceptable proportion of sound wood (dark brown) remaining. *Meripilus giganteus* fungal fruiting bodies were identified earlier in the year. This species of fungus is known to affect the root plate of other tree species, however there is no information available regarding interactions between this fungus and tree species combination.

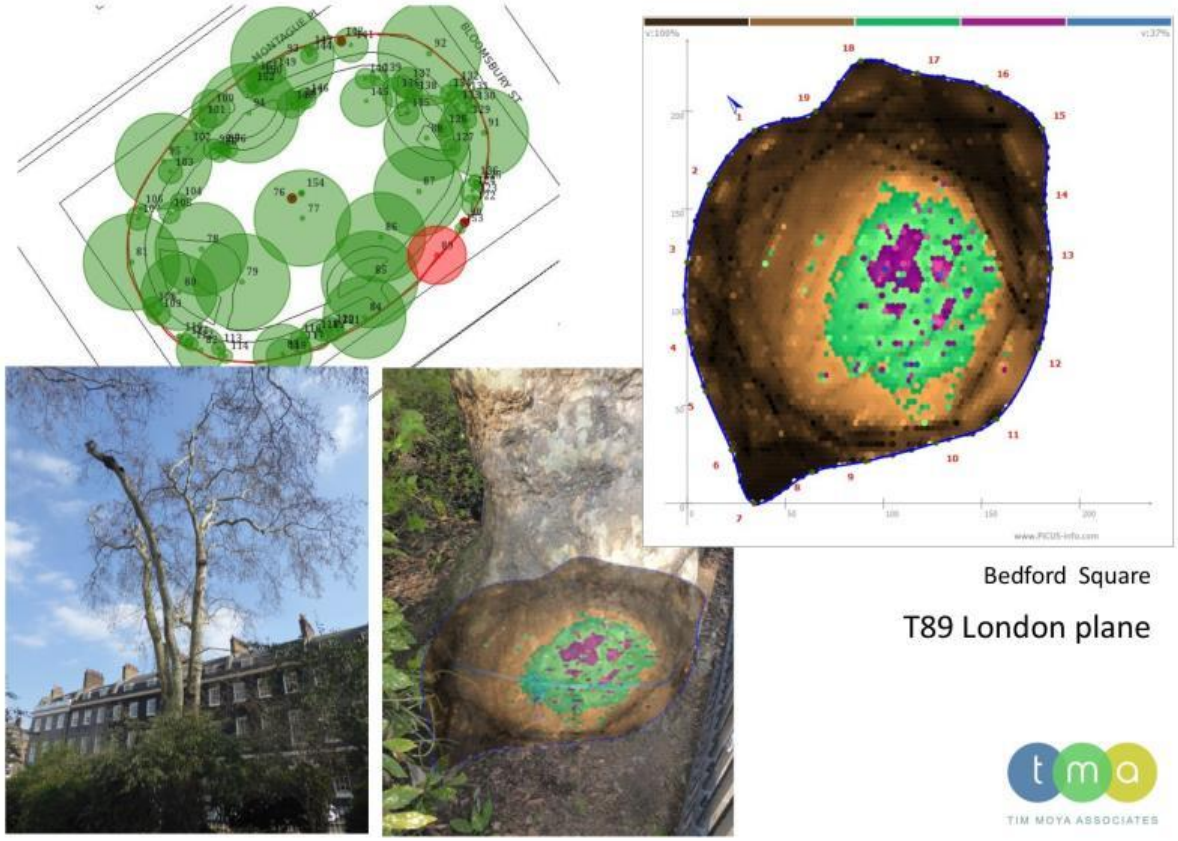
3.8 Crown reduction works are recommended as a precautionary measure to relieve wind loading in case of damage to the roots, and further decay detection testing will be necessary in the future, to monitor the development of decay and inform future management decisions (see Appendix A).



Bedford Square T82 decay detection: clockwise from the top left, map, tomogram, superimposed on tree, tree

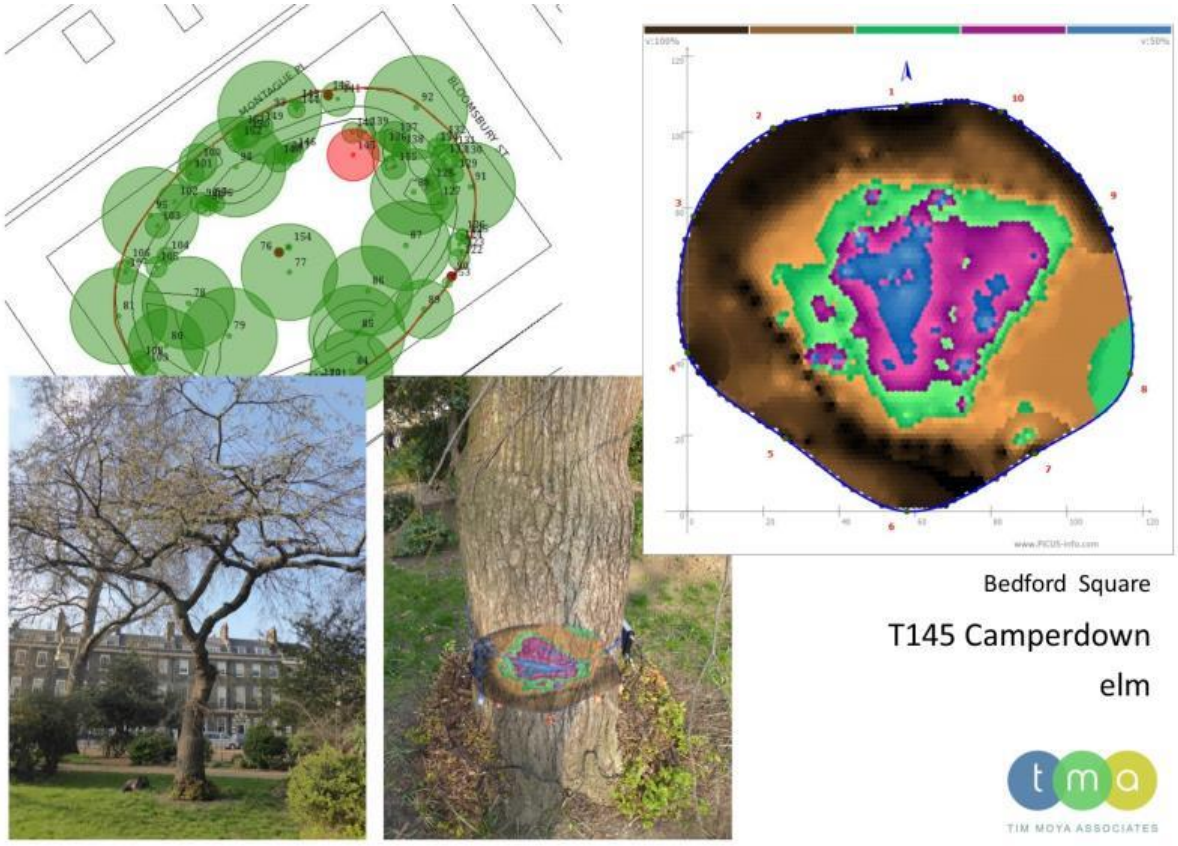
3.9 The tomogram reveals a large area of internal decay (blue, pink) which is developing (green, yellow, light brown) across the stem. A *Rigidoporus ulmarius* fungal fruiting body is present and shown by the icon between measuring points 6 and 7.

3.10 The crown of the tree has previously been reduced and the extent of decay observed does not currently present an unacceptable risk of tree failure. Additional crown reduction and future decay detection investigation are recommended (see Appendix A).



Bedford Square T89 decay detection: clockwise from the top left, map, tomogram, superimposed on tree, tree

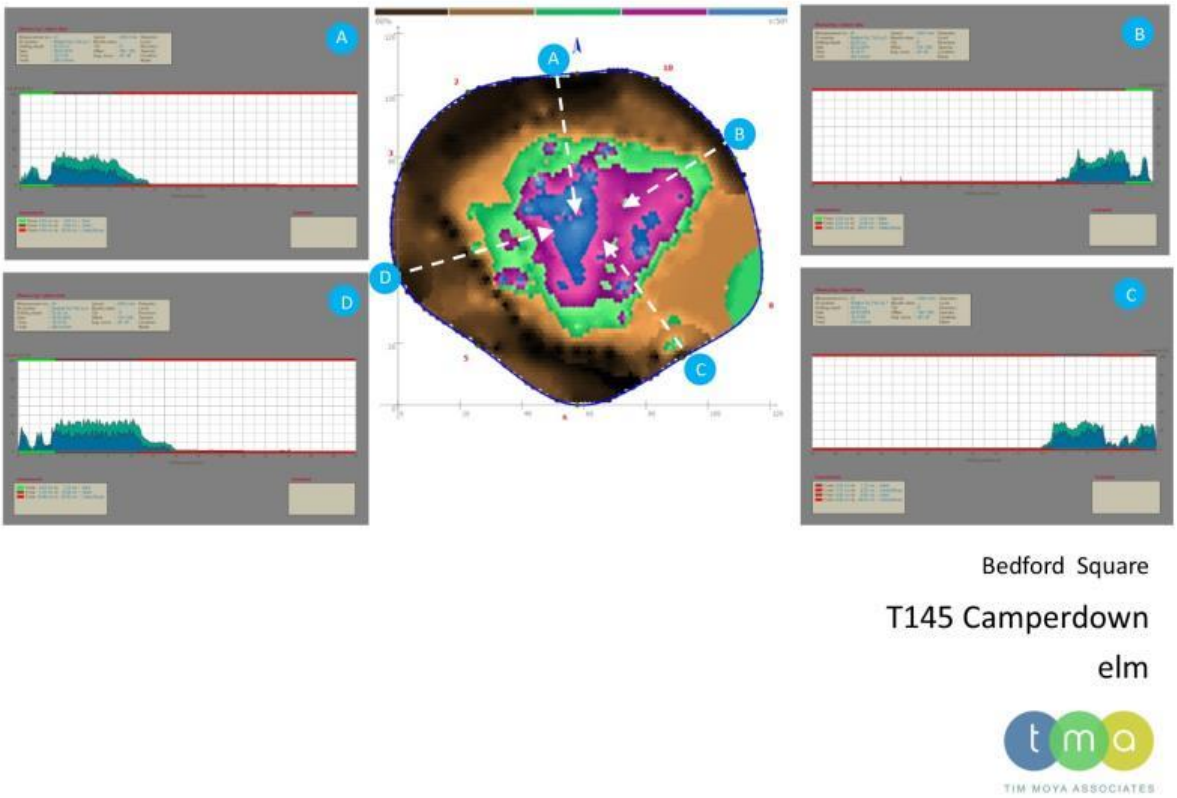
3.11 The tomogram reveals a small area of decay (pink) which is developing (green, yellow, light brown) and a large proportion of sound wood (dark brown) remaining. No causal agent was observed. Crown reduction work and future decay detection investigations are recommended (see Appendix A).



Bedford Square T145 decay detection: clockwise from the top left, map, tomogram, superimposed on tree, tree

3.12 The tomogram reveals a centralised area of decay (blue, pink) which is slowly developing (green, yellow, light brown) and a good proportion of sound wood (dark brown) remaining around the circumference. A *Rigidoporus ulmarius* fungal fruiting body and epicormic growth prevented PiCUS testing at ground level.

3.13 *Rigidoporus ulmarius* causes brown rot decay and can lead to tree failure, however this tree is growing in a sheltered position and crown reduction works have already been recommended to alleviate wind loading. The tree currently has an acceptable proportion of sound wood remaining around the circumference of the trunk, and the physiological condition of the tree does not indicate the presence of root decay.



RESI PD traces superimposed on the tomogram for reference: read left traces left to right, and right traces right to left

3.14 The RESI PD traces confirm the findings of the PiCUS tomogram. Additional testing to the east and west at ground level produced similar results. The tree is already due for crown reduction works, and further decay investigations are recommended to monitor the development of decay in the future. See Appendix A.

4 CONCLUSIONS

Further actions

4.1 The test results indicate that some remedial tree work is required to reduce the risk of tree failure to acceptable levels. Please see Appendix A for details. The trees should be re-inspected within 2 years or after storm force events which may weaken their condition.

5 APPENDICES CONTENTS

APPENDIX A

- Bedford Square works April 2019

APPENDIX B

- TMA decay detection appendix

APPENDIX C

- Duty of Care Guidance

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APPENDIX A

- Bedford Square works April 2019

Tree Schedule & work recommendations

Bedford Square

Tree / Group No.	No. of Trees	Species	Height (m)	DBH (cm)	Crown spread(m)	Tree type	Age Class	Physiological Condition	Structural Condition	Targets	Condition Notes / Recommendations	Re-inspection	Access for works	BS Category
T78	1	*Platanus x hispanica* London Plane	32.0	135	27.0	14	Mature	Fair	Fair	Footpath within crown spread. Building within crown spread. Seating area within crown spread.	Branch weight - Heavy. Bark wound - Minor. Decay / structural defect - Base. Foreign object. Lesion or fracture on limb / limbs - Minor. Physiological / cambial damage - Fungal. Pruning wounds - Historic. Reaction wood / Adaptive growth - Stem / stems. Decay- suspected Meripilus giganteus at base Reduce crown by - Specified extentheight and lateral branch length by up 3m, to relieve wind loading due to basal decay and establish smaller crown. All final cuts to be at suitable growth points. All work to be undertaken using hand saw WHICH MUST BE THOROUGHLY STERILISED after use and before use on another tree. Within 6 months Detailed investigation - Internal decay assessmentPiCUS and or RESI PD investigation at base to monitor development of decay and inform future management decisions Within 2 years	12	12	13
T82	1	*Platanus x hispanica* London Plane	20.0	125	14.0	7	Mature	Fair	Fair	Footpath within crown spread. Seating area within falling distance of tree.	Crown reduction - Recent. Decay / structural defect in crown limb / limbs - Localised. Decay / structural defect - Base. Epicormic growth - Base. Epicormic growth - Crown. Fungal fruiting body - structural decay suspected. Form - Small sail area / crown extent. Lesion or fracture on limb / limbs - Minor. Decay - Rigidoporus ulmarius brackets at the base on the south and south-west side. Reduce crown by - Specified extentreduce crown to epicormic shoots beyond previous reduction points to establish smaller crown continuing established management intentions of relieving loading on decayed base of tree. All work to be undertaken using hand saw WHICH MUST BE THOROUGHLY STERILISED after use and before use on another tree. Within 6 months Detailed investigation - Internal decay assessmentPiCUS and or RESI PD investigation at base (5cm) to monitor development of decay and inform future management decisions Within 2 years	6	6	7

Generated By MyTREES tree management software

Bedford Square

Tree / Group No.	No. of Trees	Species	Height (m)	DBH (cm)	Crown spread(m)	Tree type	Age Class	Physiological Condition	Structural Condition	Targets	Condition Notes / Recommendations	Re-inspection	Access for works	BS Category
T89	1	*Platanus x hispanica* London Plane	22.0	135	17.0	6	Mature	Fair	Poor	Footpath within crown spread. Seating area within crown spread. Road within falling distance of tree.	Access to inspect base - Restricted / obscured. Branch weight - Heavy. Crown reduction - Historic. Decay / structural defect - Base. Fungal fruiting body - structural decay suspected. Form - Small sail area / crown extent. Lesion or fracture on limb / limbs - Minor. Pruning wounds - Historic. Decay - Inonotus hispidus bracket on western leader Lichen at base to the south Reduce crown by - Specified extentheight and lateral branch length by up 3m, to relieve wind loading due to basal decay and establish smaller crown. All final cuts to be at suitable growth points. All work to be undertaken using hand saw WHICH MUST BE THOROUGHLY STERILISED after use and before use on another tree. Within 6 months Detailed investigation - Internal decay assessmentPiCUS and or RESI PD investigation at base to monitor development of decay and inform future management decisions Within 2 years	4	13	8
T145	1	*Ulmus glabra* *'Camperdownii'* Camperdown Elm	8.0	80	15.0	6	Late Mature	Fair	Poor	Footpath within falling distance of tree.	Coalesced decay seam - Suspected. Decline - Suspected. Decay / structural defect in crown limb / limbs - Localised. Deadwood - Minor. Decay / structural defect - Extensive. Decay / structural defect - Open cavity / cavities. Decay / structural defect - Bole. Epicormic growth - Base / bole / principal stems. Rigidoporus ulmarius bracket at base on north side of stem. Tap tests around base and stem indicate significant hollowing. Reduce crown by - Specified extentlateral branch length by 1-2m to suitable growth points to establish a smaller crown and minimise risk of branch or stem failure, leaving furnishing growth to minimise visual impact Within 1 year Detailed investigation - Internal decay assessmentPiCUS and RESI PD investigation at base and stem (55cm) to monitor development of decay and inform future management decisions Within 2 years	6	9	7

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APPENDIX B

- TMA decay detection appendix

PiCUS

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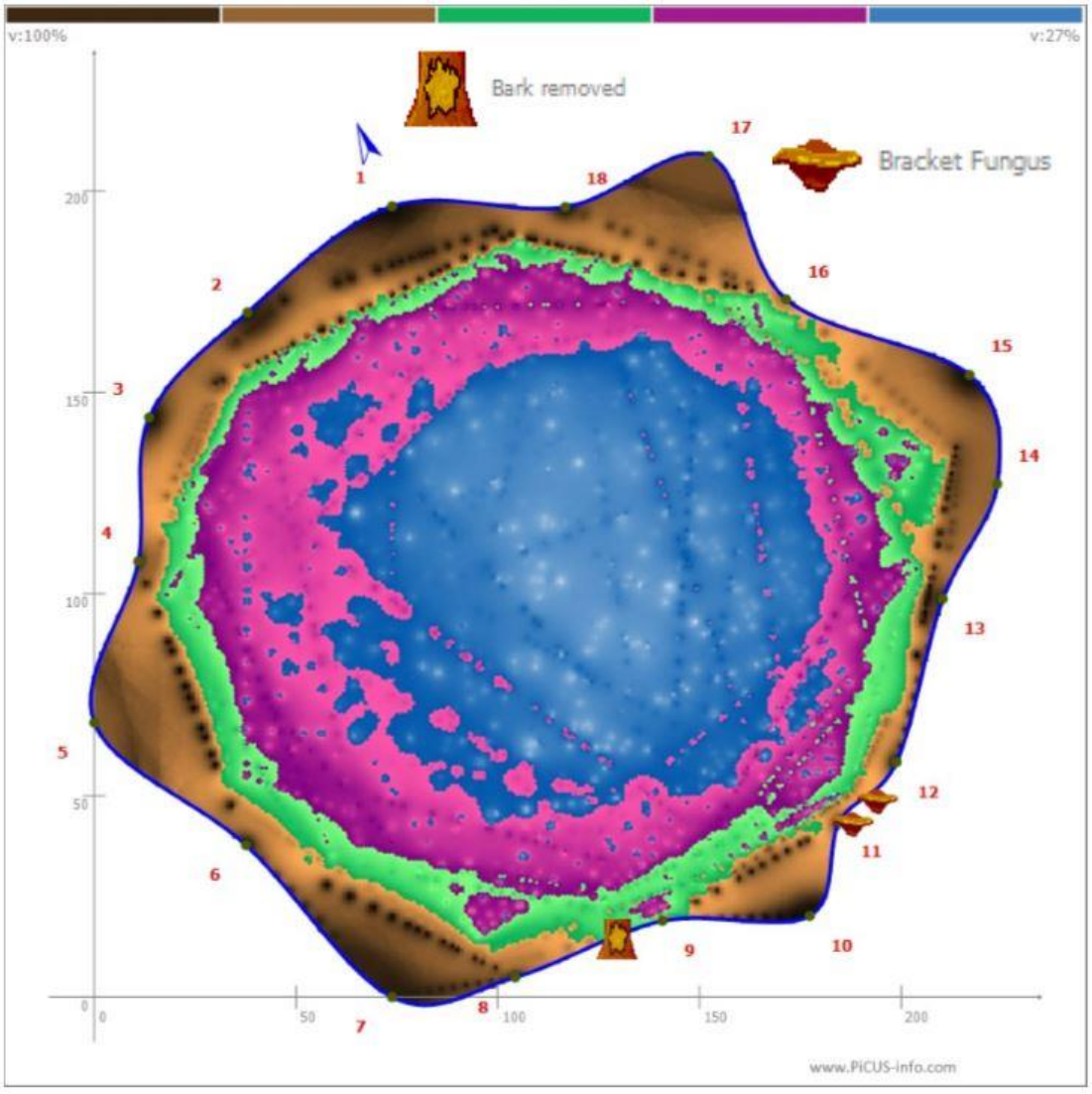
PiCUS investigations involve an assessment of the consistency of wood within a tree by passing sound waves through the trunk and measuring how long they take to reach sensors placed around the circumference. Sound travels relatively slowly through decayed wood.

The Tomogram includes a scale at the top showing;

HIGHERVELOCITYTOLOWERVELOCITY *indicating* **SOUNDWOODTODECAYEDWOOD**



The above tomogram shows extensive internal decay (blue, pink) which continues to develop across the stem (green, yellow/light brown) with some sound wood (dark brown) remaining around the circumference

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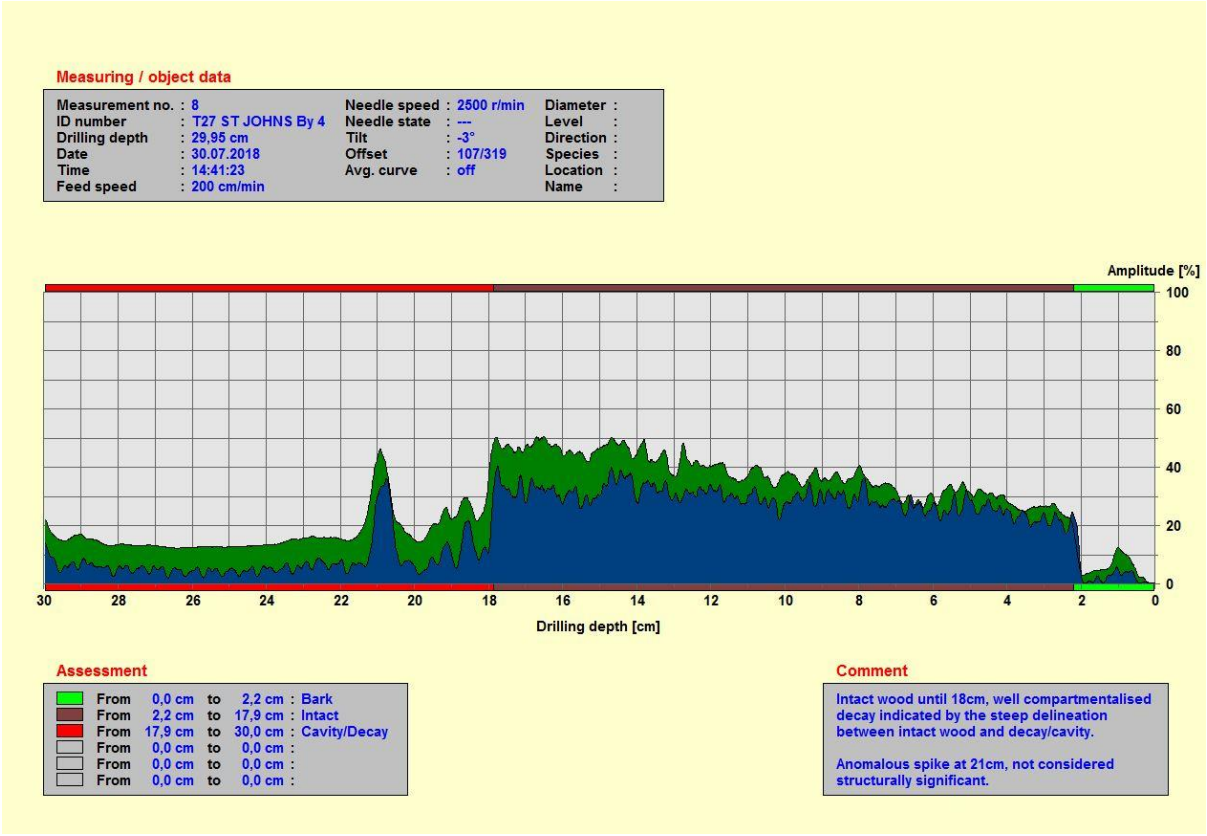
RESI PD

Resistograph testing involves measuring the levels of resistance to drilling by passing a very fine drill through the wood to determine its consistency. The results show high peaks and low peaks for relatively high and low resistance.
Decayed wood normally has lower resistance to drilling.



The above RESI PD trace (read from right to left) shows bark to 2cm, intact wood with high resistance until 18cm where resistance drops sharply, indicating well compartmentalised decay throughout the remainder of the trace

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APPENDIX C

- Duty of Care Guidance

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Meeting your duty of care - Guidance for tree owners

Please see below a selection of publicly available documents which offer guidance and information for tree owners regarding their legal duty of care as described in the Occupiers Liability Acts (1957 & 1984).

- Common sense risk management of trees – National Tree Safety Group
- Hazards from trees – Forestry Commission
- Veteran Trees: A guide to risk and responsibility (IN131) – Natural England
- Guide to Trees and the Law – Arboricultural Association
- Planning Policy Guidance – Tree Preservation Orders and trees in Conservation Areas

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