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Arboriculture Australia Consulting Arborist
Tree care and Consultancy

Advanced Level 3 Tree Risk Assessment
Botanical Observations, SoT, ERT & Confirmation Resistance Test Data Sheet

Prepared for;

Peak Arboriculture
3 Cutler Parade
North Ryde
NSW 2113

Reference;
30 Herbert Avenue
Newport
NSW 2106

November 2022

Introduction: This Scientific data sheet has been requested by Mr. David Peake – Peak Arboriculture.
Background: An ISA Tree Risk Assessment was requested by Mr. David Peake on the subject tree's visible defective tree parts.

Tree Genus Species: *Eucalyptus punctata*
Data Collection:
Advanced level 3 scientific decay analysis conducted from;

(i) 0.05m agl – Basal Stem Trunk Wound

Other specific tree date was recorded on Sonic PiCUS Tomography (SoT), Electric Resistance Tomography (ERT), IML PD500 Resistance test machine and a digital camera.

Documents Provided.
No documents were provided.

Site Visits: 22nd November 2022
Time: 8am – 10am
Weather condition: Fine
Present: Mr. Graham Brooks. Consulting Arborist. Mr. David Peake.
Analysis Conducted: Level 2 basic tree risk assessment.

(i) Escalated to advanced level 3 scientific decay analysis testing of; 0.05m agl – Basal Stem Trunk Wound, SoT, ERT and Confirmation Resistance Testing. Collection of data.

Photograph 1. Subject tree – Street View. Northern aspect.

Photograph Set 2. Visible Botanical Structural Defects – Bark Vascular Cambium Disease – Visibly identified as *Armillaria luteobubalina* – Australian Honey Fungus

Pathogenic disease indicator symptomatic of *Armillaria luteobubalina*

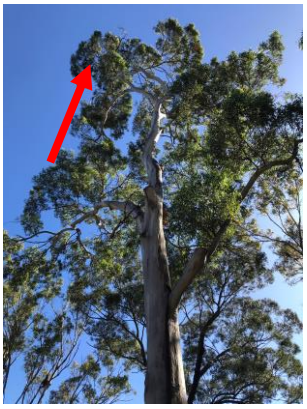
Armillaria luteobubalina – Pathogenic wood decay fungi (PWDF)

Area affected; Basal Stem and root System. Comment; Native pathogen. Very destructive pathogen.

Vascular cambium damage, discolouration and spread of *Armillaria luteobubalina* around structural stem circumference.

Stem circumference = 3.6m
Damaged bark vascular cambium tissue wound margin = 1.9m

Therefore 53% of stem circumference displays necrotic bark vascular cambium tissue.

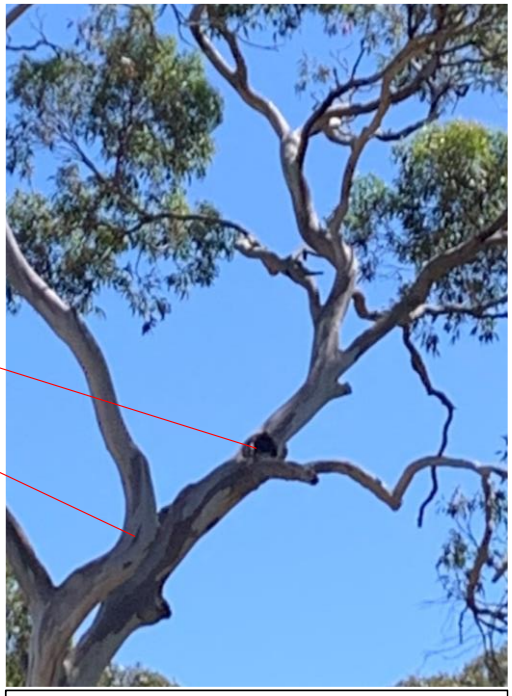


Canopy and Stem Loading = NE

Target = Residential Neighbouring Home

Likelihood of Failure = Probable
(ISA matrix 1) Likelihood matrix

Photograph 3. Visible Botanical Structural Defects – Upper Canopy Defects.

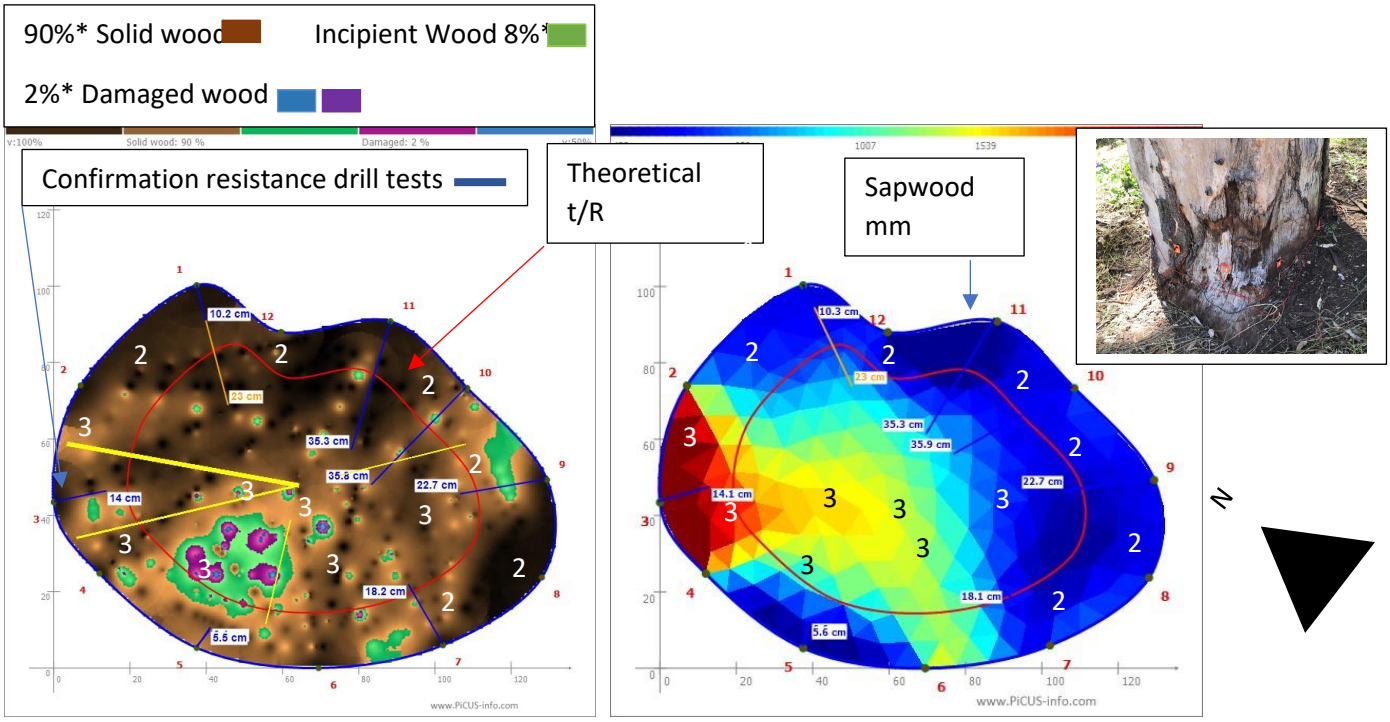


High canopy stress raiser and open decay cavity in 2nd order structural stem.

Decayed stub with epicormic growth and cambium wound in collar.

Photograph Set 4. Sonic SoT and ERT with Confirmation Resistance Test annotated into Tomograms.

Sonic PiCUS Tomograph – 0.05m agl **ERT- 0.05m agl**



ERT type 1 Decision Table

SoT – Sonic Velocity [m/s]	ERT Resistivity [Ω * m]	Wood status	# in Tomogram
High (brown)	High (red)	Sound wood, response growth	(1)
High (brown)	Low (blue)	Still safe, but early decay	(2)
Low (blue/purple)	High (red)	Cavity / crack / dead decay	(3)
Low (blue/purple)	Low (blue)	Decay	(4)

Interpretation of SoT, ERT and Confirmation Resistance Tests. Internal Cracks;

*The scientific data within the SoT as confirmed by confirmation resistance drill tests identify the tomography data as **inaccurate.** Lesser residual wall thickness and a greater volume of decay and incipient wood identified within structural basal stem (SoT) than actually displayed within tomography data. **Causation of minor anomaly** = Sound waves disrupted around circumference through denser response adaptive wood and not across the cross section. (Argus Scientist)

Spread of pathogenic wood decay fungi identified (incipient wood) large volume.

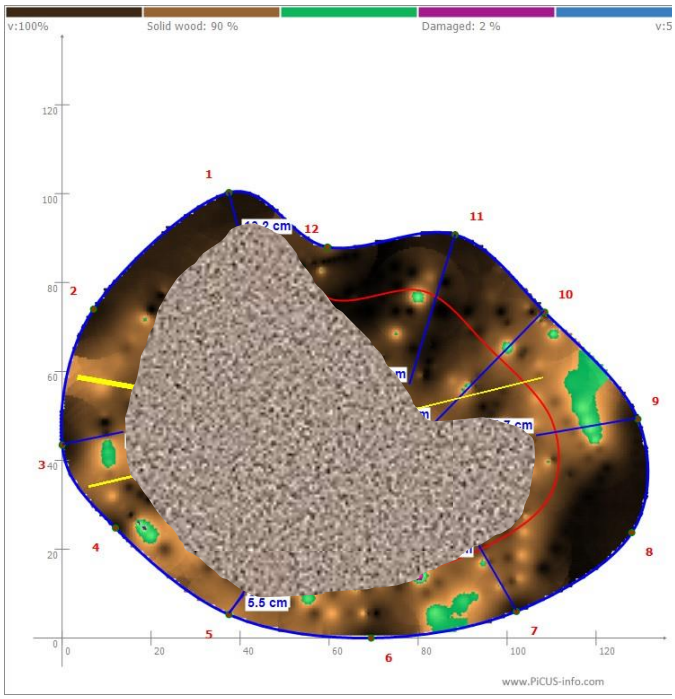
Longevity of subject tree = SHORT <7yrs

Recent or Planned Change in Load Factors = None Known

At the time of assessment; 'Likelihood of Failure' – Windthrow tree was categorised as **Probable**

(ISA Matrix 1. Likelihood matrix)

Photograph Set 5. Compromised Structural Stem



Actual decay volume within basal structural stem as confirmed by resistance testing with IML PD500 resistograph. (Decay, incipient & compromised wood)

Note: *Armillaria luteobubalina* – Pathogenic wood decay fungi (PWDF)

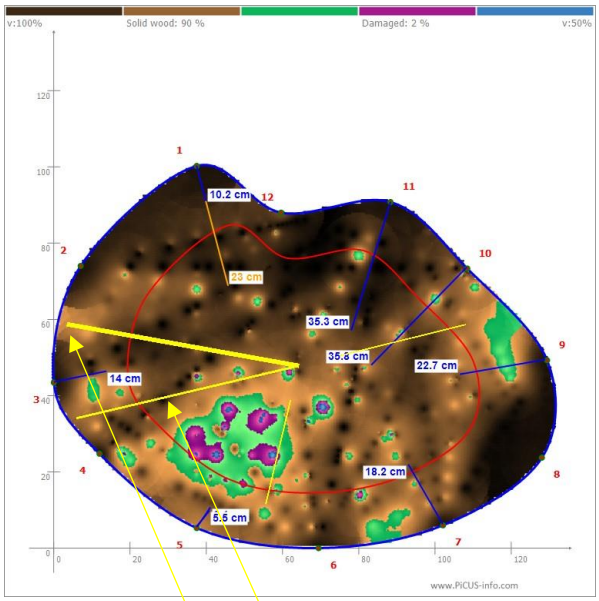
Area affected; Basal Stem and root System. Comment; Native pathogen. Very destructive pathogen.

Decay volume is greater within the root crown.

Likelihood of Failure = Probable
(ISA matrix 1) Likelihood matrix

Target = Neighbouring Residential Home

Risk Rating = High Risk



Yellow lines within tomograph identifies internal cracking which can be visibly seen externally between MP2 – MP3 and MP3 – MP4

Cracking is caused by stem segmentation (decay) and tortional forces upon structural stem

Recommendations:

- **Predominant Defective Tree Part =** Basal Structural Stem and Root Crown colonized with *Armillaria luteobubalina* = 26m Lever Arm (Windthrow)
- **Target =** Neighbouring Residential Property and Recreational areas.
- **Likelihood of Failure = Probable.**
- **Consequence = Severe**

Arboricultural Action

- Removal of HIGH RISK - Short longevity <7yrs subject tree
- Replacement Planting of 2 x Same Genus species trees.

Yours faithfully,

Arboricultural Tree Services Pty Ltd

Graham Brooks dip arb

Managing director

Arboriculture Australia Approved Consulting Arborist No: 1983

Member International Society of Arboriculture Mem No: 173140

ISA Tree Risk Assessment Qualified 2014-2024

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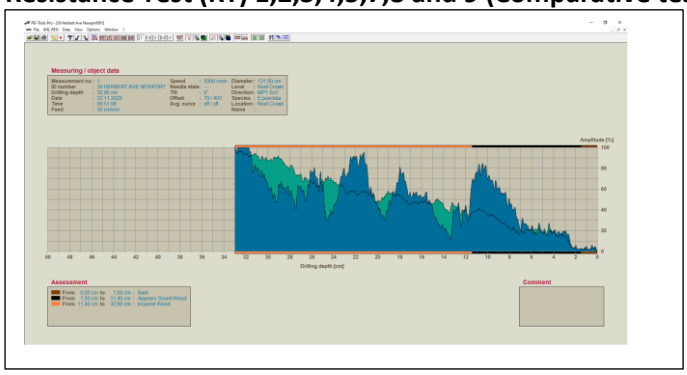
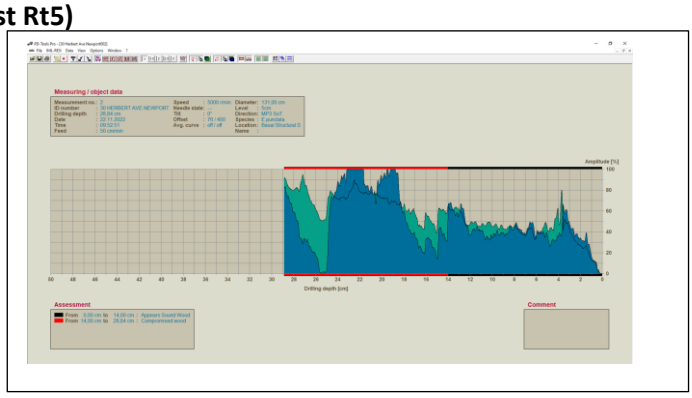
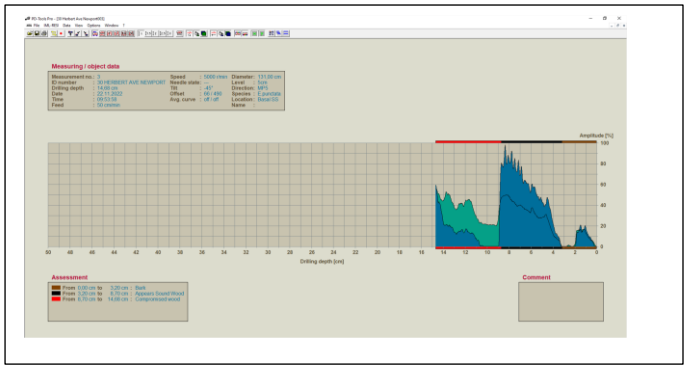
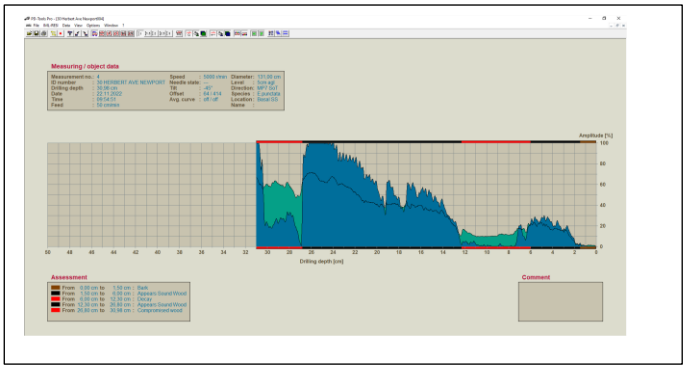
Appendix 1. Confirmation Resistance Tests.

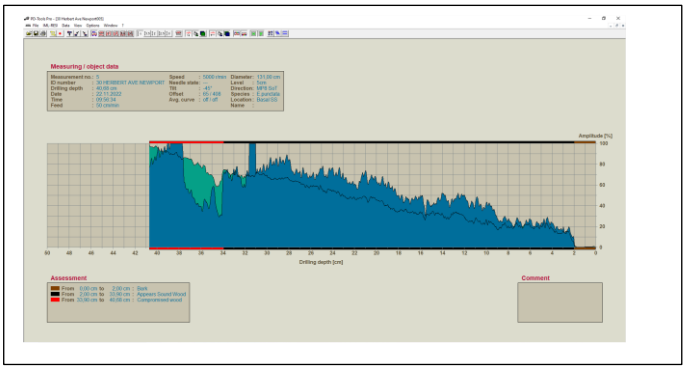
Resistance Test (RT) 1,2,3,4,5,7,8 and 9 (Comparative test Rt5)

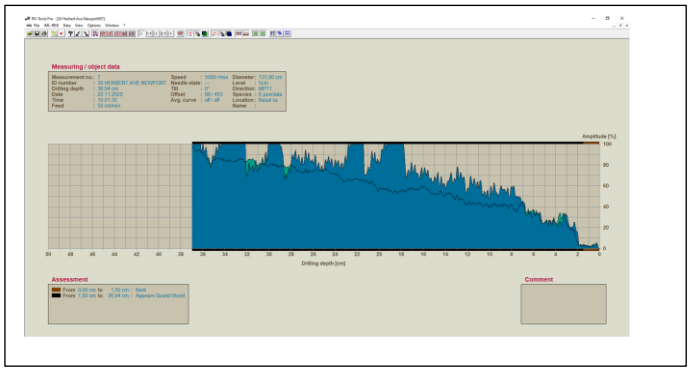


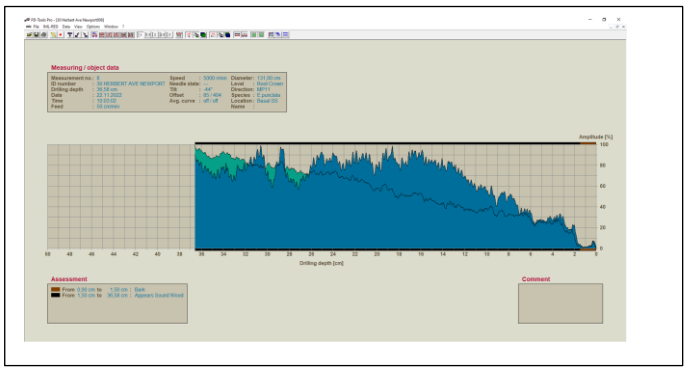


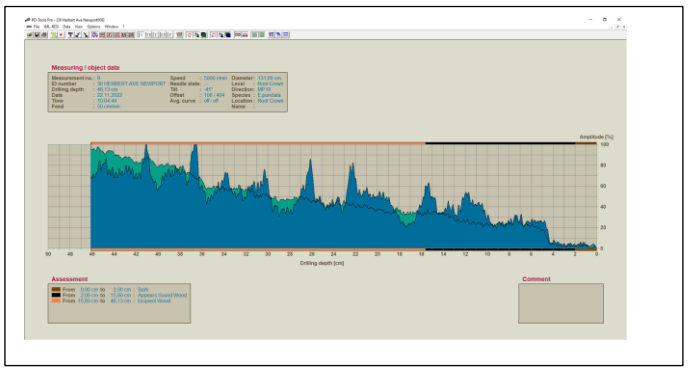












Basic Tree Risk Assessment Form

Client Peake Arboriculture Date 30/11/2022 Time 3.52pm

Address/Tree location 30 Herbert Avenue. Newport. NSW 2016 Tree no. _____ Sheet 1 of 1

Tree species Eucalyptus punctata dbh 86cm Height 26m Crown spread dia. N9S9E0W5

Assessor(s) Graham Brooks Senior Consulting Arborist ISA173140 Time frame <3yrs Tools used SH,SoT,ERT & IML PD500 Resistograph

Target Assessment

Target number	Target description	Target zone: Target within drip line	Target zone: Target within 1 x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1–rare 2–occasional 3–frequent 4–constant)	Practical to move target?	Restriction practical?
1	Neighbouring Residential Home		✔		4	N	N
2	Recreational Areas	✔			3	N	N
3	Residential Home - 30 Herbert Ave		✔		4	N	N
4							

Site Factors

History of failures Yes - 2nd order and 3rd branches **Topography** Flat☐ Slope▣ _____% **Aspect** N

Site changes None☐ Grade change■ Site clearing☐ Changed soil hydrology■ Root cuts☐ Describe Historic landscaping

Soil conditions Limited volume☐ Saturated☐ Shallow☐ Compacted☐ Pavement over roots☐ _____% Describe _____

Prevailing wind direction S **Common weather** Strong winds■ Ice☐ Snow☐ Heavy rain■ Describe _____

Tree Health and Species Profile

Vigor Low☐ Normal■ High☐ **Foliage** None (seasonal)☐ None (dead)☐ Normal 65% Chlorotic _____% Necrotic _____%

Pests Termites internally suspected + Armillaria Sp PWDF **Abiotic** Historic Landscaping

Species failure profile Branches☐ Trunk☐ Roots☐ Describe _____

Load Factors

Wind exposure Protected☐ Partial■ Full☐ Wind funneling☐ _____ **Relative crown size** Small☐ Medium☐ Large▣

Crown density Sparse☐ Normal■ Dense☐ **Interior branches** Few■ Normal■ Dense☐ **Vines/Mistletoe/Moss** ☐ _____

Recent or planned change in load factors Recent canopy Pruning - Altered wind damping effects

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown■ LCR 30%

Dead twigs/branches■ 5% overall Max. dia. 10cm

Broken/Hangers Number _____ Max. dia. _____

Over-extended branches☐

Pruning history

Crown cleaned■ Thinned■ Raised▣

Reduced☐ Topped☐ Lion-tailed☐

Flush cuts☐ Other _____

Cracks☐ _____ Lightning damage☐

Codominant■ _____ Included bark☐

Weak attachments☐ _____ Cavity/Nest hole x1% circ.

Previous branch failures■ _____ Similar branches present■

Dead/Missing bark☐ Cankers/Galls/Burls☐ Sapwood damage/decay☐

Conks☐ Heartwood decay■ Columnar decay

Response growth _____

Main concern(s) Branch Failures - Stress Raiser 2nd order structural branch. High Canopy

Load on defect N/A☐ Minor☐ Moderate☐ Significant■

Likelihood of failure Improbable☐ Possible☐ Probable■ Imminent☐

— Trunk —

Dead/Missing bark☐ Abnormal bark texture/color■

Codominant stems☐ Included bark☐ Cracks■

Sapwood damage/decay■ Cankers/Galls/Burls■ Sap ooze☐

Lightning damage☐ Heartwood decay■ Conks/Mushrooms☐

Cavity/Nest hole 53% circ. Depth _____ Poor taper☐

Lean _____° Corrected? _____

Response growth Fair - Poor

Main concern(s) Internal Decay - Armillaria sp. Pathogenic wood decay fungi (PWDF)

Load on defect N/A☐ Minor☐ Moderate☐ Significant☐

Likelihood of failure

Improbable☐ Possible☐ Probable■ Imminent☐

— Roots and Root Collar —

Collar buried/Not visible☐ Depth_____ Stem girdling☐

Dead☐ Decay■ Conks/Mushrooms☐

Ooze☐ Cavity☐ _____% circ.

Cracks■ Cut/Damaged roots☐ Distance from trunk _____

Root plate lifting☐ Soil weakness☐

Response growth Fair - Poor

Main concern(s) Root Crown Decay - Armillaria sp PWDF

Load on defect N/A☐ Minor☐ Moderate☐ Significant■

Likelihood of failure

Improbable☐ Possible☐ Probable■ Imminent☐

Risk Categorization

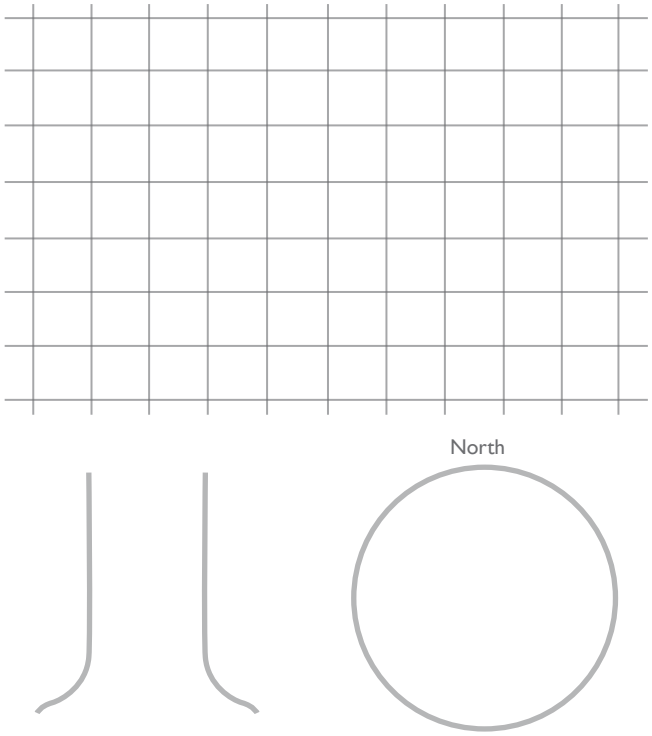
Condition number	Tree part	Conditions of concern	Part size	Fall distance	Target number	Target protection	Likelihood: Failure: Improbable	Likelihood: Failure: Possible	Likelihood: Failure: Probable	Likelihood: Failure: Imminent	Likelihood: Impact: Very low	Likelihood: Impact: Low	Likelihood: Impact: Medium	Likelihood: Impact: High	Likelihood: Failure & Impact (from Matrix 1): Unlikely	Likelihood: Failure & Impact (from Matrix 1): Somewhat	Likelihood: Failure & Impact (from Matrix 1): Likely	Likelihood: Failure & Impact (from Matrix 1): Very likely	Consequences: Negligible	Consequences: Minor	Consequences: Significant	Consequences: Severe	Risk rating of part (from Matrix 2)
1	Trunk - Basal Stem and Root Crown	Internal Decay - Armillaria sp	L	26m	1	Y			●					●			●			●			High
					2	N			●					●			●			●			High
					3	Y			●				●			●						●	Mod
2																							
3																							
4																							

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions 'Im my professional opinion the likelihood of the subject tree colonised with PWDF Armillaria sp. failing at the base - root crown (windthrow) within 3yrs and hitting the neighbouring residential home causing severe injury and or severe damage poses a HIGH RISK'

Mitigation options Removal of HIGH RISK short longevity tree **Residual risk** High

Residual risk _____

Residual risk _____

Residual risk _____

Overall tree risk rating Low ☐ Moderate ☐ High ☒ Extreme ☐ **Work priority** 1 ☒ 2 ☐ 3 ☐ 4 ☐

Overall residual risk Low ☐ Moderate ☐ High ☒ Extreme ☐ **Recommended inspection interval** NA

Data ☒ Final ☐ Preliminary **Advanced assessment needed** ☒ No ☐ Yes-Type/Reason _____

Inspection limitations ☒ None ☐ Visibility ☐ Access ☐ Vines ☐ Root collar buried Describe _____