MDJ ARBORICULTURAL CONSULTANCY LIMITED

Arboricultural ASSOCIATION
Professional Member

DECAY DETECTION REPORT

For three individual trees at Springfield Park, North Parade, Horsham

Prepared For:	Courtney Green Limited
Document reference:	MDJAC-24.001-DDR-01A
Date:	13 April 2024
Revision:	A – 14 June 2024
Author:	Matthew Jones BSc (Hons), MArborA

15 Windsor Close
Southwater
West Sussex
RH13 9XH

www.mdjac.co.uk | info@mdjac.co.uk

Company Registration No.
(England & Wales): 13900533

CONTENTS

EXECUTIVE SUMMARY 2
1 Introduction 3
1.1 Instruction 3
1.2 Terms of Reference (ToR) 3
1.3 Author 3
2 Methodology 4
2.1 Resistance drilling of trees 4
2.2 Summary of drilling assessments 6
Justification of chosen drilling sites 6
3 Results 7
3.1 Interpretation 7
3.2 Horse chestnut (T18) 7
3.3 Cedar of Lebanon (T27) 9
3.4 Horse chestnut (T46) 11
4 Discussion 11
4.1 Horse chestnut (T18) 11
4.2 Cedar of Lebanon (T27) 12
4.3 Horse chestnut (T46) 17
5 Conclusions and recommendations 18
5.1 Conclusions 18
6 Glossary of arboricultural terms 19
7 REFERENCES 19

© MDJ Arboricultural Consultancy Limited, 2024.

This document has been prepared for the sole use of Courtney Green Limited in accordance with the terms of our instruction. Views expressed or implied may not be relied upon by any third-party without the written consent of MDJ Arboricultural Consultancy Limited (MDJAC). The report remains the property of MDJAC and may not be redistributed in whole or in part, lent, hired or copied, without the written consent of MDJAC.

EXECUTIVE SUMMARY

S1. This Decay Detection Report (DDR) has been instructed by Courtney Green Limited, the Managing Agent of subject trees at Springfield Park, North Parade, Horsham.

S2. This report is intended to provide an internal assessment of the condition of the wood within the lower trunks and aerial sections of the three individual trees, using specialist decay detection equipment. The data collected is to inform new and updated management recommendations where necessary.

S3. I am in receipt of an electronic copy of The Horsham Urban District (Springfield Park) Tree Preservation Order 1956. This provides protection to one large group of trees along the eastern boundary of the site, including the individual trees discussed in this report. A statutory requirement to submit a TPO application prior to undertaking the works outlined below exists.

S4. Having assessed the resistance drilling data, I conclude that:

- The horse chestnut at the southern end of the site (T18) is of good health and does not comprise any significant areas of decay within the lower 1m of trunk, such that immediate management or intervention is required;
- The Cedar of Lebanon (T27) continues to demonstrate deterioration and an increase in the extent of decay within its trunk. The wind forces acting on this canopy can reasonably be assumed to increase following the removal of the adjacent horse chestnut, and this may increase the risk of branch or stem failure as a result. Accordingly, there is a need to carry out proactive and preventative pruning to the upper canopy to manage the risks. Illustrative examples of such pruning are provided in the discussion section; and
- Testing of the lower trunk of a second horse chestnut (T46), revealed no significant areas of underlying decay and therefore, continuation with its current management through cyclical pruning to maintain the current canopy dimensions is considered prudent.

Tree number	Species	Risk Assessment	Recommendations
T18	Horse chestnut	Acceptable	Continue with cyclical canopy management to ensure current canopy dimensions are not significantly exceeded
T27	Cedar of Lebanon	Not Tolerable	Carry out extensive weight reduction to upper canopy by reducing the height but up to 5m while maintaining the lower canopy in its current form, to minimise wind loading and biomechanical stresses.
T46	Horse chestnut	Acceptable	Continue with cyclical canopy management to ensure current canopy dimensions are not significantly exceeded

1 INTRODUCTION

1.1 INSTRUCTION

1.1.1 This Decay Detection Report (DDR) has been instructed by Courtney Green Limited, the Managing Agent of subject trees at Springfield Park, North Parade, Horsham.

1.1.2 My supplementary instruction is based on my own recommendations made following a tree risk assessment survey carried out in January 2024, where the subject trees were identified as requiring advanced assessment.

1.2 TERMS OF REFERENCE (TOR)

1.2.1 This report is intended to provide an internal assessment of the condition of the wood within the lower trunks and aerial sections of the three individual trees, using specialist decay detection equipment. The data collected is to inform new and updated management recommendations where necessary.

1.2.2 The agreed scope of work is outlined below:

1. To carry out an internal decay detection assessment of the three subject trees using a diagnostic resistance drill (IML Resi PD400);
2. To interpret the collected data in light of the previously identified structural defects contained within the VALID Tree Risk-Benefit Assessment carried out in January 2024; and
3. To produce this Decay Detection Report which outlines the data collected, discusses its relevance to tree stability and safety, and makes updated management recommendations where necessary.

1.3 AUTHOR

1.3.1 I am Matthew Jones BSc (Hons), MArborA, the Director and Principal Arboriculturist of MDJ Arboricultural Consultancy Limited.

1.3.2 I hold a Bachelor of Science Degree with Honours in Arboriculture and Urban Forestry, awarded by The University of Central Lancashire (UCLan) in 2022. This is a top up degree following successful completion of a Foundation Degree in Arboriculture, also awarded by UCLan in 2020. I have also completed the National Diploma (RQF Level 3) in Arboriculture and Forestry at Merrist Wood College, Guildford in 2009.

1.3.3 During the course of my career I have attended various CPD events and courses. I hold the Professional Tree Inspection accreditation awarded by LANTRA, and am a registered user of the VALID Tree Risk-Benefit Management and Assessment framework (a 'Validator'), and was previously a registered user of The International Society of Arboriculture (ISA) Tree Risk Assessment Qualification (TRAQ) methodology between 2016 and 2021.

1.3.4 I am a Professional Member of the Arboricultural Association (The AA) and an Associate Member of The Institute of Chartered Foresters (The ICF). I am therefore bound by the code of ethics and required to uphold the professional standards expected of both professional bodies.

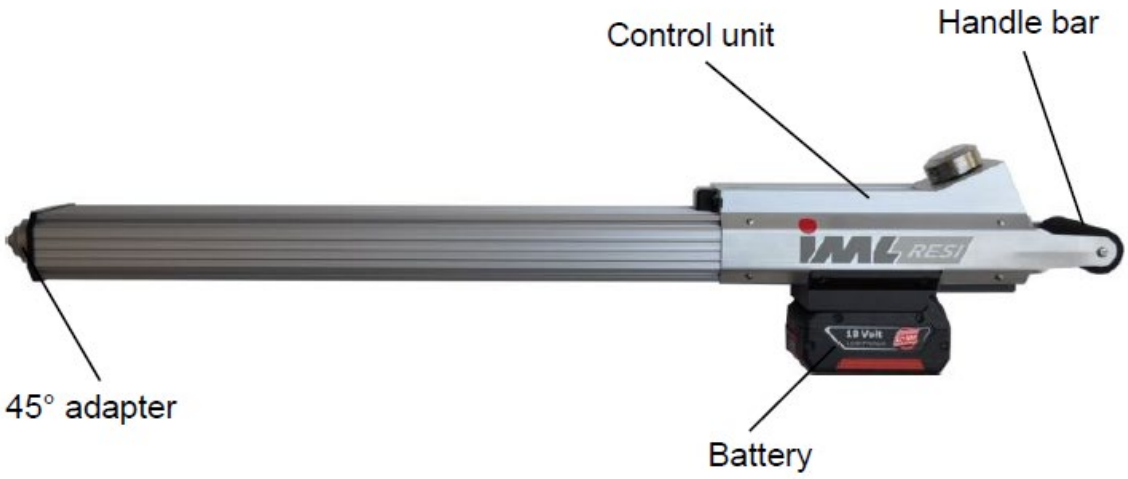
1.3.5 I am regularly instructed to carry out appraisals of various sizes of tree stocks in relation to development, health and safety considerations, and the potential impact of trees on the built environment; and I am required to provide considered tree management recommendations as necessary during the course of these instructions.

2 METHODOLOGY

2.1 RESISTANCE DRILLING OF TREES

2.1.1 To provide additional information on the internal condition of the trunk wood within the subject trees, an advanced assessment was undertaken using a resistance drill; the IML PD400 drill was used on this occasion.

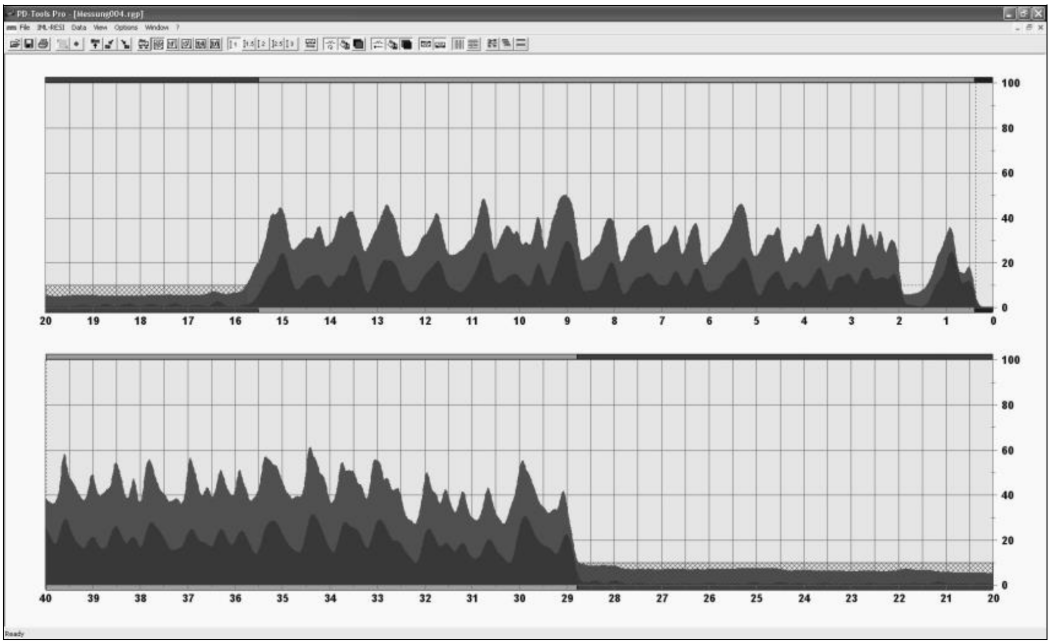
Figure 1: showing the IML PD400 drill (Instrumenta Mechanik Labor System GmbH (IML), 2023).



2.1.2 The resistance drill comprises a 400mm drilling 'bit' which is attached to an electronic unit that records, amongst other parameters, needle speed and needle resistance. The electronic unit produces a graphical representation of the data which is read from right to left; with the drilling depth (cm) noted along the X axis, and the amplitude (%) along the Y axis.

2.1.3 By analysing the data, it is possible to gain further insight into the internal condition of the wood, such as identification of areas of incipient or extensive decay which are depicted as a significant loss of resistance on the software-produced graphs. Such information might not necessarily be evident from a ground-based, visual-only inspection, but is beneficial when underlying decay is suspected.

Figure 2: example graph of a completed measurement (Instrumenta Mechanik Labor System GmbH (IML), 2023).



2.1.4 To provide an overall view of the tree at any one height, it is good practice to carry out at least four readings at the cardinal points. As the drill bit is 400mm long, this approach enables a complete cross-section assessment of trees with a diameter at inspection point of 800mm, and provides a partial assessment of trees with larger diameters at the inspection point(s).

2.1.5 Due to the logistical restriction of carrying out such assessment at height for the cedar (T27), and the initial findings of the readings carried out, a bespoke arrangement of readings was undertaken, as explained later in this report.

2.2 SUMMARY OF DRILLING ASSESSMENTS

2.2.1 The table below shows the number and height of all inspection points for the subject trees.

Table 1: summary of inspection points.

Tree ref.	Species	Measurement No.	Height [mm/m above ground level]	Orientation
T18	Horse chestnut	10	100mm	North - South
		11	100mm	East - West
		12	100mm	South - North
		13	100mm	West - East
		14	500mm	North - South
		15	1m	North- South
T27	Cedar of Lebanon	3	12m – within open cavity	East - West
		4	12m – wound wood above cavity	East - West
		5	12m – within open cavity	East - West
		6	12m – opposite cavity	West - East
		7	11.5m – opposite cavity	West - East
		8	4.5m	West - East
T46	Horse chestnut	17	200mm	North- south
		18	200mm	East - west
		19	200mm	South - north
		20	200mm	West - east

Justification of chosen drilling sites

Horse chestnut (T18)

2.2.2 During the previous tree risk assessment undertaken in January 2024, I noted a proliferation of fungal fruiting bodies to the north and north-east of the tree's base, which appeared to radiate out from the base of the tree. Unfortunately, due to a combination of the timing of my visit and the recent heavy rainfall, many of the individual fruiting bodies were found to be of significantly deteriorated quality, such that accurate identification was not possible.

2.2.3 For various reasons noted in my previous report, I suggested that an internal decay assessment would be prudent, to quantify the extent of any decay present which may have been a result of colonisation by wood decay fungi. Accordingly, the four standard inspections around the base were undertaken at 100mm above ground level, and these were supplemented by two further assessments on the north aspect.

Cedar of Lebanon (T27)

2.2.4 This tree has been the subject of intensive arboricultural management for the past 5-10 years, owing to its size, prominence within the local landscape, and its numerous structural defects. The most recent detailed assessment of problematic aerial cavities using a resistance drill were undertaken in 2020 and this confirmed that while the wood surrounding the large wound was broadly sound, the internal cavity may pose a risk to the trees structural integrity in the future and thus, repeat inspections of a similar nature should be carried.

2.2.5 The chosen drilling sites aim to provide a like-for-like comparison with those produced in 2020, and to provide additional information on the surrounding trunk wood.

Horse chestnut (T46)

2.2.6 During my inspection in January 2024, I noted the presence of abnormal swelling around the buttress roots on the east side of the canopy, which can be indicative of underlying decay. Given the tree's prominence in the landscape, and its proximity to the busy North Parade highway, further assessment was considered necessary.

2.2.7 Accordingly, four drilling assessments were carried out in the cardinal directions at 200mm above ground level.

3 RESULTS

3.1 INTERPRETATION

3.1.1 The graphical results from the IML PD400 drill's electronic unit are presented below on a tree-by-tree basis below. Graphs should be read from right to left. Coloured bars are included above and below each reading to indicate the condition of the wood. The colours represent:

- Cyan – Bark
- Green – Sound wood
- Orange – Degraded wood
- Red – Internal hollow/cavitation

3.2 HORSE CHESTNUT (T18)

Figure 3: showing the results of measurement 10, from north to south at 100mm.

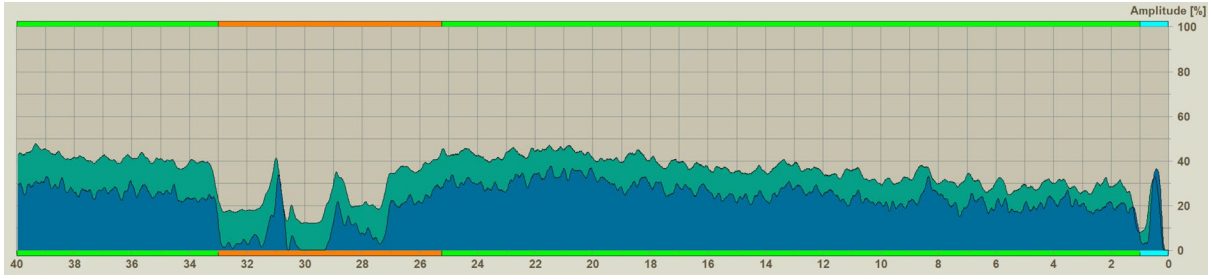


Figure 4: showing the result of measurement 11, from east to west at 100mm.

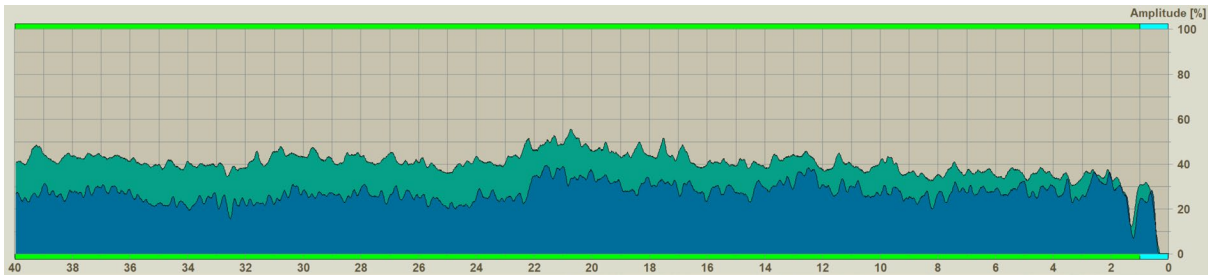


Figure 5: showing the result of measurement 12, from south to north at 100mm.

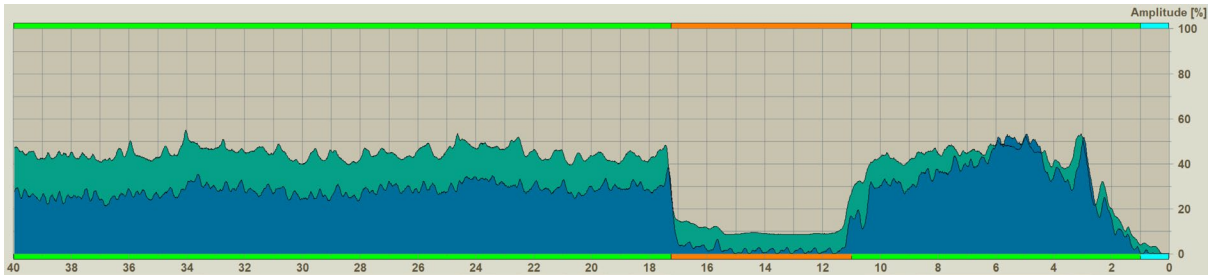


Figure 6: showing the result of measurement 13, from west to east at 100mm.

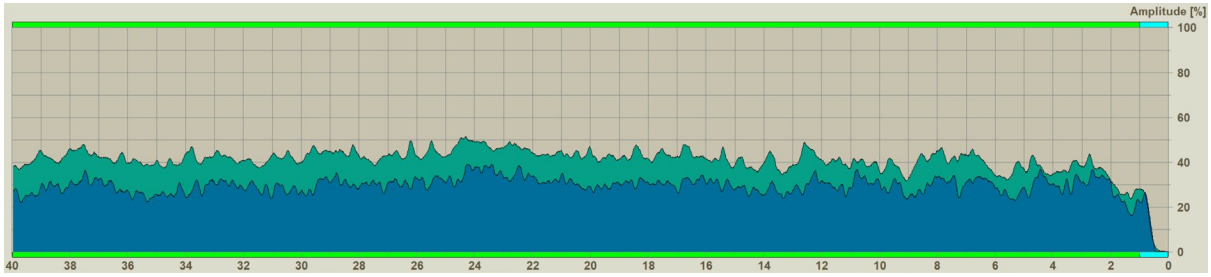


Figure 7: showing the result of measurement 14, from north to south at 500mm.

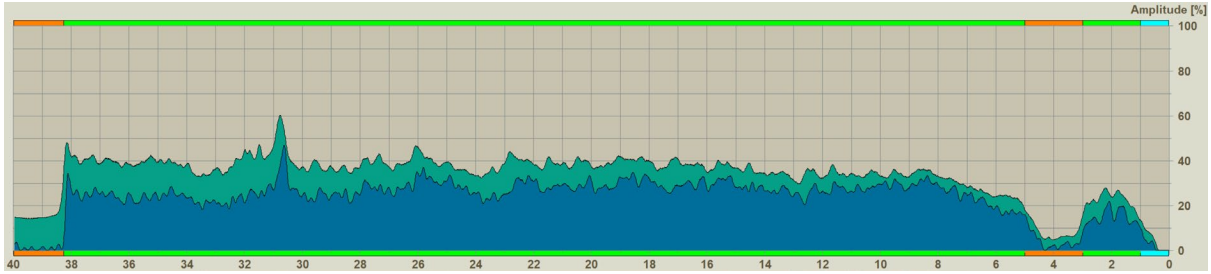
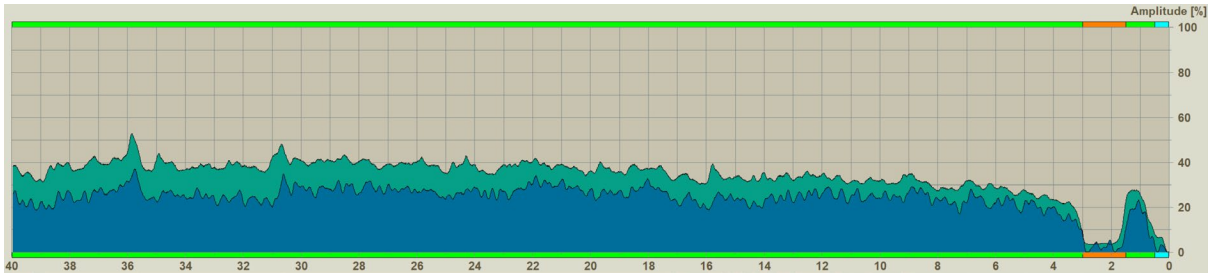


Figure 8: showing the result of measurement 15, from north to south at 1m.



3.3 CEDAR OF LEBANON (T27)

Figure 9: showing the results of measurement 3, from east to west at 12m.

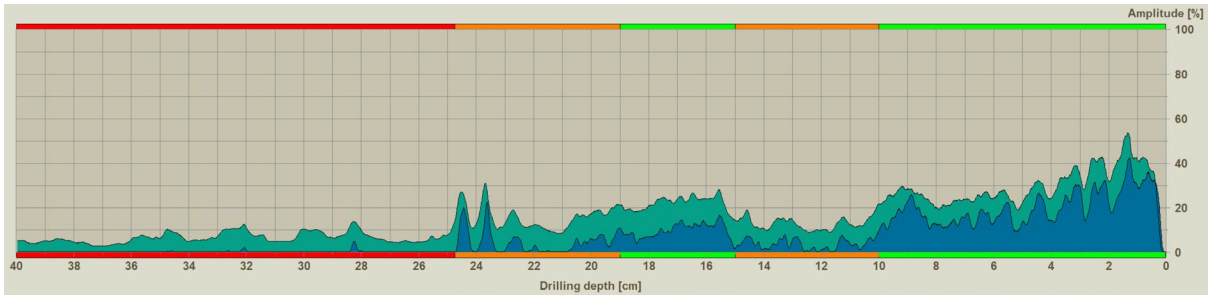


Figure 10: showing the result of measurement 4, from east to west at 12m.

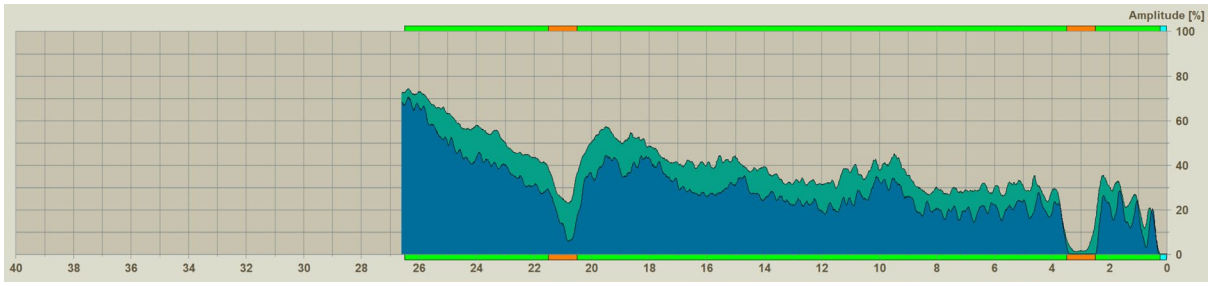


Figure 11: showing the result of measurement 5, from east to west at 12m.

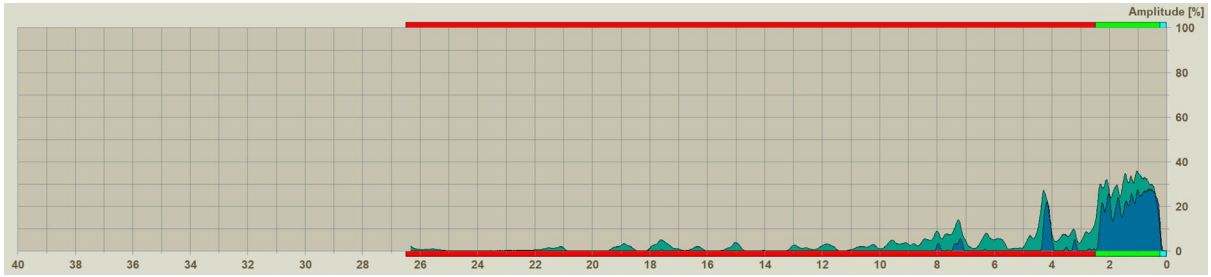


Figure 12: showing measurement 6, from west to east at 12m, opposite the cavity.

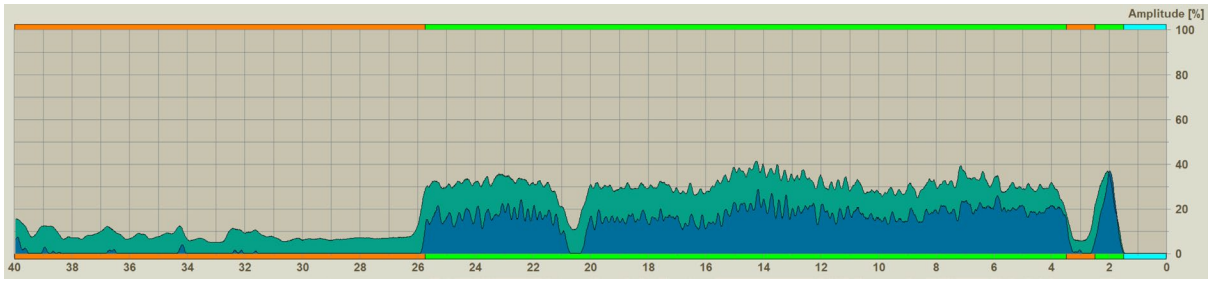


Figure 13: showing measurement 7, from west to east at 11.5m, opposite the centre of the cavity.

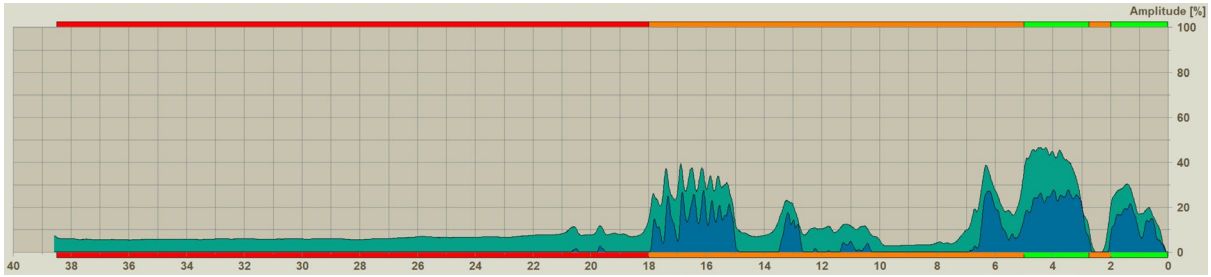
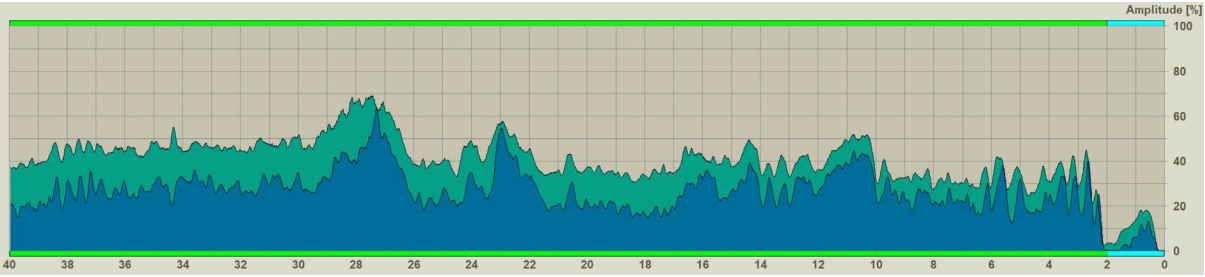


Figure 14: showing measurement 8, from west to east on the main stem adjacent to cavity in low branch on west side.



3.4 HORSE CHESTNUT (T46)

Figure 15: showing the results of measurement 17, from north to south at 200mm.

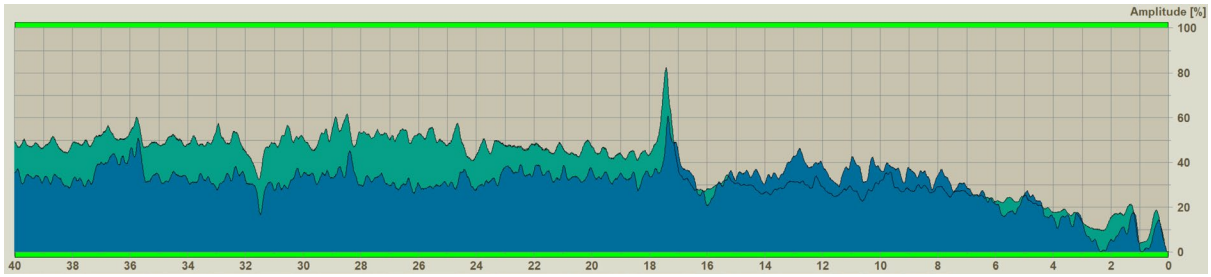


Figure 16: showing the results of measurement 18, from east to west at 200mm.

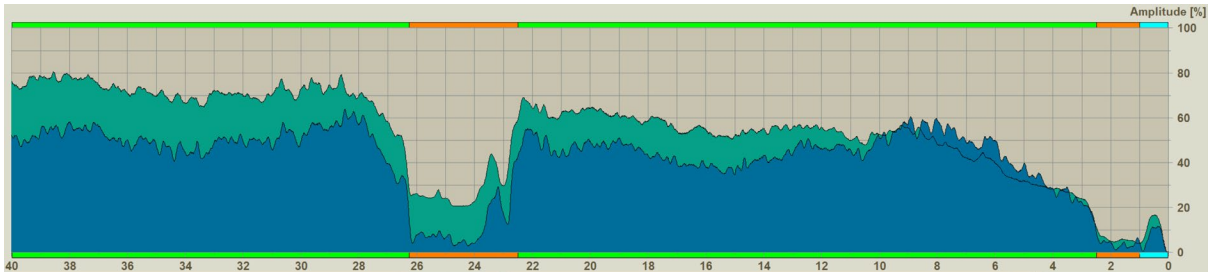


Figure 17: showing the results of measurement 19, from south to north at 200mm.

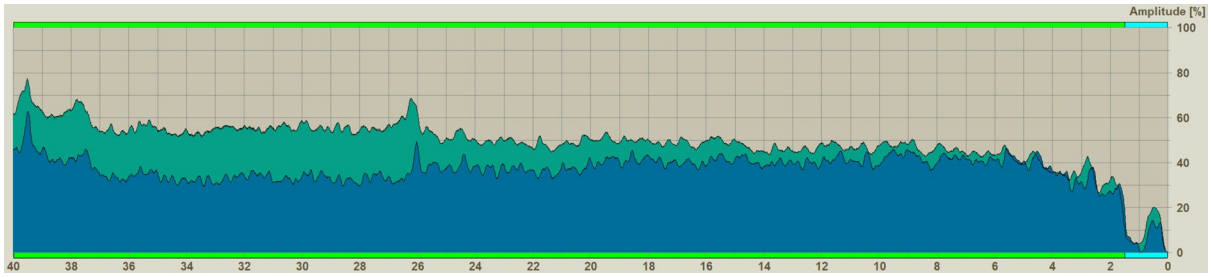
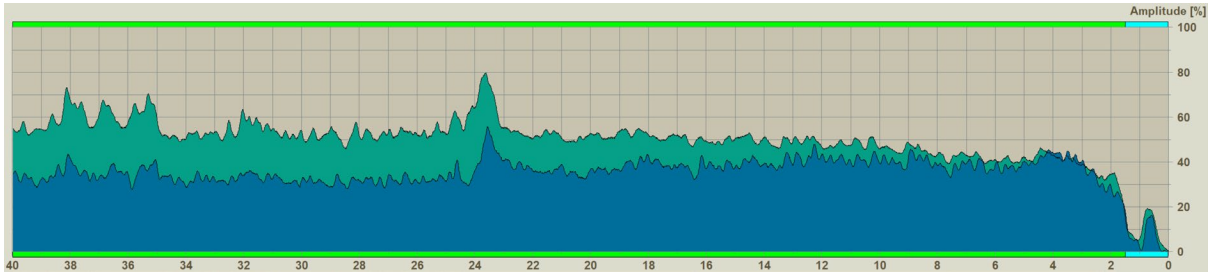


Figure 18: showing the results of measurement 20, from west to east at 200mm.



4 DISCUSSION

4.1 HORSE CHESTNUT (T18)

4.1.1 The results for the first horse chestnut (T18) suggest that the lower trunk is broadly sound. Isolated areas of low resistance which may indicate pockets of decay or dysfunction are evident on the north and south sides, but given that they are surrounded by dense wood on both the internal and external sides, these appear to have been successfully compartmentalised and are of little concern; particularly as the

canopy of the tree has been reduced previously and therefore, wind loading has been somewhat reduced when compared to a similar tree with an unmanaged canopy.

4.1.2 Pockets of dysfunction are also typical of both mature trees generally, owing to their predisposition to landscape changes over time, and of horse chestnut as a species, given its known wood characteristics which are soft and susceptible to decay (Lonsdale, 1999), relative to other broadleaf species such as oak or beech.

4.1.3 Therefore, the risks associated with this tree have been categorised as **Acceptable**. Accordingly, I do not consider any further management intervention necessary at this time. However, it would be prudent to ensure that the canopy does not become significantly larger than its current size in order to manage wind loading, and this can be assured through low-impact repeat pruning in the coming years. In addition, I do not consider there to be any material need to carry out repeat diagnostic testing in the short term, unless the health of the canopy deteriorates in the future.

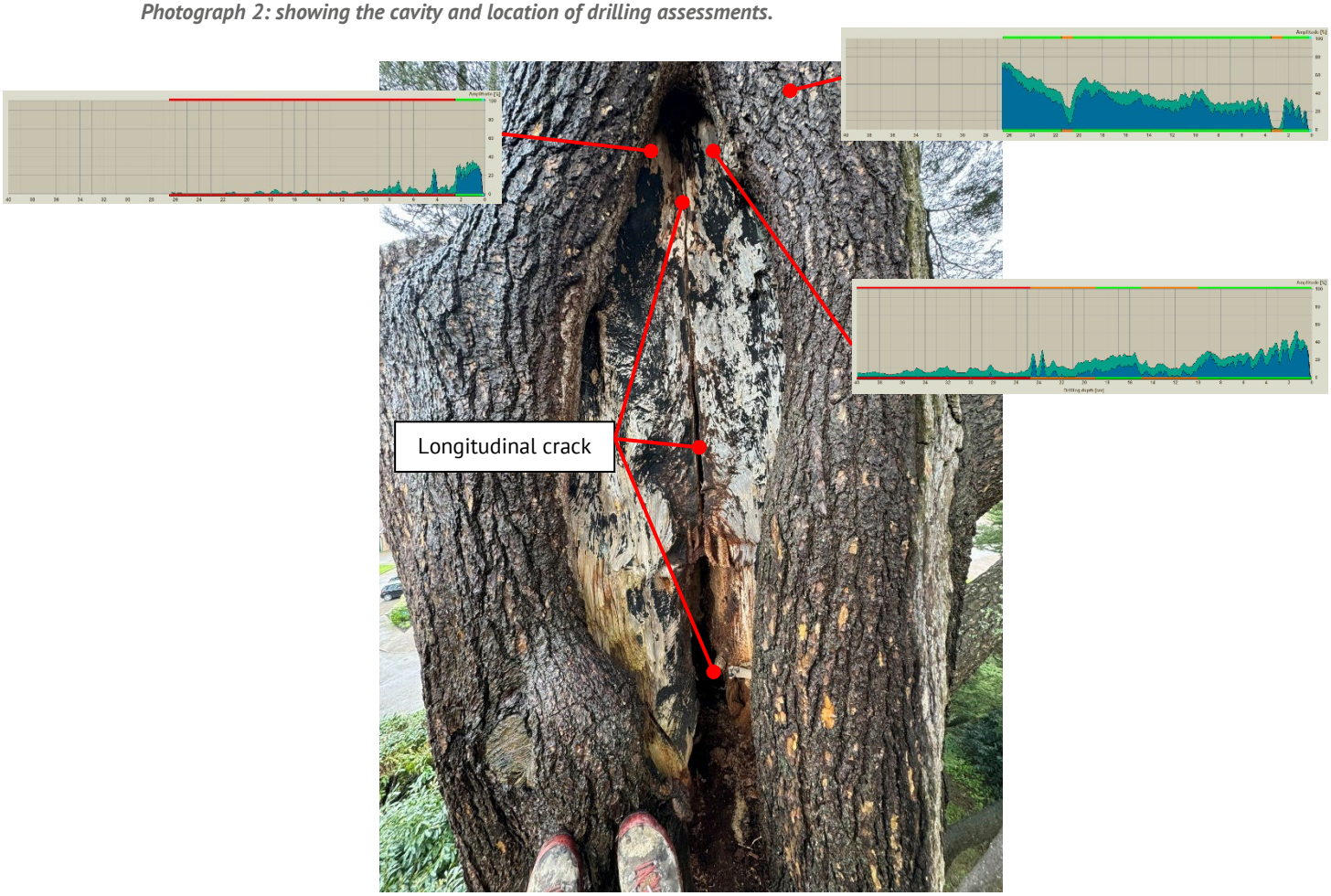
4.2 Cedar of Lebanon (T27)

4.2.1 The area of greatest concern for this tree concerns a large cavity at approximately 12m on the east side of the main trunk, where it appears that a large branch failure occurred in the past. Over time, the failure point has been exposed to the elements and has begun to start decaying back into the main stem itself, leading to concerns about the structural condition and potential for stem failure. To aid visualisation of the tests undertaken, I have superimposed the measurements onto a photograph of the cavity, as shown below.

Photograph 1: showing the aerial drilling taking place within the large cavity at 12m.



Photograph 2: showing the cavity and location of drilling assessments.



Photograph 3: (below left), showing the climber's leg within the open cavity for scale.



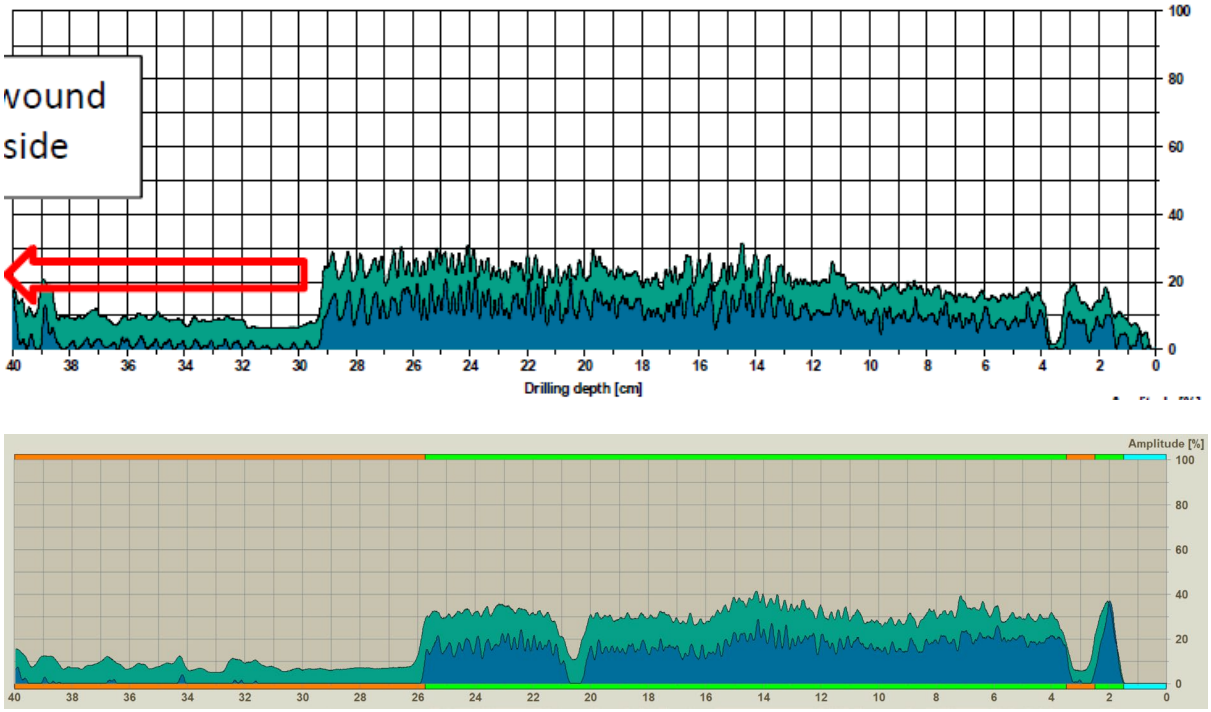
4.2.2 The results of the drilling tests show a considerable amount of decay present within the centre of the wound. The drilling assessments confirm this in the top part of the cavity at some 12m. The lower part of the cavity is so severely degraded that the climbing arborist performing the tests was able to put his lower leg into the cavity with ease, and accordingly, resistance drilling at this location would have been ineffective and would be unlikely to provide any useable data.

4.2.3 Assessment of the photographs also shows a longitudinal separation or crack between the north and west blocks of exposed sapwood, which is again, of some concern for the long-term structural integrity of the stem.

4.2.4 In order to qualify the changes in condition from the 2020 inspection, I have directly cross referenced the measurements undertaken in 2020. The measurement taken opposite the cavity, at the

centre point, revealed a residual wall of sound wood that extended to 29cm in 2020. These latest measurements now reveal that the residual wall has reduced to 26cm, a reduction of 3cm, likely caused by the continuation of decay. This provides a general overview of the decay progression over time.

Figure 19: comparative readings from 2020 (top) and 2024 (bottom), confirming continued decay progressing of the central column of decay.



4.2.5 Elsewhere, reading 5 confirms that the response wood growing around the cavity is sound, and this will be providing some much needed stability to the section of trunk in question. However, the internal parts of the cavity show a very small residual wall of sound wood which in places is limited to just 5-10cm. For a tree of this size, with such a large canopy being located above the wound, causes me some concern.

4.2.6 I have undertaken a new risk assessment using the tree using the VALID Tree Risk-Benefit methodology using this additional information. Unsurprisingly, the VALID system categorises the tree as a **Not Tolerable** risk and accordingly, intervention is required.

4.2.7 The tree is of considerable amenity value and makes an essential contribution to both the landscape of the site itself, and in longer range views along North Parade. It is also of considerable age and relevance to the historical setting of the site and therefore, management options should seek to maintain as much of the tree as possible. Accordingly, two principal options present themselves.

4.2.8 Option 1 is a more risk averse approach, and one which I consider to be excessive. This would be to remove the tree entirely and thus, remove all associated risks. This would however result in a significant loss of amenity value and ecosystem services provided by the tree. The below quote (Watson, 2006) concisely sets out a non-exhaustive list of benefits of urban trees:

> ***'There is of course every chance that the reader is already a convert and readily expounds the virtues of trees. However, you may not have found it necessary to do the exercise of deciding just how large the range of benefits are, or how important.***
>
> ***The environmental benefits of trees include: the production of oxygen (via photosynthesis); effects on the climate, such as influencing rainfall; essential wildlife habitat; creation of shade, shelter and protection, and the network of roots reducing soil erosion. Trees recycle organic matter, process atmospheric pollution, attenuate noise, improve the landscape by giving height, scale and depth, they screen unsightly views, giving improved aesthetics, and soften large buildings bridges and other structures.'***

4.2.9 Option 2 would require the pruning of the upper canopy to reduce the height by up to 5m, with the primary objective of reducing the amount of weight above the defect, so as to limit the wind forces; with particular regard to the torsional movement of the trunk as a result of these forces. Fortunately, the lower canopy of the tree is considerable in volume, and the lowest branches on the west side have been propped using timber structures in an attempt to retain and stabilise the considerable needle growth these support. In my view, the retention of this photosynthetic material will be essential in the short-term to enable the tree to respond to any pruning.

Photograph 4: showing potential, considered upper canopy reduction works for risk-mitigation purposes. Red hatching indicates the approximate canopy loss as a result of pruning.



4.2.10 The above pruning is indicative and seeks to strike a balance between works necessary to mitigate the risk of failure occurring in the short-term, and maximising the proportion of the canopy that can be retained. The following principles should be adhered to as part of the pruning:

- Pendulous branches in the upper canopy should be used to inform the final pruning line to maintain a somewhat natural looking appearance, where practicable. These will be reduced in lateral spread to alleviate weight where necessary;
- Numerous existing cable braces are present within the upper canopy. These should all be retained if possible; and
- Due to the complexities of such a pruning operation, I suggest that the works are undertaken using a mobile elevated work platform (MEWP).

4.2.11 In this way, this valuable, protected tree could be retained in situ for a considerable amount of time.

4.2.12 As part of my instruction, I have also assessed the extent of decay within the main trunk adjacent to the large first branch on the west side, which was also previously identified as potentially problematic. Fortunately, there appears to be little inward decay from the branch to the main stem. Risk of branch failure for this branch is low, particularly as it has been propped in the past.

4.2.13 The presence of the props will provide support and minimise wind loading, and also act as a fail safe should the branch collapse. I consider is likely that if any failure were to occur, it would manifest itself as a partial failure in the first instance due to the support offered by the prop. However, in the event of a total branch failure, my opinion is that there would be limited lateral movement, and that the butt of the branch would land within the grass area beneath it and cause very little damage to parked cars that might be situated in the parking bays adjacent to the tree.

4.3 HORSE CHESTNUT (T46)

4.3.1 The results of advanced testing of the base of this tree reveal no significant areas of decay. Accordingly, the swelling around the base of the tree is likely a result of incremental radial root growth caused by the presence of a girdling root which does not appear to be having any detrimental impact on the tree's vitality.

4.3.2 Therefore, the risks have been categorised as **Acceptable** and periodic management of the canopy to ensure that it does not significantly outgrow its current proportions is considered a prudent course of action for the short to medium term, unless routine arboricultural inspections reveal a need for further works.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

5.1.1 Having assessed the resistance drilling data, I conclude that:

- The horse chestnut at the southern end of the site (T18) is of good health and does not comprise any significant areas of decay within the lower 1m of trunk, such that immediate management or intervention is required;
- The Cedar of Lebanon (T27) continues to demonstrate deterioration and an increase in the extent of decay within its trunk. The wind forces acting on this canopy can reasonably be assumed to increase following the removal of the adjacent horse chestnut, and this may increase the risk of branch or stem failure as a result. Accordingly, there is a need to carry out proactive and preventative pruning to the upper canopy to manage the risks. Illustrative examples of such pruning are provided in the discussion section; and
- Testing of the lower trunk of a second horse chestnut (T46), revealed no significant areas of underlying decay and therefore, continuation with its current management through cyclical pruning to maintain the current canopy dimensions is considered prudent.

Table 2: summary table of recommended works

Tree number	Species	Risk Assessment	Recommendations
T18	Horse chestnut	Acceptable	Continue with cyclical canopy management to ensure current canopy dimensions are not significantly exceeded
T27	Cedar of Lebanon	Not Tolerable	Carry out extensive weight reduction to upper canopy by reducing the height but up to 5m while maintaining the lower canopy in its current form, to minimise wind loading and biomechanical stresses.
T46	Horse chestnut	Acceptable	Continue with cyclical canopy management to ensure current canopy dimensions are not significantly exceeded

5.1.2 Based on the above, I present my recommendations below:

1. **MDJAC to submit a TPO application once the specification has been finalised;**
2. **Upon approval, carry out the final pruning specification; and**
3. **Continue routine tree inspections to monitor any changes.**

Matthew Jones

Matthew Jones, BSc (Hons), MArborA
Director & Arboriculturist

13 April 2024

6 GLOSSARY OF ARBORICULTURAL TERMS

Compartmentalisation: natural defence process in trees by which chemical and physical boundaries are created that act to limit the spread of disease (International Society of Arboriculture, 2020)**;**

7 REFERENCES

Instrumenta Mechanik Labor System GmbH (IML). (2023). *IML-RESI PD Series manual and warrenty term and conditions*. Wiesloch, Germany.

International Society of Arboriculture. (2020). *Glossary of arboricultural terms.* Champaign, Illinois, USA: Martin One Source.

Lonsdale, D. (1999). *Principles of tree hazard assessment and management* (Seventh ed.). Stroud Green: Arboricultural Association.

Watson, B. (2006). *Trees: their use, management, cultivation and biology*. Marlborough, UK: The Crowood Press Limited.

6 GLOSSARY OF ARBORICULTURAL TERMS

Compartmentalisation: natural defence process in trees by which chemical and physical boundaries are created that act to limit the spread of disease (International Society of Arboriculture, 2020)**;**

7 REFERENCES

Instrumenta Mechanik Labor System GmbH (IML). (2023). *IML-RESI PD Series manual and warrenty term and conditions*. Wiesloch, Germany.

International Society of Arboriculture. (2020). *Glossary of arboricultural terms.* Champaign, Illinois, USA: Martin One Source.

Lonsdale, D. (1999). *Principles of tree hazard assessment and management* (Seventh ed.). Stroud Green: Arboricultural Association.

Watson, B. (2006). *Trees: their use, management, cultivation and biology*. Marlborough, UK: The Crowood Press Limited.

MDJ ARBORICULTURAL CONSULTANCY LIMITED

Arboricultural ASSOCIATION
Professional Member

APPENDIX 1: DETAILED ASSESSMENTS

15 Windsor Close
Southwater
West Sussex
RH13 9XH

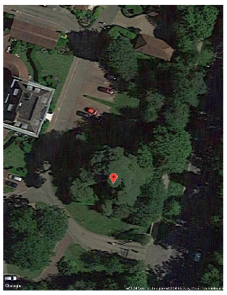
www.mdjac.co.uk | info@mdjac.co.uk

Company Registration No.
(England & Wales): 13900533

Cedar Of Lebanon (T27)



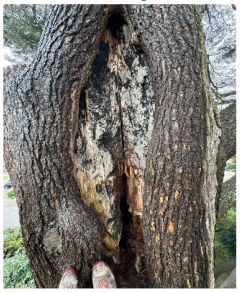
Tree Details and Location



Likelihood of Occupation



Consequences



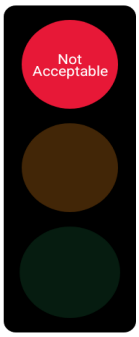
Likelihood of Failure

VITALITY	V	crown density woundwood response growth	3
ANATOMY	A	wood properties architecture H/D ratio	A
LOAD	L	exposure changes to the tree changes around tree	A
IDENTITY	I	species profile age of wounds CODIT	3
DEFECT	D	soundwood decay - extend feature or fault	R

Notes

Summary

Risk



Highest Risk	**Not Acceptable**
Risk reduction	See full report.
Tree Management	See full report.
Review Year	**2027**
Date Assessed	2024-04-12 01:21 pm
Assessed By	Matthew Jones
Phone Number	07780336000
Email	Info@mdjac.co.uk

Species	Height (m)	Stem Ø (cm)	Crown Ø (m)
Cedar Of Lebanon Cedrus libani	26	160	25

Springfield Park
North Parade
Horsham

Risk Inputs



O
1
Very High



C
1
Very High

No adverse symptoms.
Vigorous despite age....

Dense, heavy wood.
Liable to branch failures.

Increased extent of decay in trunk since 2020.
Large branch removal in 2023....

Liable to branch failures.

Extensive central decay at 12.
Increasing by c. 1cm per year....

F
3
Moderate

The highest risk is stem failure at/near 12m caused by extensive decay and recent loss of companion shelter.

VALID

Cedar Of Lebanon (T27) | Detailed Tree Risk-Benefit Assessment