



Tree Survey & Management Report

SITE:

Hyett Orchard
Painswick
GL6 6RJ

PREPARED FOR:

██████████ – Estate Manager, Anchor Hanover

PREPARED BY:

██████████ *Dip Arb L4 (ABC)*
Assistant Arboricultural Consultant

BARTLETT PROJECT REFERENCE:

CW.230508.R

SITE VISIT DATE:

24th October 2023



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Submitted on 30th October 2023

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1.0 SCOPE OF REPORT

1.1 Assignment

Bartlett Consulting were instructed by [REDACTED], Anchor Hanover on 29th September 2023 to:

1. Perform a Level 2 'Basic' Survey of the principal trees located within the boundaries of Hyett Orchard, Painswick, GL6 6RJ, following the visual tree assessment (VTA) techniques developed by [REDACTED] (1994).
2. Undertake a qualified tree risk assessment in accordance with the International Society of Arboriculture's (ISA's) Best Management Practices (BMP) *Tree Risk Assessment* and *Tree Risk Assessment Manual* of the trees detailed in Assignment Item 1 above.

Our tree risk assessment will be conducted for the following *target(s)*: people, cars & structures

3. Provide a written report summarising the tree stock subject to the survey; a schedule of trees and the level of associated tree risk based on the likelihood of failure and impact to the identified targets detailed above; and include informed management recommendations in accordance with current Arboricultural practice and tree health care techniques so that the tree owner (risk manager) can determine their tolerability of risk and take reasonable and proportionate action.

1.2 Report References

Specific tree survey references applied by Bartlett Consulting for this project include:

- [REDACTED] (2017) *Tree Risk Assessment Manual, Second Edition*. International Society of Arboriculture. Champaign, IL.
- [REDACTED] (2016) *Tree Surveys: A Guide to Good Practice*. Arboricultural Association, The Malthouse, Gloucestershire
- Health & Safety Executive (2001) *Reducing Risk, Protecting People: HSE's Decision-Making Process*
- [REDACTED] (1999) *The Principles of Tree Hazard Assessment & Management*. Department of the Environment. London.
- [REDACTED] (2015) *The Body Language of Trees – Encyclopaedia of Visual Tree Assessment*. Karlsruhe Institute of Technology Campus North.
- [REDACTED] (2016) *Assessment of Tree Forks – Assessment of Junctions for Risk Management*. Arboricultural Association, The Malthouse, Gloucestershire.

1.3 Report Limitations & Methodologies

This report is restricted to:

- Seven (7) trees, comprising five (5) species
- Trees were individually tagged with numbers ranging from 480 to 486.

Our Level 2 Basic Survey and qualified risk assessment of the trees surveyed at Hyett Orchard is based on a single site visit undertaken on 24th October 2023. All photographs, samples, and readings, if applicable, were taken at the time the assessment was performed.

This assessment was limited by the following factor(s): dense epicormic growth on T481 and T486 preventing visibility of tree stems and branch unions.

A single Lime tree in the rear garden to the North was not surveyed as instructed by [REDACTED]. This tree is under private ownership by a resident of Hyett Orchard.

Targets and *Occupancy Rates* considered in the tree risk assessment were determined based on our observations during the site visit. Targets considered in this tree risk assessment are *people* (employees, staff, visitors, third-party, etc.); *cars* (parked and driving) and *structures* (buildings, fences, walls, etc.).

The *time frame* for the risk assessment is three years.

This information is solely for the use of the tree owner and manager to assist in the decision-making process regarding the management of their tree or trees. Tree risk assessments are simply tools which should be used in conjunction with the owner or tree manager's knowledge, other information and observations related to the specific tree or trees discussed, and sound decision making.

The statements, findings and recommendations made within the report do not take into account any effects of extreme climate and weather incidences, vandalism, changes in the natural and/or built environment around the trees after the date of this report, nor any damage whether physical, chemical or otherwise.

Tree risk ratings are derived from a combination of three factors: the likelihood of failure, the likelihood of the failed tree part impacting a target, and the consequences of the target being struck. These factors are then used to categorize tree risk as extreme, high, moderate or low. The factors used to define your risk rating are identified in this report.

Tools used in the assessment included: a nylon hammer to 'sound' the tree and tree parts; a probe to measure the depth of cavities and open wounds, as well as explore soil conditions; and binoculars to observe upper portions of the tree. Tree dimensions were recorded using hand tools such as a laser range finder; diameter tape and measuring tape.

All tree information and data was captured using a Google Pixel 6a. Bartlett Tree Experts' Arbor Scope™ web-based management system is used to inventory the trees and produce the data within this report.

The tree dimensions are accurate as captured on the day.

1.4 Specifications & Definitions Used

Age Class

New Planting	Tree not yet established
Young	Established tree but not in the landscape for many years
Semi-mature	Established tree but has not yet reached full growth potential
Mature	Tree within its full growth potential
Over-mature	Tree that is declining or beginning to decline due to its age
Veteran	Tree exceeding age expectancy, which is of interest biologically, culturally and aesthetically because of age, size and condition - including decay, fungi, hollowing, associated flora and fauna, cracks, storm damage, etc.

Height Class

Small	0 metres - 5 metres
Medium	5 metres - 15 metres
Large	15 metres and greater

Structural Condition Class

Poor	Significant, numerous structural defects or features within the main stem or branching structure, which are subject to extensive decay or in the process of failure, which have compromised the structural integrity of the tree.
Moderate	Features such as storm damage, unsympathetic management practices, or the presence of decay and/or cavities, all of which can be addressed through remedial management practices.
Good	High quality trees and good example of species with no visible defects and/or decay.

Physiological Condition Class

Dead	
Poor	Approximately >30% of the canopy exhibiting branch dieback and decline, with 'fragmented' appearance possibly containing numerous broken branches and bark loss on branches and stem. Poor leaf colour and stunted leaf growth.
Fair	Parts of canopy indicate reduced vitality with reduced terminal and lateral extension growth creating 'gaps' in the canopy. Initial signs of dieback may be evident with possible leaf discolouration (chlorotic) and/or unusual leaf size for species.
Good	Vigorous annual extension growth of terminal and lateral buds creating a dense and 'full' canopy. Good leaf colour and typical leaf size for the species. No signs of dieback or decline within the canopy.

Tree Work Phase

Priority class recommendations take into consideration tree species, condition, location, age, and proximity to infrastructure. We intend that this rating system assist decision makers in prioritizing tree management needs and requirements from both a pro-active and reactive perspective.

Prioritization does not take into account any budgetary or financial considerations.

Phase 1	To be addressed within 6 months of the date of the report.
Phase 2	To be addressed within 12 months of the date of the report.
Phase 3	To be addressed within 24 months of the date of the report.
Phase 4	To be addressed within 36 months of the date of the report.
Phase 5	No priority and to be completed as general management and good tree husbandry.

2.0 TREE PROTECTION STATUS

The Town & Country Planning Act (Tree Preservation) (England) Regulations 2012 and the Town & Country Planning Act 1990 (as amended) provides legislative protection for trees within England. An enquiry was conducted by Bartlett Consulting on 24th October 2023 using the Stroud District Council interactive TPO Map website:

<https://stroud.maps.arcgis.com/apps/webappviewer/index.html?id=f0a09333db6b43e592288452e6969147>

2.1 Tree Preservation Order (TPO) Status

Tree numbers 481, 482, 484, 485 and 486 are protected by TPO number 317/B.
Tree number 483 is protected by TPO number 317/A

2.2 Conservation Area (CA) Status

The site is not within any designated Conservation Area.

2.3 Tree Management Implications

Under the Town and Country Planning (Tree Preservation) (England) Regulations 2012, you cannot carry out any works to the protected trees before obtaining formal written permission as issued by Stroud District Council. This can be sought with the submission of a Tree Preservation Order planning application (1APP) but cannot be acted upon until full planning permission is granted.

This report must be submitted with any 1APP.

Please note that the removal of dead trees and the pruning of dead branches from living trees are permitted and “excepted” works under the 2012 Regulation listed above. These works can be undertaken only after 5 working days’ written notice has been given to Stroud District Council.

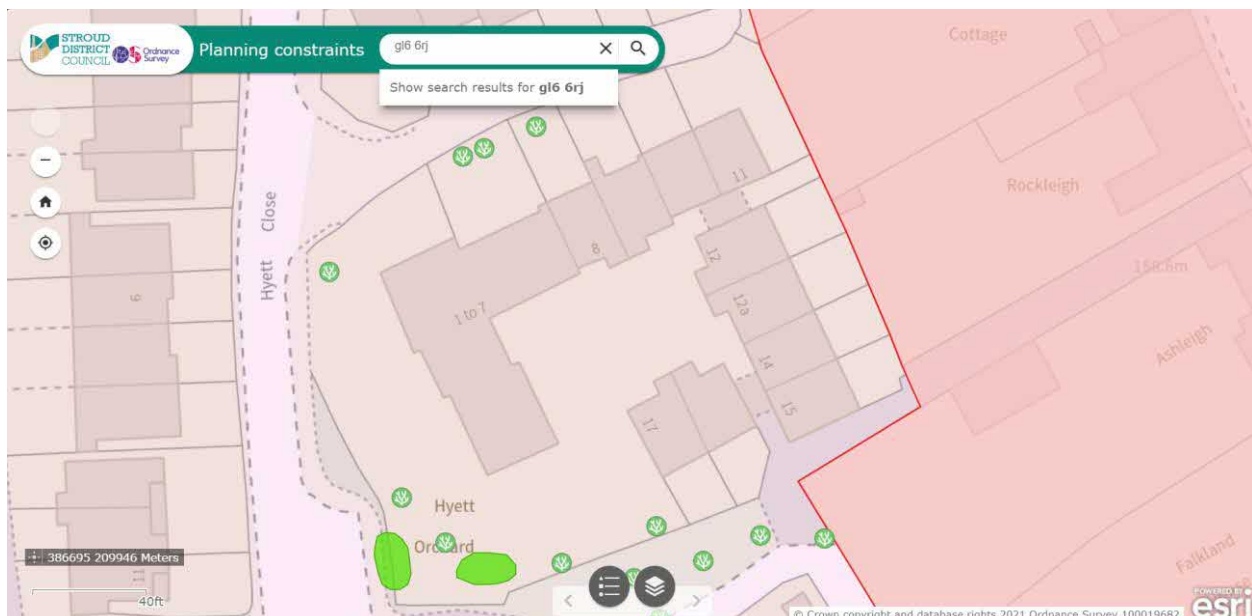


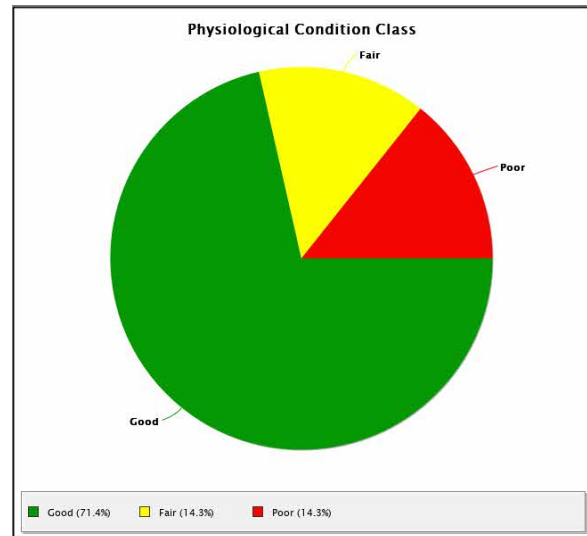
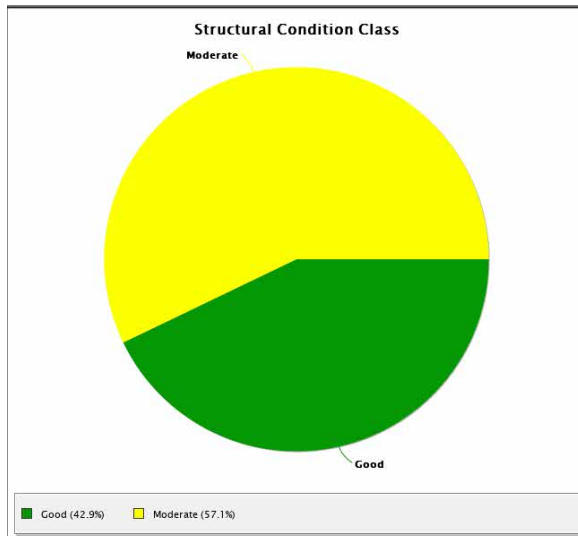
Figure 1: Snipped Image from Stroud District Council Website Showing Location of Protected Trees

3.0 TREE POPULATION OVERVIEW

Of the seven (7) trees surveyed at Hyett Orchard:

Structural Condition	Quantity	% of Total
Good	3	43%
Moderate	4	57%

Physiological Condition	Quantity	% of Total
Good	5	71%
Fair	1	14%
Poor	1	14%



3.1 Structural Condition

As can be seen in the tables and charts above, the tree population is generally in good structural condition. Trees classified as *moderate* structural condition; this is predominantly due to their primary branching structure being of reduced form and habit, as well as having included bark unions¹. These features are primarily due to tree proximity to one another, as well as a lack of formative pruning when the trees were first planted. Remedial management can address these features and concerns.

3.2 Physiological Condition

Overall, the tree population is in good health and vigour. It's not surprising, given the built and hard landscape that the trees are planted and growing in that two of the trees are in *fair* to *poor* health.

The trees in fair physiological condition may or may not recover, depending on if there can be any investment in improving their growing environment and soil conditions. This may be a worthwhile endeavour, as the cost of tree health care is far less than removal and replanting.

¹ Included bark is a defective growth habit when the inner and outer wood fibers turn and grow inwards, as opposed to outwards, and become imbedded. The result is a structurally weak growth formation and attachment point. Trees can sometimes compensate for this growth defect by producing the adaptive growth, in an attempt to add additional support.

3.0 TREE POPULATION OVERVIEW (continued...)



Figure 2: Tree Location Plan Showing Trees Structural Condition at Hyett Orchard, Painswick

3.0 TREE POPULATION OVERVIEW (continued...)



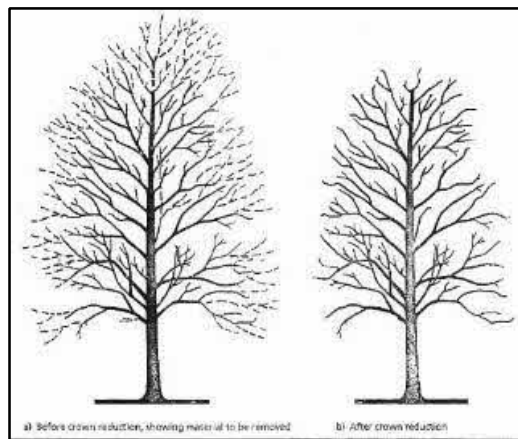
Figure 3: Tree Location Plan of Physiological Condition at West Hyett Orchard, Painswick

4.0 RECOMMENDATIONS

For reference and the benefit of the client, we have provided below detailed specifications and definitions of the various recommended tree work operations as well as tree health care practices below.

4.1 Pruning Specifications

Crown Reduction: Will be carried out in accordance with Section 7.7 of BS3998:2010 by reducing the height and/or lateral branch spread, as detailed in the tables below. Pruning cuts will be made by using the selective pruning and 'drop-crotch' methodologies, as described in Section 7.7 and 7.8 of the British Standard and as per Figure 4 of the Standard.

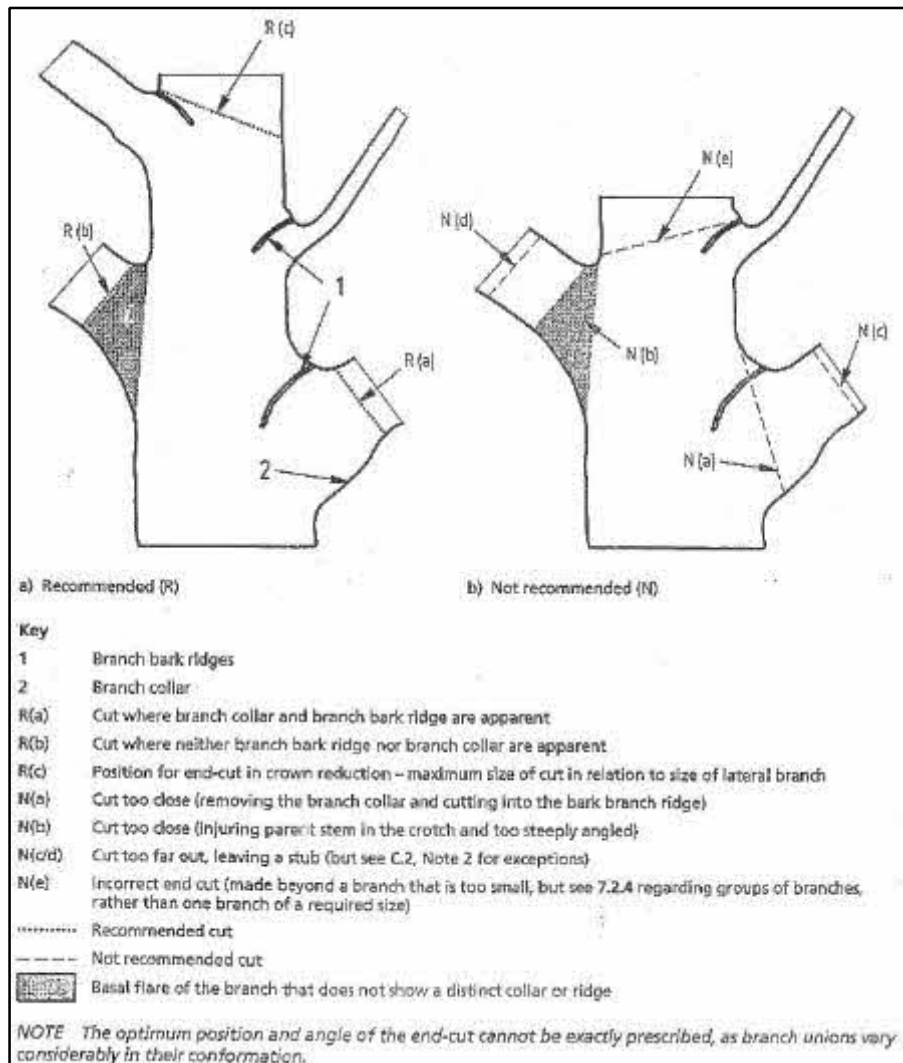


Crown Cleaning: The removal of deadwood (of all sizes) throughout the tree crown: broken and hanging branches to be removed and safely excised from the crown; stubs and ripped branches to be removed back to the branch bark collar or reduced back to substantial lateral growth; branches exhibiting any disease; branches with structural weakness such as vertical or horizontal cracking.

4.0 RECOMMENDATIONS (continued...)

4.1 Pruning Specifications (continued...)

Pruning Cuts: All cuts will be made to significant lateral growth, and not back to a bud so that only a stubbed branch end remains – in accordance with Figure 02 of British Standard 3998:2010.



4.0 RECOMMENDATIONS (continued...)

4.2 Priority Tree Works

4.2.1 One Year Priority Tree Works (Phase 2)

Tree ID	Common Name	DBH	Overall Risk Rating	Tree and Shrub Work Phase	Remove Dead Branch(s)
480	Mountain Ash-Rowan	26	Low	2	Yes

4.2.2 Two Year Priority Tree Works (Phase 3)

Tree ID	Common Name	DBH	Overall Risk Rating	Tree and Shrub Work Phase	Crown Reduction and Reshaping
481	Common Lime	84	Low	3	Reduction target: Re-pollard back to knuckles
483	Cherry Laurel-Portugal Laurel	35	Low	3	Reduction target: Previous pruning points Reduce spec: Overall reduction
484	Sycamore	70	Low	3	Reduction target: Previous pruning points Reduce spec: Overall reduction
486	Common Lime	93	Low	3	Reduction target: Re-pollard back to knuckles

4.2.3 Discussion on Phase 3 Pruning

It is commonplace to pollard trees on a cyclical basis, this is often on a 3-4 year cycle depending on regrowth. It is often the case that the branches around the base and up the main stem to the first major branch break will need to be removed before this time has elapsed.

It may be necessary before the phase 3 works to remove the epicormic branches on the main stems of T481 and 486. Within this time frame these branches are likely to impact on residents of the site due to the density and proximity to parking.

4.0 RECOMMENDATIONS (continued...)

4.2 Tree and Shrub Work Phase (continued...)



Figure 4: Tree Location Plan for All Tree Works at Hyett Orchard, Pain

5.0 RECOMMENDED TREE REMOVALS

In some cases, we may determine a tree should be removed completing the survey.

The recommendation for removal during the survey can be for many reasons including, but not limited to:

- The tree is dead.
- The tree is in poor physiological condition, considered to be terminal decline.
- The tree has a structural weakness that cannot be addressed through management.
- The tree is already, or will, cause damage to, or be damaged by infrastructure.
(Which cannot be suitably addressed through management)
- The location value for the tree is less than ideal and will constitute a 'nuisance' in the future.

The one (1) tree listed in the table below is recommended for removal:

Tree ID	Common Name	DBH	Overall Risk Rating	Tree and Shrub Work Phase	Tree Removal
482	Hawthorn-Common	41	Moderate	1	<ul style="list-style-type: none"> Remove to ground level. Grind stump Re-plant with suitable species

5.0 RECOMMENDED TREE REMOVALS (continued...)



Figure 5: Tree Location Plan for Tree Removal

6.0 RISK ASSESSMENT & DUTY OF CARE

6.1 Limitations of Tree Risk Assessments

It is important for the tree owner or tree manager to know, and understand, that all trees pose some degree of risk from failure or other conditions, and as trees are living and dynamic organisms, it is not possible to maintain them free of risk. Some level of risk must be accepted to experience the full range of benefits that trees provide. As such, we reference the National Tree Safety Group (NTSG) publication *Common Sense Risk Management of Trees* (Forestry Commission 2011). This document provides guidance on trees and public safety in the UK for owners', managers, and advisors.

The information and recommendations within this report have been derived from the level of tree risk assessment identified in this report, using the information and practices outlined in the *International Society of Arboriculture's Best Management Practices for Tree Risk Assessment*, as well as the information available at the time of the inspection.

However, the *overall tree risk rating*, the mitigation recommendations, or any other conclusions do not preclude the possibility of failure from undetected conditions, weather events, or other acts and/or influences of human or nature on the tree(s). Trees can unpredictably fail even if no defects or other conditions are present. Tree failure can cause adjacent trees to fail resulting in a "domino effect" that impacts *targets* outside the foreseeable *target zone* of this tree. It is the responsibility of the tree owner or manager to schedule repeat or advanced assessments, determine actions, and implement follow up recommendations, monitoring and/or mitigation.

Bartlett Consulting and Bartlett Tree Experts can make no warranty or guarantee whatsoever regarding the safety of any tree, trees, or parts of trees, regardless of the level of tree risk assessment provided, the risk rating, or the residual risk rating after mitigation. Bartlett Consulting and Bartlett Tree Experts cannot accept any liability in connection with these factors, nor where recommended tree management is not carried out in accordance with modern tree health care techniques, within the timelines proposed and specification provided.

The information in this report should not be considered as making safety; legal; architectural; engineering; landscape architectural; nor land surveying advice, nor any other professional advice.

This information is solely for the use of the tree owner or tree manager to assist in the decision-making process regarding their duty of care, tolerability of risk, and management of their tree or trees. Tree risk assessments are simply tools which should be used in conjunction with the owner or tree manager's knowledge, other information and observations related to the specific tree or trees discussed, and sound decision making.

All recommendations made by Bartlett Tree Experts will be based on the defects that are present and detectable at the time of the inspection or assessment, and the commonly accepted industry practices for reducing or minimising the risks associated with the trees and are meant to assist the owner/client with the decision-making process regarding the trees. Tree conditions, though, can change, and some features/hazards may not be present or detectable through the inspection process. As such, Bartlett Tree Experts can make no guarantees or warranties of any kind that all features/hazards will be detected; nor can Bartlett Tree Experts accept any liability in any manner whatsoever for any damage caused by any tree on this property, whether the tree was assessed or not, or whether any recommendations to mitigate risk were followed or not.

Therefore, to the fullest extent permitted by law, the owner/client agrees to indemnify and hold harmless Bartlett Tree Experts from any third party law suits or claims based on the past, present, or future conditions of the owner/client's trees, or decisions made by the owner/client regarding the trees, or injuries or damages caused by any future tree or tree part failures, which are under the ownership and control of the owner/client, that Bartlett Tree Experts may suffer as the result of any negligent action, inaction, or decisions made by the owner/client regarding the trees. Such obligations shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.

6.0 RISK ASSESSMENT & DUTY OF CARE continued...)

6.2 Tree Owner's Duty of Care

A tree owner has a duty of care to ensure that all visitors, guests, employees, etc. to their land shall be safe from harm, and that there is no exposure to risks to that visitor's health and safety. This duty of care means that reasonable care must be taken to avoid acts or omissions that could be reasonably foreseen, leading to harm.

This duty must also be reasonable, proportionate, and reasonably practicable when managing tree risk. Therefore, the tree owner can take a balanced approach to manage the risk, retain the many benefits trees provide, and not waste resources on unnecessary tree management.

6.3 Tolerability of Risk

Some level of risk must be accepted to experience the full range of benefits that trees provide, and an evaluation of what is reasonable to balance the benefit of trees and the risk they pose should be undertaken by the tree owner.

Risks which are considered tolerable are risks which the tree owner, visitors, guests, employees, and the wider public are prepared to accept to secure the associated tree benefits. However, tolerable risks come with expectations, such as the trees being accurately assessed; control measures being in place; residual risk as low as reasonably practical; and the risk rating is periodically reviewed.

We trust that the contents and recommendations contained within this report were informative, easy to understand and helpful to you, with regards to managing your tree(s).

Should you have any further questions or concerns, please do not hesitate to contact us again.

REPORT CLASSIFICATION: Tree Survey & Management Report

REPORT STATUS: FINAL

REPORT COMPLETED BY: [REDACTED] *Dip Arb L4 (ABC)*
Assistant Arboricultural Consultant

SIGNATURE: [REDACTED]

DATE: 25.10.2023

REPORT REVIEWED BY: [REDACTED]
Consultancy Administrator

SIGNATURE: [REDACTED]

DATE: 26th October 2023

7.0 Tree Survey & Management Schedule

Client: Anchor Hanover, [REDACTED] – Estate Manager

Report No: CW.230508.R

Completed by: Mr. [REDACTED]

Trees Tagged: YES: 480 – 486

Weather: Sunny, Dry and Still

Site: Hyett Orchard, Painswick, GL6 6RJ

Date of Survey: 24th October 2023

Tree ID	Common Name	DBH (CM)	Height Class	Age Class	Physiological Condition Class	Canopy Radius (m)	Structural Condition Class	Tree and Shrub Work Phase	Observations
480	Mountain Ash-Rowan	26	Small	Semi-mature	Poor	2	Moderate	2	<input type="checkbox"/> Pavement/curbing damage <input type="checkbox"/> Dead/dying stem <input type="checkbox"/> Compression fork <input type="checkbox"/> Included bark <input type="checkbox"/> Decay-stem <input type="checkbox"/> Dieback (moderate)
481	Common Lime	84	Medium	Mature	Good	2	Good	3	<input type="checkbox"/> Buried root collar <input type="checkbox"/> Wound-stem <input type="checkbox"/> Cavity-stem <input type="checkbox"/> Compression fork <input type="checkbox"/> Included bark <input type="checkbox"/> Wound-branch <input type="checkbox"/> Topping/heading cuts

Tree ID	Common Name	DBH (CM)	Height Class	Age Class	Physiological Condition Class	Canopy Radius (m)	Structural Condition Class	Tree and Shrub Work Phase	Observations
482	Hawthorn -Common	41	Medium	Mature	Fair	4	Moderate	1	Buried root collar Wound -root flare Decay -root flare, probed horizontally to depth of 30 cm Cavity -suspected , tonal variation to 1m height Compression fork Included bark Wound -branch Decay -branch Dieback
483	Cherry Laurel-Portugal Laurel	35	Medium	Mature	Good	3	Moderate	3	Buried root collar Co-dominant stems Compression fork Included bark
484	Sycamore	70	Medium	Mature	Good	3	Good	3	Buried root collar Wound -stem Wound -branch Adaptive growth -union Topping /heading cuts
485	Sycamore	53	Medium	Mature	Good	4	Moderate	NA	Wound root flare Decay -root flare Adaptive growth -root flare Co-dominant stems Included bark Wound -stem Compression fork Included bark Uneven crown
486	Common Lime	93	Large	Mature	Good	4	Good	3	Buried root collar Cavity -stem Compression fork Included bark

Tree Location Plan



Unit 22-25 Cross Lane Farm, Pill, Somerset, BS20 0JJ
 Tel: 01275 310 000 (Option 2) Email: consultancy@bartlettuk.com

Client	Anchor Hanover, [REDACTED], Estate Manager
Site	Hyett Orchard, Painswick, GL6 6RJ
Drawing Title	Tree Location Plan
Reference	CW.230508.R
Date of Survey	24 th November 2023
Scale	1 : 50 (Scale Bar on Plan)
Drawn	Arbor Scope Google Maps
The copyright of this plan is vested in the FA Bartlett Tree Expert Company Ltd. Not to be reproduced without their written authority.	

APPENDIX 1 – Tree Risk Assessment Glossary

Bartlett Consulting uses the International Society of Arboriculture's (ISA) Tree Risk Assessment methodology, referred to as TRAQ. This is a 'qualitative' system which uses a matrix-based combination of ratings, to reach a conclusion of associated risk. The standard Bartlett Consulting time-line within the TRAQ system is three (03) years, unless otherwise stated within the report.

Risk is the combination of the 'likelihood' of an event: in this case the failure of a tree or part of a tree, and the severity of the potential consequences. A hazard is the likely source of harm. The two tables below define both the likelihood and risk levels as per the TRAQ system.

Tree risk assessment has a unique set of terms with specific meanings. Definitions of all specific terms may be found in the International Society of Arboriculture's *Best Management Practice for Tree Risk Assessment*. Definitions of some of these terms used in this report are as follows:

Classification	Description of Likelihood of Failure (As per Dunster, Smiley, Matheny, Lilly 2017)
Improbable	The tree or tree part is not likely to fail during normal weather conditions, and may not failure in extreme weather conditions, within the specified time frame.
Possible	Failure may be expected in extreme weather conditions, but it is unlikely during normal weather conditions, within the specified time frame.
Probable	Failure may be expected under normal weather conditions, within the specified time frame.
Imminent	Failure has started or is most likely to occur in the near future, even if there is no significant wind, weather, or increased load.

Targets are people, property, or activities that could be injured, damaged or disrupted by a tree failure.

Likelihood of Impact may be categorized as high meaning that a failed tree or tree part will most likely impact a target; medium meaning the failed tree or tree part is as likely to impact the target as not; low meaning that the failed tree or tree part is not likely to impact a target; and very low meaning that the likelihood of a failed tree or tree part impacting the specified target is remote.

Consequences of a known target being struck may be categorized as severe meaning that impact could involve serious personal injury or death, damage to high-value property, or disruption to important activities; significant meaning that the impact may involve property damage of moderate to high value, considerable disruption, or personal injury; minor meaning that impact could cause low to moderate property damage, small disruptions to traffic or a communication utility, or very minor injury; and negligible meaning that impact may involve low-value property damage or disruption that can be replaced or repaired, and do not involve personal injury.

Risk Level	Description of Risk (As per Dunster, Smiley, Matheny, Lilly 2017)
Extreme Risk	Failure is <i>imminent</i> , impact & failure is <i>very likely</i> , and the consequences of the failure are <i>severe</i> . Mitigation will be a high priority or targets must be temporarily controlled.
High Risk	Impact & Failure is <i>likely</i> to <i>very likely</i> with <i>significant</i> consequences; or consequences are <i>severe</i> and the Impact & Failure is <i>likely</i> . Mitigation measures should be taken.
Moderate Risk	Impact & Failure is <i>likely</i> to <i>very likely</i> with <i>minor</i> consequences; or consequences are <i>significant</i> to <i>severe</i> with a <i>somewhat likely</i> Impact & Failure. Mitigation will be determined by tolerance of risk.
Low Risk	Consequences are either negligible or minor, with corresponding Impact & Failure ratings of either unlikely or somewhat likely respectively. Mitigation may be desirable but not strictly necessary.

Overall Tree Risk is the highest individual risk identified for the tree.

Residual Risk is the level of risk the tree should pose after the recommended mitigation

APPENDIX 2 – Tree Survey & Assessment Glossary

The scientific study of tree hazard evaluation and assessment is not an exact science, and there is still much to learn with constantly developing technology, research and calculations. Most limitations of tree hazard evaluation arise from uncertainties with trees and the loads the trees are subjected to.

The three levels of tree evaluation and assessment employed by Bartlett Consulting are those defined in the International Society of Arboriculture's (ISA) *Best Management Practices for Tree Risk Assessment* and *ANSI A300 Tree Risk Assessment Standard*. All three levels are described below, along with the basic limitations of each.

I. Level 1 Limited Visual Assessment

A *Level 1 Limited Visual Assessment* (also referred to as a Hazard Survey or Negative Tree Survey) is a visual assessment from a specific perspective of an individual tree or a population of trees near specified targets. These assessments are conducted to identify obvious defects or specified tree conditions (such as dead trees) as agreed with the client and tree owner / manager.

A *Level 1 Limited Visual Assessment* is typically performed from a pre-defined and specified perspective (i.e. from the pavement, street, car parking area(s), woodland edge, etc.), and typically of one side of the tree from that specified perspective. The specified tree or trees are visually assessed to identify tree features, defects, or specific conditions constituting a hazard which result in a likelihood of failure of probable or imminent and would impact the specified target(s).

Level 1 Limited Visual Assessments are typically performed to quickly assess large populations of trees to identify trees with the highest likelihood of failure ratings in the population, or trees that are recommended for higher level of assessment.

A *Level 1 Limited Visual Assessment* typically includes:

1. Identifying the location and/or selection criteria of trees to be assessed.
2. Determining and documenting the most efficient route to be taken.
3. Determining and documenting the method of visual assessment (e.g. walk-by, drive-by).
4. Recording the location of, and assessing the condition of, tree(s) of concern from the defined perspective meeting the predefined criteria (e.g. dead trees, broken branches).
5. Evaluating the risk (a risk rating is optional).
6. Identifying trees needing a higher level of assessment (*Level 2 Basic* or *Level 3 Advanced*) and/or priority corrective action.
7. Submitting risk mitigation recommendations and/or report.

Limitations of Level 1 Limited Visual Assessments

As the least thorough means of assessment, tree features and/or conditions may not be visible as the inspection is from a particular viewpoint; not all tree features and observations may be visible or apparent at different times of the year; climbers, undergrowth, basal growth, etc. will not be removed inhibiting the inspection; and the inspection may not be adequate enough to make a risk mitigation recommendation. Residual risk designations for trees are not included.

APPENDIX 2 – Tree Survey & Assessment Glossary (continued...)

II. Level 2 Basic Visual Assessment

A *Level 2 Basic Visual Assessment* is a more detailed visual inspection of a tree and its surrounding site, and a synthesis of the information collected. It requires complete inspection around a tree including the site and ground conditions / growing environment; visible buttress roots; main stem(s); and branches (as defined in the International Society of Arboriculture's (ISA) *Best Management Practices for Tree Risk Assessment* and *ANSI A300 Tree Risk Assessment Standard*).

A *Level 2 Basic Visual Assessment* allows for all aspects of the tree(s) to be surveyed and removal of climbers, undergrowth and basal growth. The crown, branches, stem(s), and buttress roots of the specified tree(s) are all assessed to look for notable features including any defect, decay, dysfunction or other structural weakness, as well as assessing the overall health and vitality of the tree(s). A *Level 2 Basic Visual Assessment* will include the use of hand-tools such as a sounding hammer; depth probe; binoculars; and measuring tapes / laser range finders to record tree dimensions; and possibly a trowel to uncover buttresses. Recommendations for trees that need a higher level of assessment are typically included.

A *Level 2 Basic Visual Assessment* typically includes:

1. Locating and identifying the tree or trees to be assessed.
2. Determining the *targets* and *target zone* for the tree or branches of concern.
3. Reviewing the site history and conditions, and species failure profile.
4. Assessing the potential load on the tree and its parts.
5. Visually assessing general tree health based on observable features at the time.
6. Completing the tree inspection and assessment using tools listed above.
7. Recording all details and observations.
8. Analysing all captured field data to determine the *likelihood of failure* and *consequences of failure* in order to complete a tree risk assessment.
9. Developing mitigation options, recommending a further Level 3 Advanced Assessment, if deemed necessary, and estimating *residual risk* for each mitigation option.
10. Producing and submitting the report, including when appropriate, advice on re-inspection intervals.

Limitations of Level 2 Basic Visual Assessments

This visual assessment will only include details and information on tree features and conditions that can be detected from a ground-based inspection on the day of the assessment, using the tools listed in the introduction above. The extent of some internal decay, as well as the type of wood decay, and below ground or high canopy features or conditions may be difficult to observe, determine or assess.

APPENDIX 2 – Tree Survey & Assessment Glossary (continued...)

III. Level 3 Advanced Assessment

A *Level 3 Advanced Assessment* is performed to provide detailed information about specific tree parts, conditions or features, targets, or site conditions. A *Level 3 Advanced Assessment* typically incorporates all aspects of a *Level 2 Basic Visual Assessment* and is usually conducted after a *Level 2 Basic Visual Assessment* with client approval.

Specialized equipment, data collection and analysis, and/or expertise are typically required for these advanced assessments to provide detailed and in-depth information about a specific tree parts, conditions or features, and the likelihood of failure, previously identified in a *Level 2 Basic Visual Assessment*.

A *Level 3 Advanced Assessment* typically includes:

1. Locating and identifying the tree or trees to be assessed.
2. Determining the *targets* and *target zone* for the tree part of concern.
3. Reviewing and updating the *Level 2 Basic Visual Assessment* data as necessary.
4. Completing the advanced assessment using methods and/or techniques as determined necessary and appropriate by the Arborist, and as defined in the Scope of Work.
5. Interpreting and analysing the advanced assessment data and information to update and revise the *likelihood of failure* and *consequences of failure* in order to complete a tree risk assessment.
6. Developing mitigation options and estimating *residual risk* for each mitigation option.
7. Producing and submitting the report, including when appropriate, advice on re-inspection intervals.

Limitations of Level 3 Advanced Assessments

Using technology, methodologies and equipment listed below always involves a degree of uncertainty as well as limitations in use. Furthermore, most data is not an accurate measure, but a qualified or quantified estimation.

Arborists employing advanced assessment equipment and technology must have an advanced knowledge of the application and use of the various equipment (e.g. when and where it is appropriate for use and which method); in-depth knowledge of decay fungi and host tree species relationships; training and experience in interpreting data; and likelihood of failure assessment.

APPENDIX 2 – Tree Survey & Assessment Glossary (continued...)

III. Level 3 Advanced Assessment (continued...)

Methods of Advanced Assessment

Procedure	Methodology
Aerial Tree Inspection (evaluation of tree structure within crown)	<ul style="list-style-type: none"> • visual inspection from within the tree crown or from a lift • unmanned aerial vehicle (UAV) photographic inspection • decay testing of branches
Detailed Target Analysis	<ul style="list-style-type: none"> • property value • use and occupancy statistics • potential disruption of activities
Detailed Site Evaluation	<ul style="list-style-type: none"> • history evaluation • soil profile inspection to determine root depth • soil mineral and structural testing
Decay Testing	<ul style="list-style-type: none"> • increment boring • drilling with small-diameter bit • resistance -recording drilling • single path sonic (stress) wave • sonic / impulse tomography • electrical impedance tomography • radiation (radar, X-ray) • advanced analysis for pathogen identification
Tree Health Evaluation	<ul style="list-style-type: none"> • tree ring analysis (in temperate zone trees) • shoot length measurement • detailed health/vigour analysis • starch assessment
Root Inspection and Evaluation	<ul style="list-style-type: none"> • root and root collar excavation • root decay evaluation • ground -penetrating radar • sonic / impulse tomography
Storm / Wind Load Analysis	<ul style="list-style-type: none"> • detailed assessment of tree exposure and protection • computer-based estimations according to engineering models • wind reaction monitoring over a defined interval
Measuring & Assessing the Change in Tree Lean	<ul style="list-style-type: none"> • visual documentation • plumb line • digital spirit level
Load Testing	<ul style="list-style-type: none"> • hand pull • measured static pull • measured tree dynamics

Note: All levels of tree inspection, evaluation and assessment consider visible, and detectable, tree observation, conditions and features in proximity to the known and/or assigned targets of the tree or trees being assessed. Regardless of the level selected, any tree risk assessment will be limited to the tree or trees selected, and the detectable conditions at the time of the defined and assigned assessment. The client should also recognize that not all defects will be detectable, and not all failures can be predictable