

Visual Tree Assessment Report

SITE:

Guinea Street
Redcliffe
Bristol
BS1 6SX

PREPARED FOR:

Redcliffe West Residents Association

PREPARED BY:

Chris Watson *Dip Arb L4 (ABC), MArborA*
Assistant Arboricultural Consultant

BARTLETT PROJECT REFERENCE:

CW.240072.R

SITE VISIT DATE:

12th February 2024



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1.0 SCOPE OF REPORT

1.1 Assignment

- 1.1.0 I was instructed by Redcliffe West Residents Association on 7th February 2024:
- 1.1.1 To perform a visual tree assessment (VTA) of one (1) Common Ash (*Fraxinus excelsior*) located within the grounds of 40 Guinea Street, Redcliffe, Bristol, BS1 6SX following the techniques developed by Mattheck & Breloer (1994).
- 1.1.2 To undertake a qualified tree risk assessment in accordance with the International Society of Arboriculture's (ISA's) Best Management Practices (BMP) *Tree Risk Assessments* and *Tree Risk Assessment Manual* of the tree detailed in Assignment as above.
- 1.1.3 After review and discussion with the client, the tree risk assessment will be conducted for the following *target(s)*: *people* (resident, and third party), *cars* (parked and driving) and *structures* (buildings, walls).
- 1.1.4 To provide a written report on the health and structural condition of the tree and the level of associated tree risk.
- 1.1.5 Redcliffe West Residents Association have commissioned me to undertake a visual assessment of the Ash, as well as provide a "technical review" and analysis of the Silverback Arboricultural Consultancy report, dated 26th January 2024, in which the tree was recommended for removal.

1.2 Background

- 1.2.1 It has been brought to my attention by Redcliffe West Residents Association that several applications have been made to the council to remove the tree.
- 1.2.2 The report by Silverback Arboricultural Consultancy has been submitted as part of a TPO application, providing evidence to support removal of the Ash on the grounds that the tree is unsafe and poses a risk to the public.
- 1.2.3 The tree has been subject to two refusals for removal by Bristol City Council in 2013 and again in 2023. Both requests were made citing damage to the boundary wall being caused by the tree, and the council has twice refused permission on the grounds that the wall is not being damaged by the tree, and its loss would be of detriment to the character and appearance of the conservation area.

Within both decision notices, Bristol City Council advised repairs to be made to the wall, and that this work is possible without negatively impacting the tree.

1.3 Report Author

- 1.3.1 This particular site survey and report have been completed by me, Mr. Chris Watson. I hold a Foundation degree in Forestry and Woodland Management and Level 4 Diploma in Arboriculture, and over 10 years' experience in the profession as a climbing arborist; and Arboricultural consultant.
- 1.3.2 I am a Professional Member of the Arboricultural Association and hold I.S.A – Tree Risk Assessment, Tree Risk- Benefit Validator and LANTRA – Professional Tree Inspector qualification.

1.0 SCOPE OF REPORT (Continued...)

1.4 Report Limitations & Methodologies

- 1.4.0 This report is restricted to the one (1) Common Ash tree detailed in the Assignment above.
- 1.4.1 My VTA and qualified risk assessment of one (1) Common Ash located at 40 Guinea Street, Redcliffe, Bristol, BS1 6SX is based on a single site visit on 12th February 2024. All photographs, samples, and readings, if applicable, were taken at the time the assessment was performed.
- 1.4.2 This assessment was limited by the following factor(s): I did not have permission to access the garden in which the tree stands. Therefore, I had limited visibility of the rooting environment, buttress and lower stem, and no 360° visibility or access. My assessment was completed from the southern aspect of the tree, as well as from the public highway. From my limited vantage points I was still able to see significant portions of the tree's features and I am happy with the level of information I was able to gather on the tree for my visual tree assessment.
- The tree was in dormancy when assessed so quantifying and qualifying the extent of Ash Dieback was difficult. I used binoculars to assess the buds in the outer canopy as well as look for any obvious lesions / cankers.
- 1.4.3 *Targets and Occupancy Rates* considered in the tree risk assessment were determined based on my observations whilst on site, as well as agreement with my client. Targets considered in this tree risk assessment are *people* (resident, and third party), *cars* (parked and driving) and *structures* (buildings and walls).
- 1.4.4 The *time frame* for my risk assessment is three years.
- 1.4.5 This information is solely for the use of Redcliffe West Resident Association and whomever they approve to use it or decide to share it with. Tree risk assessments are simply tools which should be used by Redcliffe West Residents Association in conjunction with knowledge, other information and observations related to the specific tree discussed, and sound decision making.
- 1.4.6 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.
- 1.4.7 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.
- 1.4.8 Tree dimensions were recorded using a laser range finder and binoculars to observe upper portions of the tree .

1.0 SCOPE OF REPORT (Continued...)

1.5 Assessment of Ecological Status of Tree & Potential Constraints

- 1.5.0 Following the site visit and tree survey and assessment, we believe that there is a LOW potential for wildlife and ecological associations with the tree subject to this report. Ecological associations are considered to be nesting birds.
- 1.5.1 The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000, provides statutory protection to birds, bats, insects and other species that inhabit trees, hedgerows, or other associated vegetation.
- 1.5.2 All trees must be thoroughly assessed for protected species prior to any recommended tree works.

2.0 TREE PROTECTION STATUS

2.0.0 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.

2.0.1 An enquiry was conducted by Bartlett Consulting on 26th February 2024 through the Bristol City Council interactive mapping website: [Bristol - Pinpoint local information](#)

2.1 Tree Preservation Order (TPO) Status

2.1.0 The Common Ash tree is protected by an individual TPO, reference number 1246.

2.2 Conservation Area (CA) Status

2.2.0 The Common Ash tree is located within the *Redcliff* designated Conservation Area.

2.3 Tree Management Implications

2.3.0 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 the appropriate LPA. This can be sought with the submission of a Tree Preservation Order planning application (1APP) but cannot be acted upon until full Local Planning Authority permission is granted.

This report must be submitted with any 1APP.

2.3.1 Please note that the removal of dead trees and the pruning of dead wood 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 the local planning authority.

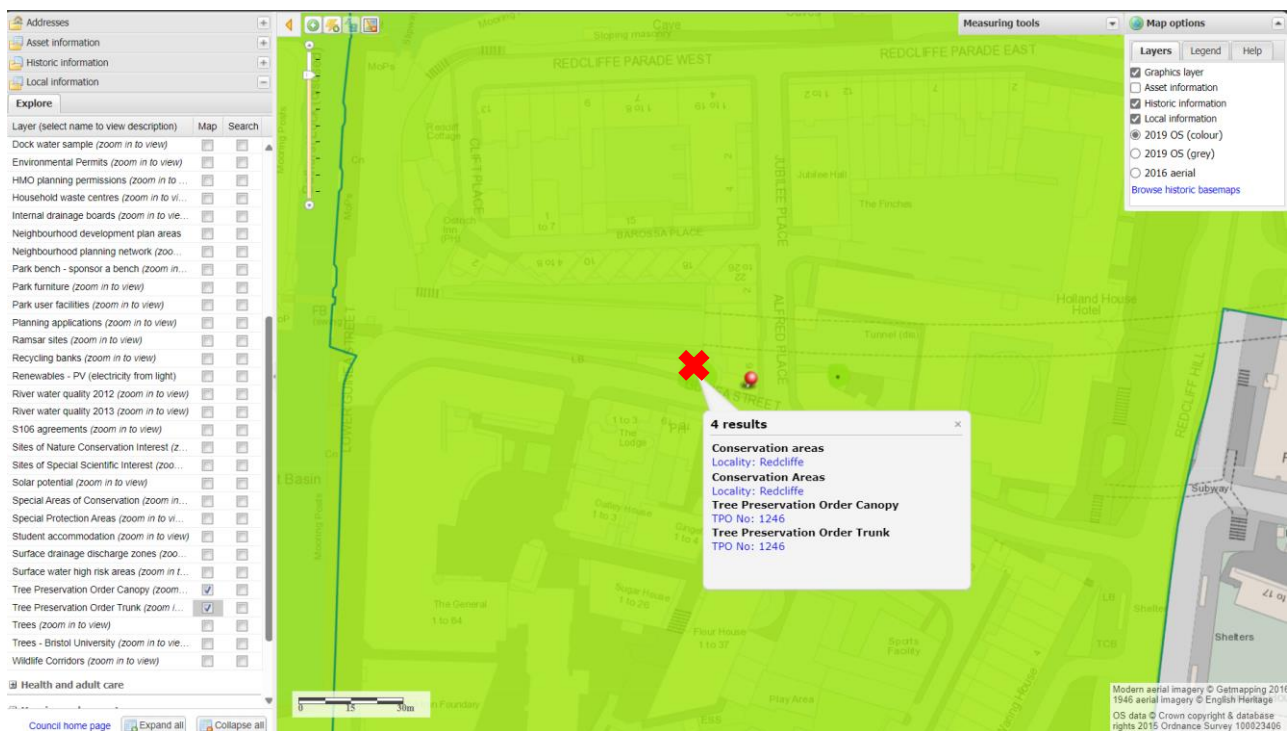


Figure 1: Snipped Image from Bristol City Council Website Showing Location of Common Ash (Red X) with individual TPO

3.0 TREE & SITE DETAILS

Species	Common Ash (<i>Fraxinus excelsior</i>)			
Stem Diameter at 1.5 metres height	No access to take measurements of stems.			
Age	Early Mature			
Tree Height (metres)	16.0			
Crown Spread (metres)	N 7.0 (approx.)	E 7.0	S 7.0	W 7.0
Vitality	Good bud development and density on branches throughout crown.			
Location	Tree is located on derelict land adjacent to Guinea Street, BS1 6SX			
Targets	<ol style="list-style-type: none"> 1. People: within crown spread, occasional occupancy 2. Vehicles: within crown spread, frequent occupancy 3. Buildings: target within 1x tree height, constant occupancy 			
Rooting Environment	<ol style="list-style-type: none"> 1. Non permeable pavement over roots 1 metre from main stem south. 2. Estimate approximately 60% of rooting zone under pavement. 3. Soil to north of tree appears compacted based on visual assessment. 4. Debris and wooden pallets piled against the tree stem, southern aspect. (Figure 4) 5. Rubble piled 1.5 metres from main stem, west. 6. Steep gradient change 4 metres from main downwards towards railway cutting, north. 7. Unable to quantify due to limited access to the tree. 8. No evidence of fungal fruiting bodies. 			
Surface Roots / Buttresses	<ol style="list-style-type: none"> 1. Buttress development present southern aspect. Un-able to view northern aspect to quantify. 2. No evidence of fungal fruiting bodies or pest damage. 			
Main Stem	<ol style="list-style-type: none"> 1. Trifurcated stems, with partial included bark unions at approx. 600 millimetres height. Based on my limited observation from the southern aspect it appears to be forming a cup shaped union (Figure 3) 2. Some adaptive growth present below union on southwest side. 3. Co-dominant leaders with well-formed branch union at 1.5 metres height eastern stem. <ol style="list-style-type: none"> 1. Northern stem expressing apical dominance. 2. Northern stem trifurcated leaders at 2.5 metres with well-formed branch unions. (Figure 7) 3. Historic wounds southern leader attributed to crown lifting. (Figure 6) 4. All wounds are nearly fully occluded. 4. Small suspect cavity at 4 metres nearly fully occluded, approximate dimensions 15x10cm. 5. No evidence of fungal fruiting bodies or pest damage on any stems or leaders. 			
Crown	<ol style="list-style-type: none"> 1. Open grown form, expressing good crown symmetry. 2. Second and third order branch unions throughout crown appear well formed. (Figure 8) 3. Lower crown clearance over southern quadrant. approx. 2.5 metres. 4. Dead branches throughout crown, max 4cm diameter, 1.5 metre length. 5. Dead branches constituting approx. 5% of total crown volume. 6. Good bud density with no signs of dieback. (Figure 2) 7. No evidence of fungal bodies or disease damage. 			

4.0 PHOTOGRAPHIC OVERVIEW



Figure 2: Image showing Ash in landscape viewed from west



Figure 3: Image showing trifurcated stems



Figure 4: Image showing rooting environment viewed from east and materials piled against tree stem



Figure 5: Image showing branching structure of the mid crown viewed from the southwest

4.0 PHOTOGRAPHIC OVERVIEW (Continued...)



Figure 6: Image showing historic pruning wounds and cavity, southern aspect



Figure 7: Image showing trifurcated leaders on northern stem



Figure 8: Image showing well-formed branching unions in upper crown



Figure 9: Image provided by Redcliffe West Residents Association of tree in leaf taken 23rd June 2023.

5.0 DISCUSSIONS

5.1 Visual Tree Assessment

- 5.1.0 At the conclusion of my visual tree assessment, the Ash tree appears to be in good health with no signs of Ash Dieback present within the canopy of the tree. The branches and buds appear normal in appearance and density, with no signs of lesions on the branches.
- 5.1.1 The tree does not have the large amounts of epicormic growth within the inner crown that is commonly associated with infected trees, nor has it “held” onto the seed pods which is also commonly associated with Ash Dieback.
- 5.1.2 The tree is growing within suspected compacted soil to its northern aspect and pavement over its rooting area to the southern aspect. Despite the ‘poor’ growing environment in which the tree is situated it does not appear to be detrimental to the trees health at present.
- 5.1.3 Although I was unable to assess the tree itself for a closer inspection, from my observations of the main union, I have no immediate cause for concern.
- 5.1.4 The main union at approximately 600 millimetres height does appear to be formed with included bark, which is a common feature of many trees. I consider the union to be forming a “cup-shaped union” which is a natural form of reinforcement created by the tree. This indicates the tree is adapting to the included bark, and further indicates the good health of the tree.
- 5.1.5 I have identified a limited percentage of dead branches throughout the tree crown, and their location is within the inner crown, indicating to me that this is due to being shaded out and nothing more concerning.

5.2 Common Ash Tree Risk Assessment

- 5.2.0 I used 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. More detail can be found in Appendix 1 and Appendix 2 below.
- 5.2.1 Only the dead branches were included within this risk assessment as I judged these to have the greatest likelihood of failure. I do not consider the trifurcated stems or branch unions to be of concern at the present time.

Target	Tree Part	Likelihood of Failure	Likelihood of Impact	Failure & Impact	Consequences	Risk Rating
People	Dead Branches	Possible	Low	Unlikely	Negligible	Low
Vehicles	Dead Branches	Possible	Very Low	Unlikely	Negligible	Low
Buildings	Dead Branches	Possible	Very Low	Unlikely	Negligible	Low

- 5.2.3 Using the methods outlined in this report, and the results of my visual inspection of the Dead Branches of the Common Ash it is my professional judgment that this tree part has a *tree risk rating* of **LOW**.
- 5.2.4 I recommend mitigation to reduce the risk to a level as low as reasonably practical, which will allow for retention of the tree and the benefits it provides to the landscape and local amenity.

5.0 DISCUSSIONS (continued...)

5.3 Technical Review & Analysis of Silverback Arboricultural Ltd Report

- 5.3.0 As a point of note, the cover page of the report advises the report was prepared in January 2024. Whilst in section 1.4 it states that the site visit was conducted Friday 24th June 2022. It would be useful to clarify if this is a typing error or if two years have elapsed between the site visit and the report being prepared as changes to the tree could have occurred during this time frame.
- 5.3.1 Section 4.2 of the Silverback Arboricultural Consultancy Ltd (from here referred to as SACL) report states that “*significant amounts of major deadwood and minor dieback*” were present within the crown of the tree. Although my site visit was carried out in the winter I did not see signs of dieback within the tree crown, figure 9 above provided by the client from summer 2023 does not indicate dieback, and the largest dead branches I identified within the tree were approximately 4 cm diameter, which I do not consider ‘major’.
- 5.3.2 I approximated that the dead branches within the tree amount to only 5% of the tree’s total crown. In my professional opinion this does not constitute a significant amount.
- 5.3.3 Also in section 4.2 of the SACL report Mr Wright identifies “*extensive epicormic growth*” present along the main branches within the crown that he says have developed due to a reaction from stress. Following my site visit and tree survey, as shown in figures 5 - 8 above, I did not identify extensive epicormic growth throughout the crown.
- 5.3.4 A final point to highlight from section 4.2 is that Mr Wright states he was informed “*the foliage of the tree was sparse last year*”. I reference my figure 9 above provided to me by Redcliffe West Resident Association, which I have been advised was taken 23rd June 2023 showing the tree in full leaf, the foliage appears normal and healthy in my opinion.
- 5.3.5 Section 4.3 of the SACL report concludes that the combination of dieback and epicormic growth is indicative of the tree being ‘infected’ with Ash Dieback. Following my visual inspection the lack of dieback, limited and internal deadwood, as well as lack of other symptoms I’ve referenced in section 5.1.2 above leads me to the conclusion the tree is not infected with Ash dieback.
- 5.3.6 Within section 4.4 Mr Wright quotes from the Tree Council *Ash Dieback Action Plan Toolkit* (Summer 2019) that Ash Dieback has a mortality rate of 90%. Unfortunately, this is misquoted and the text reads: “*90% of the 2 billion ash trees across the UK are likely to be infected*”
- 5.3.7 Within the Arboricultural Association guidance *Ash Dieback Guidance for Tree Owners, Managers, Contractors and Consultants* (January 2022), current advice is “*uninfected ash trees should not be felled unless there are other overriding management requirements to do so and if all necessary permissions are in place.*”
- 5.3.8 Within the same guide, Forest Research are quoted as saying “*With the exceptions of felling for public safety or timber production, we advise a general presumption against felling living ash trees, whether infected or not.*”
- 5.3.9 The conclusion of the SACL report, section 5 of the document, leans heavily on the consideration that the tree is infected with Ash Dieback, which I believe I have shown is not the case at present from my observation of the tree in section 3.0 within the report.
- 5.3.10 Section 5 Conclusions of the SACL report recommend the removal of the Ash tree on the grounds of the tree being a ‘health and safety risk’ but without a completed tree risk assessment included within the report. While not a formal requirement of the TPO application, this conclusion appears to be unsubstantiated without a formal risk assessment.

5.0 DISCUSSIONS (continued...)

5.3 Technical Review & Analysis of Silverback Arboricultural Ltd Report (continued...)

5.3.11 As per section 5.2 above, I have completed a formal risk assessment for the dead branches and it's my professional advice that the risk of this tree part is low. I am also unconcerned about the trifurcation of the main stems at approximately 600mm height.

6.0 CONCLUSIONS

6.0.0 At the conclusion of my visual tree assessment of the buttress, trifurcated unions and branching structure I do not believe that the tree is structurally weakened in any way that leads me to believe that there is an increased risk to persons or property at present.

6.0.1 Whilst conducting my visual tree assessment I did not see any signs of Ash Dieback present, there appeared good bud density with none of the symptoms mentioned in section 5.1.2 in the above report present.

6.0.2 Based on the images provided by the Redcliffe West Residential Association, figure 9 in the above report and using the *Tree Council Ash Dieback Disease A Guide For Tree Owners* system for classifying scale of severity, I would classify this tree as class 1. I would however wish to view the tree myself during the next growing season to confirm this.

6.0.3 After conducting my tree risk assessment for the dead branches, I have determined that this tree part is a low risk. I did not risk assess any other tree parts as I did not see any features within the tree that I believe pose a risk.

6.0.4 After reviewing the report by Silverback Arboricultural Ltd, I do not believe that it can be used as justification for the removal of the Ash tree as it directly contradicts the findings of my visual tree assessment.

6.0.5 Therefore, I believe there are suitable grounds for objection to the proposal to remove the tree as I do not believe it poses a health and safety risk at present.

6.0.6 I would strongly suggest that the tree is assessed whilst in leaf as this is when it will be easiest to spot any signs of Ash Dieback.

6.1 Common Ash Tree Recommendations

6.1.0 Based on my site observations I recommend the following proactive management.

- Continued monitoring of the tree's health to assess any signs of decline
- Removal of material against tree stem
- Application of organic mulch ring, radius 3.0 metre (minimum)
- PRUNING SPECIFICATION – Remove dead branches
- TIMEFRAME FOR COMPLETION – 1 year
- Residual Risk - low

6.1.1 I have provided a glossary of terms at the end of this report to help with understanding terminology used within this report, as well as with determining your tree care needs and final risk level.

6.1.2 It is important to understand that tree conditions do change over time, and as such, visual re-assessment is recommended annually and after major storm events.

7.0 RISK ASSESSMENT & DUTY OF CARE

7.1 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.

7.0 RISK ASSESSMENT AND DUTY OF CARE (continued...)

7.2 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.

7.3 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 properly 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: Visual Tree Assessment Report/Technical Review

REPORT STATUS: Final

REPORT COMPLETED BY: Chris Watson *Dip Arb L4 (ABC), MArborA*
Assistant Arboricultural Consultant

SIGNATURE:



DATE: 28/2/2024

REPORT REVIEWED BY: Jason Hasaka *HNDArb TechArborA*
Principal Arboricultural Consultant

SIGNATURE:



DATE: 29/02/2024

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 to which the trees are subjected.

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 a measuring tape / laser range finder 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* 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