Tree Risk Management Appraisal

of Trees within Identified Areas at

Brockhall Village, Gleneagles Drive, Old Langho, Lancashire, BB6 8AR

Prepared by:

Bowland Tree Consultancy Ltd

August 2025

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TREE RISK MANAGEMENT APPRAISAL
BROCKHALL VILLAGE, OLD LANGHO

PROJECT DETAILS

Project No.: BTC3206

Site: Brockhall Village, Old Langho, BB6 8AR

Survey Type: 'Negative Recording' Walkover Survey

Tree(s) Considered: In areas within falling distances of buildings and areas of pedestrian and vehicular usage

Report Time Frame: 12 months from date of issue

Next Inspection Date: ≈18 months from date of issue

Agent for Client: HDAK

Survey Date: 31 July 2025

Surveyor: William Hawkswell NDArb TechArborA

Report Prepared by: William Hawkswell NDArb TechArborA

Report Checked by: Joseph Lambert BSc(Hons) FdSc MArborA MICFor

Date of Issue: 15 August 2025

Version No: 1

1. CIVIL LAW REGARDING TREE OWNERSHIP AND DUTY OF CARE

1.1 Under civil law the owner of the land on which a tree stands, together with any party who has control over the tree's management, has a duty of care to take reasonable steps to prevent or minimise the risk of personal injury and/or damage to property from any tree located within the curtilage of the land in question.

1.2 In turn, it is accepted that these steps should normally include commissioning a qualified and experienced arboriculturist to survey the tree in order to identify and appraise any risk of harm to persons or damage to property that it may present and, where unacceptable risks are identified, taking suitable remedial action to negate or reduce those risks accordingly.

2. QTRA METHODOLOGY OVERVIEW AND APPLICATION IN MANAGEMENT DECISIONS

2.1 A survey was carried out in order to consider the general structural stability of the identified trees at the site and the associated risk of harm posed to persons and/or property and, from this information, to make management recommendations to reduce any risks identified to be unacceptable to a level that is considered to be either tolerable or broadly acceptable (see Table 1, below).

2.2 The Quantified Tree Risk Assessment (QTRA) methodology utilised for the tree survey (see appended QTRA Practice Note for more details) quantifies the three components of tree failure risk, which are:
i. *Target* (something with potential to be harmed and/or damaged by the mechanical failure of tree parts);
ii. *Impact Potential*; and
iii. *Probability of Failure* (within the coming year).

2.3 The product of the three component values is the annualised 'Risk of Harm', which is a combined measure of the likelihood and the consequence of tree failure considered in terms of the loss within the coming year, and is expressed as a probability. In applying the 'Tolerability of Risk Framework' (ToR) the QTRA methodology divides the 'Risk of Harm' into three threshold values, being;
1. *Unacceptable* (i.e. >1/1,000), which is unacceptable and will not ordinarily be tolerated;
2. *Tolerable* (i.e. between 1/1,000,000 and 1/1,000, where the Risk of Harm will be tolerable if it is As Low As Reasonably Practicable (ALARP); but a Risk of Harm 1/10,000 or greater will not ordinarily be Tolerable where it is imposed on others, such as the public. In the Tolerable range management decisions are informed by consideration of the benefits and costs of risk control, including benefits provided by trees that would be lost to risk control measures; and
3. *Broadly Acceptable* (<1/1,000,000), which is already ALARP.

2.4 The QTRA advisory thresholds, (see Table 1, below) are proposed as a reasonable approach to balancing safety from falling trees with the costs of risk reduction. This approach takes account of the principles of ALARP and ToR, but does not dictate how these principles should be applied. While the thresholds can be the foundation of a robust policy for tree risk management, tree managers should make decisions based on their own situation, values and resources.

Table 1: QTRA Advisory Risk Thresholds:

Threshold	Description	Action
Risk of harm of 1/1,000 or greater	**Unacceptable** - Risks will not ordinarily be tolerated	▪ Control the risk
Risk of harm between 1/1,000 and 1/10,000	**Unacceptable** (where imposed on others) - Risks will not ordinarily be tolerated	▪ Control the risk ▪ Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	▪ Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value ▪ Review the risk
Risk of harm between 1/10,000 and 1/1,000,000	**Tolerable** (where imposed on others) - Risks are tolerable if ALARP	▪ Assess costs and benefits of risk control ▪ Control the risk only where a significant benefit might be achieved at reasonable cost ▪ Review the risk
Risk of harm less than 1/1,000,000	**Broadly Acceptable** - Risk is already ALARP	▪ No action currently required ▪ Review the risk

2.5 As detailed in Table 1, a Risk of Harm less than 1/1,000,000 is Broadly Acceptable and already ALARP (i.e. 'as low as reasonably practicable'). A Risk of Harm 1/1,000 or greater is unacceptable and will not

ordinarily be tolerated. Between these two thresholds, the Risk of Harm is in the Tolerable region of the ToR Framework and will be tolerable if it is ALARP, but a Risk of Harm 1/10,000 or greater will not ordinarily be Tolerable where it is imposed on others, such as the public. Here, management decisions are informed by consideration of the benefits and costs of risk control, including benefits provided by trees that would be lost to risk control measures.

2.6 In respect of the above the assessor (i.e. Bowland Tree Consultancy Ltd) may consider the costs of risk control when providing options for management if specifically asked to do so, but the tree owner/manager, who owns the risk and therefore exercises control over the costs, must consider the balance and make the final management decision(s).

3. PROTECTED SPECIES AND STATUTORY RESTRICTIONS

Tree Preservation Orders and Conservation Area Designations

3.1 The Town & Country Planning Act (1990) (the Act) and associated Regulations empower Local Planning Authorities (LPAs) to protect trees in the interests of amenity by making Tree Preservation Orders (TPOs). The Act also affords protection for trees of over 75mm diameter that stand within the curtilage of a Conservation Area (CA). Subject to certain exemptions, an application must be made to the LPA in question to carry out works upon or to remove trees that are subject to a TPO, whilst six weeks' notice of intention must be given to carry out works upon or to remove trees within a CA that are not protected by a TPO.

3.2 According to the Ribble Valley Borough Council, contacted on 08 August 2025, although the site does not stand within a CA, there are various TPO covered trees, group's and woodlands across the site, including; T5, T6, T25, T26, G4, G5, G17, G12, G26, G27, G28, W2, W3 and W8 (1998) within the boundaries of the site. As such, it is essential that relevant permissions are obtained from the planning department of the local council, in this case Ribble Valley Borough Council, prior to scheduling or undertaking any tree works.

Protected Species

3.3 Nesting birds are afforded statutory protection under the Wildlife & Countryside Act (1981) (as amended) and their potential presence should therefore be considered when clipping hedges, removing climbing plants and pruning and removing trees. The breeding period for woodlands runs from March to August inclusive. Hedges provide valuable nesting sites for many birds and clipping should therefore be avoided during March to July. Trees, hedges and ivy should be inspected for nests prior to pruning or removal and any work likely to destroy or disturb active nests should be avoided until the young have fledged.

3.4 All bat species and their roosts are protected under Schedule 5 of the Wildlife & Countryside Act (1981) (as amended) and under Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). In this respect, it should be noted that it is possible that unidentified bat habitat features may be located high in tree crowns and all personnel carrying out tree works at the site should therefore be vigilant and mindful of the possibility that roosting bats may be present in trees with such features. If any bat roosts are identified, then it is essential that works are halted immediately and that a suitably qualified and experienced ecologist investigates and advises on appropriate actions prior to works continuing.

3.5 In turn, any subsequent works carried out in relation to any protected species must be carried out under guidance from a suitably qualified and experienced ecologist and in strict accordance with applicable industry guidance (i.e. BS8596:2015 - Surveying for Bats in Trees and Woodlands).

Felling Licences

3.6 Subject to certain exemptions the Forestry Act (1967) requires that a 'Felling Licence' be obtained to remove growing trees amounting to more than five cubic metres of timber in a calendar quarter, providing no more than two cubic metres are sold. Felling Licences are administered by the Forestry Commission and contravention of the associated controls can incur substantial penalties. A felling licence is, however, not required for trees standing within the curtilage of a private residential garden, orchard, churchyard or in public open spaces such as land registered under the Commons Act 1899, village greens, public parks and public gardens.

4. SUMMARY OF SURVEY FINDINGS AND RECOMMENDATIONS

4.1 A 'Negative Recording Walkover Tree Survey' (see 'Schedule of Operations' appended to agreed project quote) was carried out on 31 July 2025 at the site under consideration. The extents of the survey boundaries were based upon the information detailed in the previous surveys and associated report(s) carried out at the site by Bowland Tree Consultancy most recently in 2023 and through a set of ownership plans shared with the surveyor by the agent for the client's representative, Lindsay Topping of HDAK, relating to part of the woodland area to the east.

4.2 The survey identified 13 individual trees, five groups of trees and five woodlands. They are in the young to mature age range and have heights of up to 28 metres, stem diameters of up to 1030 millimetres, and maximum diametral crown spreads of up to approximately 22 metres.

4.3 The site is a private gated village consisting mainly of detached residential properties with private gardens and driveways and associated access roads, along with various areas of open space. There are also several wooded areas within the site boundaries that are evidently regularly accessed by persons via a network of footpaths and desire lines. The site is accessed via Gleneagles Drive with this road being the singular vehicle access and egress point to the village from Old Langho Road to the south-east of the site. According to online Ordnance Survey maps there are no public rights of way within the site boundaries.

4.4 It is understood that the training grounds of Blackburn Rovers Football Club, which border the residential areas to the south-west of the village, and the residential properties of Brookside which stand to the site's south-western corner, are not within the management of Brockhall Village. In turn, the survey did not include any trees that are evidently under third-party ownership, such as within Blackburn Rovers' training grounds, within private residential gardens, or within the areas surrounding the commercial buildings to the west of Gleneagles Drive.

4.5 Furthermore, it is noted that a widespread presence of Ash Dieback Disease *(Hymenoscyphus fraxineus)* was identified throughout the Ash tree population, both within the site under consideration and the wider local landscape. Consequently, all Ash trees exhibiting a late stage of decline as a result of the disease have been recommended for removal in accordance with prudent arboricultural practice.

4.6 In turn, as a guide, the surveyed Ash trees have been assessed in accordance with the following scales of approximate percentages of remaining canopy at the time of viewing:
- Class 1 – 100% canopy - Healthy trees displaying good vitality;
- Class 2 – 75% canopy - Weakened trees show treetop shoots in the degeneration phase;
- Class 3 – 50% canopy – Severely weakened trees exhibiting a significant reduction in vitality, e.g. with bushy and lumpy accumulation of growth; and
- Class 4 – 25% canopy – Trees in a state of severe decline, e.g. with large dead canopy areas and twigs and branches starting to break off.

4.7 With regard to these classifications, it is emphasised that trees falling within classes 3 and 4 are normally recommended for risk management remedial works where targets exist within falling distance of said trees.

4.8 As a component of this appraisal various targets were identified to be within falling distances of the surveyed trees, including, but not restricted to, pedestrians using both private and public rights of way, parked and moving vehicles using the internal access roads and Old Langho Road, residential properties and their gardens, recreational areas, including a children's playground, and the Blackburn Rovers' training grounds.

4.9 In turn, as highlighted with the colours orange and green in the appended Tree Survey Schedule, and in Table 2 (overleaf), the risk assessment established that all the surveyed trees have calculated QTRA risk indices that fall within the tolerable to unacceptable risk threshold range of more than 1/10,000 to less than 1,000,000, the trees that fall into the unacceptable risk category are T01 and G05, and management recommendations have been made to reduce risks to a tolerable level (please refer to Table 1, on the previous page, with regard to advisory tree risk thresholds). However, as also detailed in Table Two, various recommendations have also been made for a range of general management purposes.

Table 2: Tree Work Recommendations:

No.	Species	Management Works Recommended*	Responsible Professional	Work Priority
T1	Sycamore	1. Prune tree to remove 240mm diameter piece of deadwood at 5m height to the east of the canopy over the car park due to identified increased risk of failure and subsequent unacceptable risk of harm to property.	1. Tree contractor	1. High
T3	Common Oak	1. Reduce tree to a monolith at 4m height due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Stem to be retained as standing deadwood of habitat value.	1. Tree contractor	1. High
T4	Common Beech	Option 1: 1. Prune tree to remove severely declined western co-dominant stem over the Gleneagles Drive due to identified increased risk of failure and subsequent increased risk of harm to persons; or, Option 2 2. Remove tree due to identified increased risk of failure and subsequent increased risk of harm to persons.	1. Tree contractor 2. Tree contractor	1. High 2. High
T5	Sycamore	1. Remove tree due to evident progressive decline, identified increased risk of failure and subsequent increased risk of harm to persons.	1. Tree contractor	1. Moderate
T6	Common Beech	1. Remove tree due to evident progressive decline, identified increased risk of failure and subsequent increased risk of harm to persons.	1. Tree contractor	1. High
T7	Sycamore	1. Remove tree due to evident progressive decline, identified increased risk of failure and subsequent increased risk of harm to persons.	1. Tree contractor	1. Moderate
T8	Common Oak	1. Prune tree to remove snapped out branch due to identified increased risk of failure. 2. Prune remaining tree canopy to reduce by approximately 2-3m to reduce static and dynamic loading on branches and prevent further branch failures.	1. Tree contractor 2. Tree contractor	1. Moderate 2. Low
T10	Common Alder	1. Reduce tree to a monolith at 4m height due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Stem to be retained as standing deadwood of habitat value and brash as fallen deadwood of habitat value in woodland area.	1. Tree contractor	1. Moderate
T11	Common Oak	1. Reduce tree to a monolith at 4m height due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Stem to be retained as standing deadwood of habitat value and brash as fallen deadwood of habitat value in woodland area.	1. Tree contractor	1. High
T13	Sycamore	1. Prune tree to remove deadwood from lower canopy >75mm diameter over desire line to south, by snapping, due to identified increased risk of failure and subsequent risk of harm to persons.	1. Tree contractor	1. Moderate
G1	2no. Common Horse Chestnut, 1no. Sycamore	1. Prune tree canopies within group to attain an approximately 1.5m clearance from the building to the east (M).	1. Tree contractor	1. High

Table continued overleaf

Table 2: Tree Work Recommendations (continued):

G2	2no. Silver Birch	1. Prune tree canopies to attain approximately 5.05m ground clearance over road (M).	1. Tree contractor	1. Moderate
G3	Various Species	1. Prune applicable tree canopies to attain approximately 5.05m ground clearance over road (M).	1. Tree contractor	1. Moderate
G4	Common Ash	1. Remove semi mature Ash falling into ADD class 3 or higher within falling distance of desire lines from the group due to identified increased risk of failure and subsequent increased risk of harm to persons.	1. Tree Contractor	1. Moderate
G5	1no. Common Beech, 1no. Common Oak	1. Remove group due to evident progressive decline and increased risk of failure and subsequent unacceptable risk of harm to persons.	1. Tree contractor	1. High
W1	Various Species	1. Prune applicable trees to remove deadwood >40mm diameter over footpath through woodland due to identified increased risk of failure. 2. Prune applicable tree canopies to attain approximately 5.05m ground clearance over road (M).	1. Tree contractor 2. Tree contractor	1. High 2. Moderate
W2	Various Species	1. Prune applicable trees to attain adequate clearance from football pitch fencing to north (M).	1. Tree contractor	1. Moderate
W4	Various Species	1. Instruct forestry/arb contractor to undertake woodland management works including: Removal of Ash succumbing to ADD due to identified increased risk of failure and silvicultural thinning of remaining species where appropriate inclusive of restocking of areas of removed Ash.	1. Client	1. Moderate

*Note: it shall be the client's responsibility to arrange contact with the applicable council's planning department to check for any statutory tree protection, and obtain any necessary permissions if required, prior to scheduling or carrying out any tree works

4.10 Where trees are recommended for removal, whether for risk management purposes or for other arboricultural management reasons, then it is strongly recommended that replacement trees of suitable sizes and species be planted in appropriate locations of the site, both in order to compensate for the loss of the multiple benefits the trees provided to the environment, and to help ensure continuity of canopy cover in the local area. Accordingly, new tree planting advice should be sought from the project tree consultant.

4.11 Subsequently, any new tree planting should be carried out in strict accordance with BS8545:2014 that they are of a suitable quality for usage, and that they are provided with adequate care and maintenance following planting for them to successfully establish and, over the long term, grow to maturity.

5. GENERAL TREE MANAGEMENT COMMENTS

5.1 During the course of the survey, it was noted that the canopies of a number of the trees border and overhang footpaths and carriageways of adjacent roads. In this respect it is generally accepted that the minimum clearances should be 2.4 metres over a footpath and 5.05 metres over a road which, in turn, should give sufficient clearance for a person with a raised umbrella to walk unimpeded along a footpath and for a double-decker bus to travel along a road without striking any overhanging branches.

5.2 As such, it is essential that periodic maintenance pruning should be carried out to applicable trees to ensure the clearances are maintained in order to avoid future tree canopy conflicts with highway and footpath users.

6. TREE RISK MANAGEMENT STRATEGY RECOMMENDATIONS

6.1 In consideration of the moderately to moderately high usage of various areas adjacent to and within the site, in particular along Old Langho Road and the access driveways and around the properties themselves, and the associated identified targets such as moving vehicles and their occupants and pedestrians, it is subsequently recommended that all of the retained trees be re-inspected on a cyclical programme of roughly every 18 months, so that they can be alternately viewed whilst in and out of leaf in order to monitor both their structural and physiological condition and, consequently, for the site occupiers to meet their duty of care. In this respect it is therefore recommended that the trees be re-inspected during late winter 2026/2027.

6.2 Finally, in addition to the re-inspection cycle mentioned above, the trees, groups and in particular the woodlands on site should be passively monitored by the grounds maintenance staff during normal routine ground works in order to look for obvious defects and hazards, such as stem or branch splits and cracks, broken branches etc., particularly following severe inclement weather events. As such, it is strongly recommended that the persons charged with maintaining the grounds undertake some basic tree risk management training in order to confidently identify obvious tree defects which, in turn, can then be rectified where appropriate or, where considered necessary referred to the tree consultant.

Site:	Brockhall Village, Gleneagles Drive, Old Langho, Lancashire, BB6 8AR
Agent:	HDAK
Brief:	Carry out a negative recording 'Walkover Tee Survey' within area specified by agent for client, report on risk posed to persons and property, and make management recommendations where appropriate

Surveyor:	William Hawkswell NDArb TechArborA
Survey Date:	31 July 2025
Viewing Conditions:	Overcast, slight breeze
Job Reference:	BTC3206

No.	Species	Age	Height (m)	Stem Diam. (mm)	Crown Spread (m)	Vitality	Comments	Management Recommendations	Risk Assessment Description (Part/Target)	Target	Size	P.O.F	Reduced Mass %	Risk Index	Work Priority
T1	Sycamore	M	21	570	10	M	▪ Moderate stem lean east over car park for local shop. ▪ Large piece of deadwood over car park to the east at approximately 5m height, 9m in length and approximately 240mm diameter. ▪ Moderate thinning of canopy with moderate deadwood up to approximately 90mm throughout the rest of the canopy.	▪ Tree contractor to prune tree to remove 240mm diameter piece of deadwood at 5m height to the east of the canopy over the car park due to identified increased risk of failure and subsequent unacceptable risk of harm to property.	P = Deadwood up to approximately 240mm diameter. T = Parked vehicles.	3	P	2	N/A	3K	H
T2	Red Oak	M	23	660	11	G	▪ Tree located on edge of group adjacent to roundabout junction. ▪ Severe stem and canopy bias north east over Gleneagles Drive. ▪ Exposed surface roots around the circumference of the stem. ▪ Large basal cavity at ground level to the north east of the stem, 450mm wide and 300mm high with evident cubical brown rot decay within. ▪ Moderate occluding wood present. ▪ Hollowing estimated to extend up to 2m up the main stem when sounded with a nylon mallet. ▪ Moderately severe bottle butt bulging at a height of 1.8m up to 2.5m to the north of the stem extending from the east to west cardinal points. ▪ Branches to the north are beginning to encroach the grass area beneath the tree.	▪ Tree consultant to monitor structural and physiological condition of tree through ongoing cyclical inspections.	P = Stem at ground level. T = Vehicles and occupants stopped at road junction	3	1	5	N/A	<1M	L

HEADINGS & ABBREVIATIONS

NO. TREE/GROUP REFERENCE NUMBER. REFER TO PLAN OR NUMBERED TAGS WHERE APPLICABLE
SPECIES: COMMON NAME
AGE: Y = YOUNG, SM = SEMI MATURE, EM = EARLY MATURE, M = MATURE, PM = POST MATURE
HEIGHT: APPROXIMATELY 80% OF TREES ARE MEASURED USING AN ELECTRONIC CLINOMETER AND THE REMAINDER ESTIMATED AGAINST THE MEASURED TREES
DIAMETER: STEM DIAMETER MEASURED OR ESTIMATED AT A HEIGHT OF APPROXIMATELY 1.3 METRES
CROWN SPREAD: MEASURED OR ESTIMATED DIAMETER OF CROWN(S) AT THE WIDEST POINT
VITALITY: A MEASURE OF PHYSIOLOGICAL CONDITION WHEREBY D = DEAD, MD = MORIBUND, P = POOR, M = MODERATE, G = GOOD
MANAGEMENT: SUFFIXES: (M) = FOR GENERAL ARBORICULTURAL OR SILVICULTURAL MANAGEMENT; (S) = TO REMOVE OR REDUCE THE RISK OF DIRECT DAMAGE TO A FIXED STRUCTURE BY MEANS OF CIRCUMFERENTIAL ROOT, STEM OR BRANCH GROWTH; (I) = TO ENABLE THE TREE(S) TO BE INSPECTED FURTHER FOR RISK ASSESSMENT PURPOSES
TARGET RANGE: HIGHEST VALUE TARGET THAT THE MOST SIGNIFICANT PART LIKELY TO FAIL COULD STRIKE. RANGES 1-6. 1 = HIGH, 6 = LOW VALUE/OCCUPANCY
RISK ASSESSMENT DESCRIPTION: DESCRIPTION OF PART IDENTIFIED AS MOST LIKELY TO FAIL AND ASSOCIATED TARGET, ASSESSED IN ACCORDANCE WITH QTRA SYSTEM
SIZE RANGE: SIZE CATEGORY OF MOST SIGNIFICANT PART CONSIDERED LIKELY TO FAIL. - RANGES 1-4 WHEREBY 1 = LARGE, 4 = SMALL, P = PROPERTY
P.O.F: PROBABILITY OF FAILURE WITHIN 12 MONTHS. RANGES 1-7. 1 = HIGH, 7 = LOW
REDUCED MASS %: WHERE THE MASS OF A TREE OR BRANCH IS REDUCED BY DEGRADATION THE RISK INDEX IS MULTIPLIED TO REFLECT THE PERCENTAGE OF MASS REDUCTION
RISK INDEX: E.G. RISK INDEX 20 = RISK OF SIGNIFICANT HARM 1 IN 20,000. AN ADDITIONAL FIGURE, IN BRACKETS, MAY BE SUFFIXED 'T' REPRESENTING THE RATE OF MULTIPLE OCCUPATION OVER THE YEAR, E.G. 10(10T) REPRESENTS A RISK OF HARM 1/10,000 TO 10 OCCUPANTS OR AN EQUIVALENT MONETARY VALUE. SEE QTRA PRACTICE NOTE FOR MORE INFORMATION REGARDING COLOURS USED TO SIGNIFY RISK INDEX
WORK PRIORITY: H (HIGH) = TREE WORKS TO BE GIVEN IMMEDIATE CONSIDERATION. M (MODERATE) = TREE WORKS TO BE CARRIED OUT WITHIN 12 MONTHS OF SURVEY (TIMING MAY BE SPECIFIED IN MANAGEMENT RECOMMENDATIONS). L (LOW) = TREE WORKS THAT ARE NOT CONSIDERED ESSENTIAL FOR RISK MANAGEMENT PURPOSES, BUT ARE RECOMMENDED IN ACCORDANCE WITH PRUDENT ARBORICULTURAL MANAGEMENT (TO BE REVIEWED IN 12 MONTHS, OR SPECIFIED TIME, IF APPLICABLE). N/A = NOT APPLICABLE

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Surveyor:	William Hawkswell NDArb TechArborA
Survey Date:	31 July 2025
Viewing Conditions:	Overcast, slight breeze
Job Reference:	BTC3206

No.	Species	Age	Height (m)	Stem Diam. (mm)	Crown Spread (m)	Vital-ity	Comments	Management Recommendations	Risk Assessment Description (Part/Target)	Target	Size	P.O.F	Reduced Mass %	Risk Index	Work Priority
T3	Common Oak	M	15	690	3	MD	▪ Tree located in woodland group running parallel to Gleneagles Drive, adjacent to footpath through woodland group. ▪ Moderate easterly stem bias from 8m height. ▪ Managed grass area directly below stem. ▪ Top 10m of the tree at 550mm diameter is dead, minor amount of epicormic reaction growth at a height of 5m to the north west of the stem. ▪ Large lateral wound from 6m height to 10m height on the south east of the stem.	▪ Tree contractor to reduce tree to a monolith at 4m height due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Stem to be retained as standing deadwood of habitat value.	P = Main stem at 6m, approximately 460mm diameter. T = Persons using woodland and managed grass area below dead stem.	4	1	2	N/A	40K	H
T4	Common Beech	M	22	840	14	P	▪ Two areas of soft rot decay causing *Kretzschmaria Deusta* to the south east of the stem at 750mm height and to the south west of the stem at 650mm height, showing a progression in colonisation since the last survey in October 2023. ▪ Canopy to the west is displaying a severe reduction in vitality, particularly the co-dominant leader over the adjacent Gleneagles Drive, arising from the main stem bifurcation at 5.5m height. ▪ Canopy to the east over the managed grass area within the woodland group and footpath through woodland group showing a moderate reduction in vitality.	Option 1: ▪ Tree contractor to prune tree to remove severely declined western co-dominant stem over the Gleneagles Drive due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Tree consultant to review physiological condition in 12 months' time; or, Option 2 ▪ Tree contractor to remove tree due to identified increased risk of failure and subsequent increased risk of harm to persons.	P = Co dominant stem of approximately 400mm diameter at 5.5m height. T = Vehicles travelling on road.	3	2	3	N/A	100 K	H
T5	Sycamore	SM	18	340	6	P	▪ Severe ivy cover up stem. ▪ Severe reduction in vitality. ▪ Minor western stem and moderate western canopy bias over adjacent Gleneagles Drive. ▪ Moderately severe dieback in tips of canopy to the west.	▪ Tree contractor to remove tree due to evident progressive decline, identified increased risk of failure and subsequent increased risk of harm to persons.	P = Primary branches at 5Am height, up to approximately 200mm diameter. T = Vehicles and occupants travelling on road.	3	3	3	N/A	1M	M

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T6	Common Beech	EM	16	470	7	P	▪ Wound from ground level to 1.8m height and up to 100mm wide to the west of the stem with no occluding wood present. ▪ Severe thinning to whole tree canopy indicating a severe reduction in vitality. ▪ Approximately 220mm diameter snap out wound at the top of the canopy with evidently no occluding wood present. ▪ Top third of the canopy is subsequently dead. ▪ Moderate stem and canopy bias east into woodland group and over path through woodland.	▪ Tree contractor to remove tree due to evident progressive decline, identified increased risk of failure and subsequent increased risk of harm to persons.	P = Whole tree at ground level. T = Persons using outdoor amenity space in woodland group.	4	1	3	N/A	400 K	H
T7	Sycamore	SM	14	270	6	P	▪ Moderately severe thinning of canopy indicating a reduction in vitality. ▪ Top third of the canopy is dead, up to approximately 160mm diameter.	▪ Tree contractor to remove tree due to evident progressive decline, identified increased risk of failure and subsequent increased risk of harm to persons.	P = Dead top up to approximately 160mm diameter. T = Persons using outdoor amenity space below tree.	4	3	2	N/A	500 K	M
T8	Common Oak	M	28	1030	22	G	▪ Located between moderate usage road and moderate usage footpath. ▪ Approximately 250mm diameter snapped out branch from the lower canopy resting in lower use area beneath the tree, part on the ground part resting against the stem. ▪ Moderate canopy bias south east towards adjacent road, growing out of woodland.	▪ Tree contractor to prune tree to remove snapped out branch due to identified increased risk of failure. ▪ Tree contractor to prune remaining tree canopy to reduce by approximately 2-3m to reduce static and dynamic loading on branches and prevent further branch failures.	P = Branches up to approximately 250mm diameter. T = Persons using internal woodland footpath.	4	3	3	N/A	<1M	L

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Agent:	HDAK
Brief:	Carry out a negative recording 'Walkover Tee Survey' within area specified by agent for client, report on risk posed to persons and property, and make management recommendations where appropriate

Surveyor:	William Hawkswell NDArb TechArborA
Survey Date:	31 July 2025
Viewing Conditions:	Overcast, slight breeze
Job Reference:	BTC3206

No.	Species	Age	Height (m)	Stem Diam. (mm)	Crown Spread (m)	Vital-ity	Comments	Management Recommendations	Risk Assessment Description (Part/Target)	Target	Size	P.O.F	Reduced Mass %	Risk Index	Work Priority
T9	Common Beech	M	24	610	16	M	▪ Not fully accessed to view or inspect in detail due to being located behind managed length of hawthorn hedge and in approximately 1.5m high nettle and bramble area of woodland. ▪ Located north west of road with associated public footpath of moderate use. ▪ Canopy bias south east over road and associated public footpath. ▪ Moderately severe reduction in vitality of upper canopy resulting in deadwood of up to approximately 90mm diameter throughout the canopy. ▪ Canopy beginning to encroach road.	▪ Tree consultant to monitor structural and physiological condition of tree through ongoing cyclical inspections.	P = Deadwood up to approximately 90mm diameter. T = Vehicles and occupants travelling on road.	3	4	3	N/A	<1M	L
T10	Common Alder	PM	13	3x550 (ms)	15	P	▪ Located directly over moderate use footpath through woodland group. ▪ Severe reduction in vitality. ▪ Dead branches up to approximately 240mm diameter. ▪ Saprophytic white rot decay fungi *Stereum sp.* present at the base of the tree indicating dysfunctional wood area.	▪ Tree contractor to reduce tree to a monolith at 4m height due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Stem to be retained as standing deadwood of habitat value and brash as fallen deadwood of habitat value in woodland area.	P = Deadwood up to approximately 240mm diameter. T = Persons using footpath through woodland.	4	3	2	N/A	500 K	M
T11	Common Oak	EM	22	400	9	P	▪ Large lateral wound from ground level up to 13m height, up to approximately 280mm wide. ▪ Severe thinning and dieback in canopy. ▪ Moderate occluding wood present. ▪ Moderate stem and canopy bias east over moderate use footpath through woodland.	▪ Tree contractor to reduce tree to a monolith at 4m height due to identified increased risk of failure and subsequent increased risk of harm to persons. NB: Stem to be retained as standing deadwood of habitat value and brash as fallen deadwood of habitat value in woodland area.	P = Main stem at approximately 6m height, up to approximately 300mm diameter. T = Persons walking on footpath through woodland.	4	2	2	N/A	100 K	H

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T12	Sycamore	M	23	750	16	MD	▪ Located over evidently low use area of woodland and therefore recommended to retain and let deteriorate naturally to enhance habitat value in the woodland. ▪ Footpath located 10m to the west of the stem however tree has moderately severe canopy bias east away from the footpath into an evidently low use part of the woodland with a dense and high understory. ▪ Not accessed to view or inspect in detail due to 2m high undergrowth around the base of the tree. ▪ Approximately 5-10% canopy remaining.	▪ Tree consultant to monitor structural and physiological condition of tree through ongoing cyclical inspections.	P = Dead and moribund branches up to approximately 200mm diameter. T = Persons using woodland area below tree.	5	3	2	N/A	<1M	L
T13	Sycamore	M	23	900	22	P	▪ Southern side of canopy showing a severe reduction in vitality. ▪ Partial decay cavity visible at ground level on south side but obscured by Holly bushes. ▪ Remaining buttresses to north east and west sounded with nylon mallet and gave no indication of significant hollowing at time of survey. ▪ Four pieces of deadwood over evident desire line to south in lower canopy up to approximately 6m long and 150mm diameter.	▪ Tree contractor to prune tree to remove deadwood from lower canopy >75mm diameter over desire line to south, by snapping, due to identified increased risk of failure and subsequent risk of harm to persons.	P = Deadwood up to approximately 150mm diameter. T = Persons using evident desire lines.	4	3	2	N/A	500 K	M
G1	2no. Common Horse Chestnut, 1no. Sycamore	M	≤ 21	≤ 500	≤ 12	G	▪ Canopies encroaching building to the east by approximately 2m.	▪ Tree contractor to prune tree canopies within group to attain an approximately 1.5m clearance from the building to the east (M).	P = Deadwood up to approximately 90mm diameter. T = Building property.	4	P	3	N/A	300 K	H
G2	2no. Silver Birch	EM	≤ 16	≤ 390	≤ 8	G	▪ Located on banking adjacent to roundabout road junction. ▪ Canopies encroaching Gleneagles Drive to the south west of the group.	▪ Tree contractor to prune tree canopies to attain approximately 5.05m ground clearance over road (M).	P= Deadwood up to approximately 25mm diameter. T = Vehicles and occupants stopped at road junction.	3	4	3	25%	<1M	M

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G3	Horse Chestnut, Common Lime, Common Oak, Common Alder, Silver Birch	Y-M	≤ 16	≤ 660	≤ 12	M-G	▪ Linear group adjacent to Gleneagles Drive. ▪ Buttresses in contact with footpath edge on east side and causing minor displacement in parts. ▪ Canopies of trees to the north of the group are beginning to encroach the road to the east. ▪ One Common Oak and one Common Alder to south of group have canopies heavily encroaching footpath to the east. ▪ Lime (3rd mature tree from south) has fungal fruiting bodies of white rot decay causing *Ganoderma* sp. between buttresses from ground level up to approximately 300mm height on west side. ▪ No significant hollowing when sounded with nylon mallet and canopy displaying moderately good overall vitality. ▪ Horse Chestnuts have various levels of past colonisations by Horse Chestnut Bleeding Canker. ▪ Likely some historic root damage from footpath installation with some instances of small clumps of fungal fruiting bodies of white rot decay causing *Pholiata squarrosa* likely associated with previous root damage. ▪ Tree to south of group has historic un-occluded stem wound of approximately 1m width to south-east from ground level to a height of approximately 1.2m, with evident reaction wood either side of wound. ▪ No visible indications of progressive decay and/or hollowing at time of survey.	▪ Tree contractor to prune applicable tree canopies to attain approximately 5.05m ground clearance over road (M).	P = Branches up to approximately 180mm diameter. T = Vehicles and occupants.	2	3	4	N/A	<1M	M
G4	Common Ash	SM	≤ 12	≤ 200	≤ 5	P-D	▪ Multiple areas of semi mature Ash within falling distance of desire lines. ▪ All colonised by Ash Dieback Disease (ADD) with remaining canopies falling into Class 3/4 (see paragraph 4.5 of the cover).	▪ Tree contractor to remove semi mature Ash falling into ADD class 3 or higher within falling distance of desire lines from the group due to identified increased risk of failure and subsequent increased risk of harm to persons.	P = Dead and moribund stems up to approximately 200mm diameter. T = Persons using informal desire lines through group.	4	3	2	N/A	500 K	M

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G5	1no. Common Beech, 1no. Common Oak.	M	≤ 24	≤ 700	≤ 16	P	▪ Located adjacent to moderate usage footpath running north to south through the woodland group, located to the west of the group. ▪ Beech to west of group has large wound to the north, east and south of stem from ground level up to 3m height, encompassing approximately 50% of the circumference of the stem with decay pockets approximately 150mm by 150mm to the north and east buttresses extending down more than 400mm into the root plate when probed. ▪ Evident progressive soft rot decay within stem, hollowing estimated to extend past 3m height when sounded with nylon mallet. ▪ No occluding wood present. ▪ Moderately severe reduction in vitality in the upper canopy. ▪ Oak to east of the group has large basal cavity from ground level up to 1m height and up to 500mm in width with evident progressive soft rot within. ▪ Hollowing extends up to 2m up the stem when sounded with nylon mallet. ▪ Moderate stem lean east away from footpath.	▪ Tree contractor to remove group due to evident progressive decline and increased risk of failure and subsequent unacceptable risk of harm to persons.	P = Whole tree at ground level up to 700mm diameter. T = Persons using footpath.	4	1	1	N/A	4K	H
W1	Common Alder, Oak, Beech, Ash, horse Chestnut, Lawson Cypress, Sycamore, Silver Birch, Norway Maple, Scots Line, Willow	M	≤ 23	≤ 900	≤ 20	MD-G	▪ Mixed woodland area with evident moderate usage throughout by persons as an outdoor amenity space. ▪ Group runs parallel to the Gleneagles Drive Road, the main entrance to the site. ▪ Moderate usage footpath through the centre of the group running north west to south east. ▪ Moderate amount of deadwood throughout group over footpath, up to approximately 180mm diameter and up to approximately 3.5m in length. ▪ Ash throughout group displaying ADD Class 1. ▪ Canopies of trees to the south west of the woodland area beginning to encroach the road.	▪ Tree contractor to prune applicable trees to remove deadwood >40mm diameter over footpath through woodland due to identified increased risk of failure. ▪ Tree contractor to prune applicable tree canopies to attain approximately 5.05m ground clearance over road (M).	P Deadwood up to approximately 180mm diameter. T = Persons walking of public footpath through woodland.	4	3	2	N/A	500 K	H

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No.	Species	Age	Height (m)	Stem Diam. (mm)	Crown Spread (m)	Vital-ity	Comments	Management Recommendations	Risk Assessment Description (Part/Target)	Target	Size	P.O.F	Reduced Mass %	Risk Index	Work Priority
W2	Oak, Beech, Alder, silver Birch, Scots Pine, Hazel, Holly, Rowan	M	≤ 22	≤ 850	≤ 18	M	▪ Woodland belt between football training pitches and Old Langho Road. ▪ Areas within woodland area evidently being used to dispose of garden waste, with some areas having rubbish disposed in the woodland, particularly to the north east of the woodland ▪ Several Oaks showing a moderate reduction in vitality. ▪ Canopies to north contacting fence of all weather football pitches.	▪ Tree contractor to prune applicable trees to attain adequate clearance from football pitch fencing to north (M).	P = Deadwood up to approximately 100mm diameter. T = Vehicles and occupants on Old Langho Road.	2	4	2	50%	100 K	M
W3	Oak, Holly, Silver Birch, Sycamore, Ash, Hawthorn	M	≤ 22	≤ 810	≤ 18	M	▪ Located between Blackburn Rovers' artificial sports pitch to east and rear gardens of residential houses on Brookside to west. ▪ Predominantly mature Oak woodland growing in moderately dense to dense ground vegetation and Hawthorn/Holly understorey, which severely restricted detailed inspection of trees in parts. ▪ Oak to centre/east of woodland adjacent to training pitch has sustained failure of approximately 280mm diameter branch at a height of approximately 14m. ▪ Small amount of deadwood up to approximately 100mm diameter over residential gardens to west. ▪ Areas of fencing encroaching into woodland by homeowners with gates backing into woodland and debris disposed of internally. ▪ Canopies in close proximity to all weather pitch fence to east.	▪ Tree consultant to monitor structural and physiological condition of woodland through ongoing cyclical inspections.	P = Deadwood up to approximately 100mm diameter over neighbouring gardens. T = Persons using residential gardens below tree canopies.	3	4	2	50%	1M	M
W4	Ash, Spruce, Scots Pine, Sycamore, Beech, Oak, Cherry, Hawthorn, Common Oak	EM-M	≤ 16	≤ 400	≤ 9	P-G	▪ Plantation of predominantly Scots Pine, Ash and Spruce. ▪ Several main paths lead from cemetery to the south east towards the river and Great Wood. ▪ Evidently little silvicultural management of plantation has been undertaken in recent years. ▪ Areas of Ash within woodland, notably to the south east bordering the cemetery, showing severe colonisation by ADD, falling into Class 3/4. ▪ Woodland areas border adjacent caravan park to the west with the species predominantly pine and spruce in this area. ▪ Areas of woodland not accessed due to dense undergrowth and dense woodland.	▪ Client to instruct forestry/arb contractor to undertake woodland management works including: Removal of Ash succumbing to ADD due to identified increased risk of failure and silvicultural thinning of remaining species where appropriate inclusive of restocking of areas of removed Ash.	P = Dead and moribund stems up to approximately 200mm diameter. T = Persons using informal paths through woodland.	4	3	2	N/A	1M	M

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W5	Common Alder, Oak, Beech, Ash, Horse Chestnut, Sycamore, Silver Birch, Holly, Scots Pine, Wild Cherry, Norway Spruce, Wych Elm	M	≤ 24	≤ 950	≤ 18	P	▪ Predominantly mature deciduous trees growing within established woodland to east of main developed site. ▪ Eastern edge of woodland has been removed in places, initially in order to allow development to occur. ▪ Some evidence of piecemeal removal of individual trees from woodland edge, and retained trees having either been topped or had branches lopped back. ▪ Trees which now make up eastern edge of woodland have attenuated crowns and are relatively slim in terms of their stem widths and overall heights. ▪ Several frequently used paths and desire lines were observed throughout woodland and some residential properties to east have gated access which back onto it. ▪ Numerous waterlogged areas within woodland, more so to south-western edge. ▪ Small to moderate amounts of deadwood up to 200mm diameter within several mature trees' canopies. ▪ Several mature Beech to top of steep bank leading to river in western area have sustained significant soil erosion below root plate to south and west. ▪ Several semi-mature to early-mature Beech and Sycamore have basal cavities. ▪ Squirrel damage observed to canopies of several Beech and Sycamore. ▪ NB: Understood, from information provided by agent for client, that several areas of woodland to north are now under private ownership, with these areas indicated approximately on plans supplied via e-mail on the day of the survey. As such, these areas are understood to be under private ownership and were not subsequently included within the survey.	▪ Tree consultant to monitor structural and physiological condition of woodland through ongoing cyclical inspections.	P = Deadwood up to approximately 200mm diameter. T = Persons using unmade paths and desire line through woodland.	4	3	2	N/A	500 K	L

T = Individual Tree | G = Group of trees | W = Woodland Group

- **(Red) = Tree/Group/Woodland with Risk of Harm of 1/1,000 or greater**
- **(Orange) = Tree/Group/Woodland with Risk of Harm between 1/1,000 and 1/10,000**
- **(Yellow) = Tree/Group/Woodland with Risk of Harm between 1/10,000 and 1/1,000,000**
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*** See QTRA Methodology Overview and Application in Management Decisions Section of Report for details regarding Risk of Harm**

Site: Brockhall Village, Gleneagles Drive, Old Langho, Lancashire, BB6 8AR

Job No. BTC3206

Scale: Not to Scale

Paper Size (for printing): A4

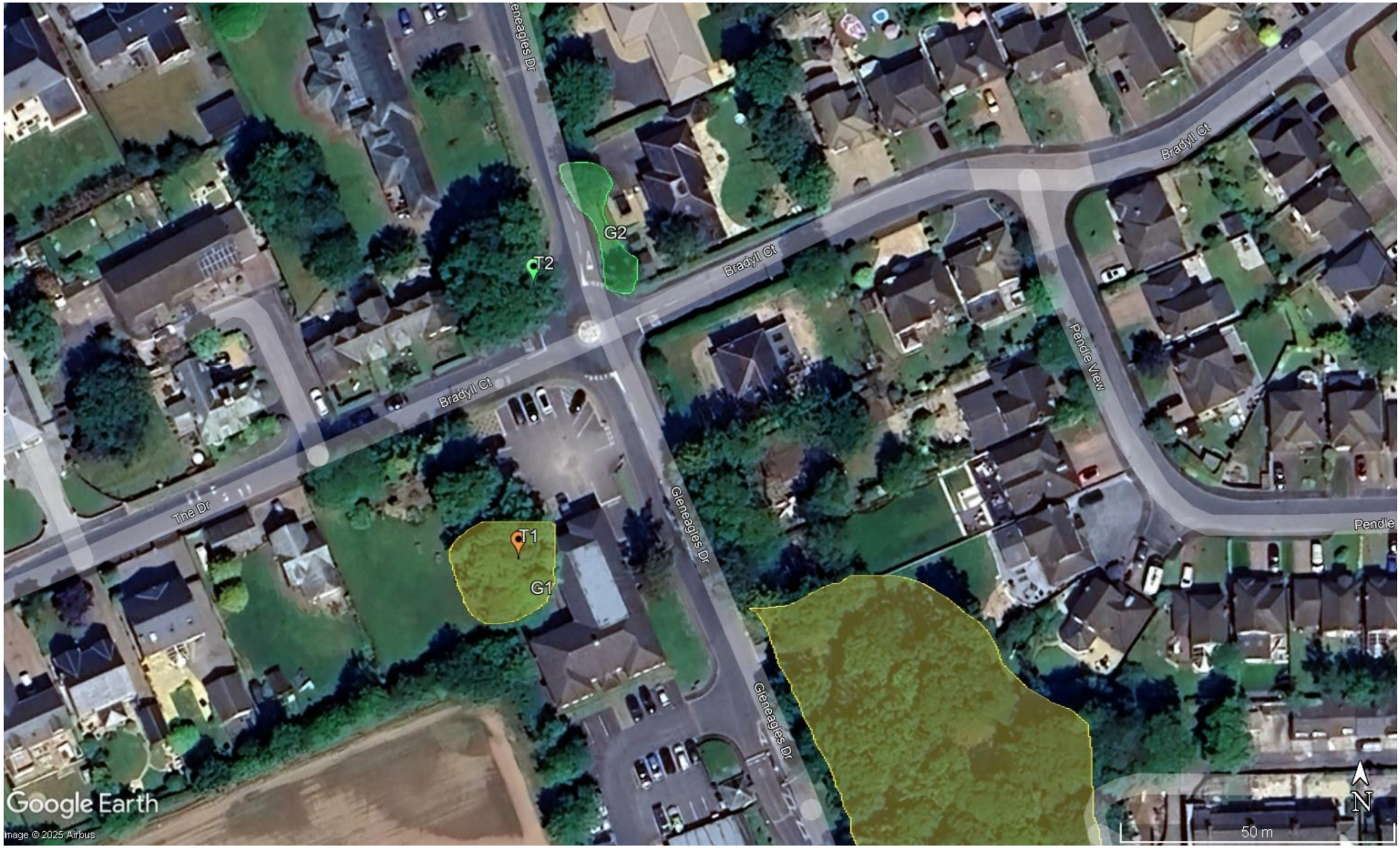
Date: August 2025

TREE SURVEY PLAN

(Overview)

Bowland Tree Consultancy Ltd

e: info@bowlandtreeconsultancy.co.uk
t: 01772 437150



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Site: Brockhall Village, Gleneagles Drive, Old Langho, Lancashire, BB6 8AR

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TREE SURVEY PLAN

(Plan 1 of 4)

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Site: Brockhall Village, Gleneagles Drive, Old Langho, Lancashire, BB6 8AR

Job No. BTC3206

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Date: August 2025

TREE SURVEY PLAN

(Plan 2 of 4)

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*** See QTRA Methodology Overview and Application in Management Decisions Section of Report for details regarding Risk of Harm**

Site: Brockhall Village, Gleneagles Drive, Old Langho, Lancashire, BB6 8AR

Job No. BTC3206

Scale: Not to Scale

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Date: August 2025

TREE SURVEY PLAN

(Plan 3 of 4)

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Date: August 2025

TREE SURVEY PLAN

(Plan 4 of 4)

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Quantified Tree Risk Assessment

Simply Balancing Risks With Benefits

Quantified Tree Risk Assessment

PRACTICE NOTE

VERSION 5

Quantified Tree Risk Assessment Practice Note

"***When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind"***

William Thomson, Lord Kelvin, Popular Lectures and Addresses [1891-1894]

1. INTRODUCTION

Every day we encounter risks in all of our activities, and the way we manage those risks is to make choices. We weigh up the costs and benefits of the risk to determine whether it is acceptable, unacceptable, or tolerable. For example, if you want to travel by car you must accept that even with all the extensive risk control measures, such as seat-belts, speed limits, airbags, and crash barriers, there is still a significant risk of death. This is an everyday risk that is taken for granted and tolerated by millions of people in return for the benefits of convenient travel. Managing trees should take a similarly balanced approach.

A risk from falling trees exists only if there is both potential for tree failure and potential for harm to result. The job of the risk assessor is to consider the likelihood and consequences of tree failure. The outcome of this assessment can then inform consideration of the risk by the tree manager, who may also be the owner.

Using a comprehensive range of values[1], Quantified Tree Risk Assessment (QTRA) enables the tree assessor to identify and analyse the risk from tree failure in three key stages. 1) to consider land-use in terms of vulnerability to impact and likelihood of occupation, 2) to consider the consequences of an impact, taking account of the size of the tree or branch concerned, and 3) to estimate the probability that the tree or branch will fail onto the land-use in question. Estimating the values of these components, the assessor can use the QTRA manual calculator or software application to calculate an annual Risk of Harm from a particular tree. To inform management decisions, the risks from different hazards can then be both ranked and compared, and considered against broadly acceptable and tolerable levels of risk.

A Proportionate Approach to Risks from Trees

The risks from falling trees are usually very low and high risks will usually be encountered only in areas with either high levels of human occupation or with valuable property. Where levels of human occupation and value of property are sufficiently low, the assessment of trees for structural weakness will not usually be necessary. Even when land-use indicates that the assessment of trees is appropriate, it is seldom proportionate to assess and evaluate the risk for each individual tree in a population. Often, all that is required is a brief consideration of the trees to identify gross signs of structural weakness or declining health. Doing all that is reasonably practicable does not mean that all trees have to be individually examined on a regular basis (HSE 2013).

The QTRA method enables a range of approaches from the broad assessment of large collections of trees to, where necessary, the detailed assessment of an individual tree.

Risk of Harm

The QTRA output is termed the Risk of Harm and is a combined measure of the likelihood and consequences of tree failure, considered against the baseline of a lost human life within the coming year.

ALARP (As Low As Reasonably Practicable)

Determining that risks have been reduced to As Low As Reasonably Practicable (HSE 2001) involves an evaluation of both the risk and the sacrifice or cost involved in reducing that risk. If it can be demonstrated that there is gross disproportion between them, the risk being insignificant in relation to the sacrifice or cost, then to reduce the risk further is not 'reasonably practicable'.

Costs and Benefits of Risk Control

Trees confer many benefits to people and the wider environment. When managing any risk, it is essential to maintain a balance between the costs and benefits of risk reduction, which should be considered in the determination of ALARP. It is not only the financial cost of controlling the risk that should be considered, but also the loss of tree-related benefits, and the risk to workers and the public from the risk control measure itself.

When considering risks from falling trees, the cost of risk control will usually be too high when it is clearly 'disproportionate' to the reduction in risk. In the

[1] See Tables 1, 2 & 3.

context of QTRA, the issue of 'gross disproportion'[2], where decisions are heavily biased in favour of safety, is only likely to be considered where there are risks of 1/10 000 or greater.

Acceptable and Tolerable Risks

The Tolerability of Risk framework (ToR) (HSE 2001) is a widely accepted approach to reaching decisions on whether risks are broadly acceptable, unacceptable, or tolerable. Graphically represented in Figure 1, ToR can be summarised as having a Broadly Acceptable Region where the upper limit is an annual risk of death 1/1 000 000, an Unacceptable Region for which the lower limit is 1/1 000, and between these a Tolerable Region within which the tolerability of a risk will be dependent upon the costs and benefits of risk reduction. In the Tolerable Region, we must ask whether the benefits of risk control are sufficient to justify their cost.

In respect of trees, some risks cross the Broadly Acceptable 1/1 000 000 boundary, but remain tolerable. This is because any further reduction would involve a disproportionate cost in terms of the lost environmental, visual, and other benefits, in addition to the financial cost of controlling the risk.

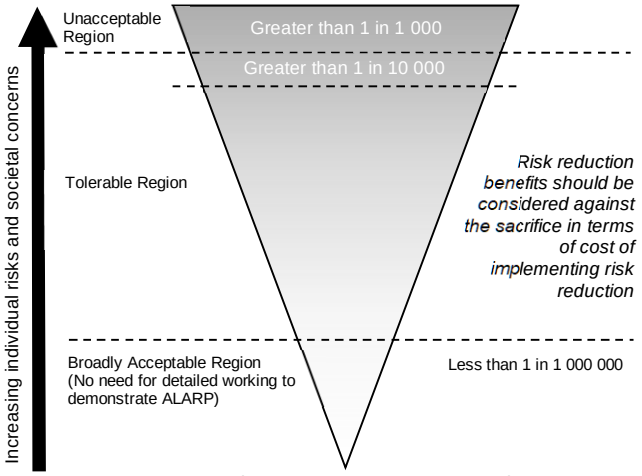

Figure 1. Adapted from the Tolerability of Risk framework (HSE 2001).

Value of Statistical Life

The Value of Statistical Life (VOSL), is a widely applied risk management device, which uses the value of a hypothetical life to guide the proportionate allocation of resources to risk reduction. In the UK, this value is currently in the region of £2 000 000, and this is the value adopted in the QTRA method.

In QTRA, placing a statistical value on a human life has two particular uses. Firstly, QTRA uses VOSL to enable damage to property to be compared with the loss of life, allowing the comparison of risks to people and property. Secondly, the proportionate allocation of financial resources to risk reduction can be informed by VOSL. "***A value of statistical life of £1 000 000 is just another way of saying that a reduction in risk of death of 1/100 000 per year has a value of £10 per year***" (HSE 1996).

Internationally, there is variation in VOSL, but to provide consistency in QTRA outputs, it is suggested that VOSL of £2 000 000 should be applied internationally. This is ultimately a decision for the tree manager.

2. OWNERSHIP OF RISK

Where many people are exposed to a risk, it is shared between them. Where only one person is exposed, that individual is the recipient of all of the risk and if they have control over it, they are also the owner of the risk. An individual may choose to accept or reject any particular risk to themselves, when that risk is under their control. When risks that are imposed upon others become elevated, societal concern will usually require risk controls, which ultimately are imposed by the courts or government regulators.

Although QTRA outputs might occasionally relate to an individual recipient, this is seldom the case. More often, calculation of the Risk of Harm is based on a cumulative occupation – i.e. the number of people per hour or vehicles per day, without attempting to identify the individuals who share the risk.

Where the risk of harm relates to a specific individual or a known group of people, the risk manager might consider the views of those who are exposed to the risk when making management decisions. Where a risk is imposed on the wider community, the principles set out in the ToR framework can be used as a reasonable approach to determine whether the risk is ALARP.

3. THE QTRA METHOD - VERSION 5

The input values for the three components of the QTRA calculation are set out in broad ranges[3] of Target, Size, and Probability of Failure. The assessor estimates values for these three components and inputs them on either the manual calculator or software application to calculate the Risk of Harm.

[2] Discussed further on page 5.

[3] See Tables 1, 2 & 3.

Assessing Land-use (Targets)

The nature of the land-use beneath or adjacent to a tree will usually inform the level and extent of risk assessment to be carried out. In the assessment of Targets, six ranges of value are available. Table 2 sets out these ranges for vehicular frequency, human occupation and the monetary value of damage to property.

Human Occupation

The probability of pedestrian occupation at a particular location is calculated on the basis that an average pedestrian will spend five seconds walking beneath an average tree. For example, an average occupation of ten pedestrians per day, each occupying the Target for five seconds is a daily occupation of fifty seconds, giving a likelihood of occupation 1 / 1,728. Where a longer occupation is likely, as with a habitable building, outdoor café, or park bench, the period of occupation can be measured, or estimated as a proportion of a given unit of time, e.g. six hours per day (1 / 4). The Target is recorded as a range (Table 2).

Weather Affected Targets

Often the nature of a structural weakness in a tree is such that the probability of failure is greatest during windy weather, while the probability of the site being occupied by people during such weather is often low. This applies particularly to outdoor recreational areas. When estimating human Targets, the risk assessor must answer the question 'in the weather conditions that I expect the likelihood of failure of the tree to be initiated, what is my estimate of human occupation?' Taking this approach, rather than using the average occupation, ensures that the assessor considers the relationship between weather, people, and trees, along with the nature of the average person with their ability to recognise and avoid unnecessary risks.

Vehicles on the Highway

In the case of vehicles, likelihood of occupation may relate to either the falling tree or branch striking the vehicle or the vehicle striking the fallen tree. Both types of impact are influenced by vehicle speed; the faster the vehicle travels the less likely it is to be struck by the falling tree, but the more likely it is to strike a fallen tree. The probability of a vehicle occupying any particular point in the road is the ratio of the time it is occupied - including a safe stopping distance - to the total time. The average vehicle on a UK road is occupied by 1.6 people (DfT 2010). To account for the substantial protection that the average vehicle provides against most tree impacts and in particular, frontal collisions, QTRA values the substantially protected 1.6 occupants in addition to the value of the vehicle as equivalent to one exposed human life.

Property

Table 1. Size

Size Range	Size of tree or branch	Range of Probability
1	> 450mm (>18") dia.	1/1 - >1/2
2	260mm (10½") dia. - 450mm (18") dia.	1/2 - >1/8.6
3	110mm (4½") dia. - 250mm (10") dia.	1/8.6 - >1/82
4	25mm (1") dia. - 100mm (4") dia.	1/82 - 1/2 500

* Range 1 is based on a diameter of 600mm.

Property can be anything that could be damaged by a falling tree, from a dwelling, to livestock, parked car, or fence. When evaluating the exposure of property to tree failure, the QTRA assessment considers the cost of repair or replacement that might result from failure of the tree. Ranges of value are presented in Table 2 and the assessor's estimate need only be sufficient to determine which of the six ranges the cost to select.

In Table 2, the ranges of property value are based on a VOSL of £2 000 000, e.g. where a building with a replacement cost of £20 000 would be valued at 0.01 (1 / 100) of a life (Target Range 2).

When assessing risks in relation to buildings, the Target to be considered might be the building, the occupants, or both. Occupants of a building could be protected from harm by the structure or substantially exposed to the impact from a falling tree if the structure is not sufficiently robust, and this will determine how the assessor categorises the Target.

Multiple Targets

A Target might be constantly occupied by more than one person and QTRA can account for this. For example, if it is projected that the average occupation will be constant by 10 people, the Risk of Harm is calculated in relation to one person constantly occupying the Target before going on to identify that the average occupation is 10 people. This is expressed as Target 1(10T) / 1, where 10T represents the Multiple Targets. In respect of property, a Risk of Harm 1(10T) / 1 would be equivalent to a risk of losing £20 000 000 as opposed to £2 000 000.

Tree or Branch Size

A small dead branch of less than 25mm diameter is not likely to cause significant harm even in the case of direct contact with a Target, while a falling branch with a diameter greater than 450mm is likely to cause some harm in the event of contact with all but the most robust Target. The QTRA method categorises

Size by the diameter of tree stems and branches (measured beyond any basal taper). An equation derived from weight measurements of trees of different stem diameters is used to produce a data set of comparative weights of trees and branches ranging from 25mm to 600mm diameter, from which Table 1 is compiled. The size of dead branches might be discounted where they have undergone a significant reduction in weight because of degradation and shedding of subordinate branches. This discounting, referred to as 'Reduced Mass', reflects an estimated reduction in the mass of a dead branch.

Table 2. Targets

Target Range	Property (repair or replacement cost)	Human (not in vehicles)	Vehicle Traffic (number per day)	Ranges of Value (probability of occupation or fraction of £2 000 000)
1	£2 000 000 – >£200 000	Occupation: Constant – 2.5 hours/day Pedestrians & cyclists: 720/hour – 73/hour	26 000 – 2 700 @ 110kph (68mph) 32 000 – 3 300 @ 80kph (50mph) 47 000 – 4 800 @ 50kph (32mph)	1/1 – >1/10
2	£200 000 – >£20 000	Occupation: 2.4 hours/day – 15 min/day Pedestrians & cyclists: 72/hour – 8/hour	2 600 – 270 @ 110kph (68mph) 3 200 – 330 @ 80kph (50mph) 4 700 – 480 @ 50kph (32mph)	1/10 – >1/100
3	£20 000 – >£2 000	Occupation: 14 min/day – 2 min/day Pedestrians & cyclists: 7/hour – 2/hour	260 – 27 @ 110kph (68mph) 320 – 33 @ 80kph (50mph) 470 – 48 @ 50kph (32mph)	1/100 – >1/1 000
4	£2 000 – >£200	Occupation: 1 min/day – 2 min/week Pedestrians & cyclists: 1/hour – 3/day	26 – 4 @ 110kph (68mph) 32 – 4 @ 80kph (50mph) 47 – 6 @ 50kph (32mph)	1/1 000 – >1/10 000
5	£200 – >£20	Occupation: 1 min/week – 1 min/month Pedestrians & cyclists: 2/day – 2/week	3 – 1 @ 110kph (68mph) 3 – 1 @ 80kph (50mph) 5 – 1 @ 50kph (32mph)	1/10 000 – >1/100 000
6	£20 – £2	Occupation: <1 min/month – 0.5 min/year Pedestrians & cyclists: 1/week – 6/year	None	1/100 000 – 1/1 000 000

Vehicle, pedestrian and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of 1/1 000 and >1/10 000 (column 5). Using the VOSL £2 000 000, the property repair or replacement value for Target Range 4 is £2 000 - >200.

Probability of Failure

In the QTRA assessment, the probability of tree or branch failure within the coming year is estimated and recorded as a range of value (Ranges 1 – 7, Table 3).

Selecting a Probability of Failure (PoF) Range requires the assessor to compare their assessment of the tree or branch against a benchmark of either a non-compromised tree at Probability of Failure Range 7, or a tree or branch that we expect to fail within the year, which can be described as having a 1/1 probability of failure.

During QTRA training, Registered Users go through a number of field exercises in order to calibrate their estimates of Probability of Failure.

Table 3. Probability of Failure

Probability of Failure Range	Probability
1	1/1 - >1/10
2	1/10 - >1/100
3	1/100 - >1/1 000
4	1/1 000 - >1/10 000
5	1/10 000 – >1/100 000
6	1/100 000 – >1/1 000 000
7	1/1 000 000 – 1/10 000 000

The probability that the tree or branch will fail within the coming year.

The QTRA Calculation

The assessor selects a Range of values for each of the three input components of Target, Size and Probability of Failure. The Ranges are entered on either the manual calculator or software application to calculate a Risk of Harm.

The Risk of Harm is expressed as a probability and is rounded, to one significant figure. Any Risk of Harm

that is lower than 1/1 000 000 is represented as <1/1 000 000. As a visual aid, the Risk of Harm is colour coded using the traffic light system illustrated in Table 4 (page 7).

> Risk of Harm - Monte Carlo Simulations
>
> The Risk of Harm for all combinations of Target, Size and Probability of Failure Ranges has been calculated using Monte Carlo simulations[4]. The QTRA Risk of Harm is the mean value from each set of Monte Carlo results.
>
> In QTRA Version 5, the Risk of Harm should not be calculated without the manual calculator or software application.

Assessing Groups and Populations of Trees

When assessing populations or groups of trees, the highest risk in the group is quantified and if that risk is tolerable, it follows that risks from the remaining trees will also be tolerable, and further calculations are unnecessary. Where the risk is intolerable, the next highest risk will be quantified, and so on until a tolerable risk is established. This process requires prior knowledge of the tree manager's risk tolerance.

Accuracy of Outputs

The purpose of QTRA is not necessarily to provide high degrees of accuracy, but to provide for the quantification of risks from falling trees in a way that risks are categorised within broad ranges (Table 4).

4. INFORMING MANAGEMENT DECISIONS

Balancing Costs and Benefits of Risk Control

When controlling risks from falling trees, the benefit of reduced risk is obvious, but the costs of risk control are all too often neglected. For every risk reduced there will be costs, and the most obvious of these is the financial cost of implementing the control measure. Frequently overlooked is the transfer of risks to workers and the public who might be directly affected by the removal or pruning of trees. Perhaps more importantly, most trees confer benefits, the loss of which should be considered as a cost when balancing the costs and benefits of risk control.

When balancing risk management decisions using QTRA, consideration of the benefits from trees will usually be of a very general nature and not require detailed consideration. The tree manager can consider, in simple terms, whether the overall cost of risk control is a proportionate one. Where risks are approaching 1/10 000, this may be a straightforward balancing of cost and benefits. Where risks are 1/10 000 or greater, it will usually be appropriate to implement risk controls unless the costs are grossly disproportionate to the benefits rather than simply disproportionate. In other words, the balance being weighted more on the side of risk control with higher associated costs.

Considering the Value of Trees

It is necessary to consider the benefits provided by trees, but they cannot easily be monetised and it is often difficult to place a value on those attributes such as habitat, shading and visual amenity that might be lost to risk control.

A simple approach to considering the value of a tree asset is suggested here, using the concept of 'average benefits'. When considered against other similar trees, a tree providing 'average benefits' will usually present a range of benefits that are typical for the species, age and situation. Viewed in this way, a tree providing 'average benefits' might appear to be low when compared with particularly important trees – such as in Figure 2, but should nonetheless be sufficient to offset a Risk of Harm of less than 1/10 000. Without having to consider the benefits of risk controls, we might reasonably assume that below 1/10 000, the risk from a tree that provides 'average benefits' is ALARP.

In contrast, if it can be said that the tree provides lower than average benefits because, for example, it is declining and in poor physiological condition, it may be necessary to consider two further elements. Firstly, is the Risk of Harm in the upper part of the Tolerable Region, and secondly, is the Risk of Harm likely to increase before the next review because of an increased Probability of Failure. If both these conditions apply then it might be appropriate to consider the balance of costs and benefits of risk reduction in order to determine whether the risk is ALARP. This balance requires the tree manager to take a view of both the reduction in risk and the costs of that reduction.

[4] For further information on the Monte Carlo simulation method, refer to http://en.wikipedia.org/wiki/Monte_Carlo_method


Fig. 2

Lower Than Average Benefits from Trees

Usually, the benefits provided by a tree will only be significantly reduced below the 'average benefits' that are typical for the species, age and situation, if the life of the benefits is likely to be shortened, perhaps because the tree is declining or dead. That is not to say that a disbenefit, such as undesirable shading, lifting of a footpath, or restricting the growth of other trees, should not also be considered in the balance of costs and benefits.

The horse chestnut tree in Figure 3 has recently died, and over the next few years, may provide valuable habitats. However, for this tree species and the relatively fast rate at which its wood decays, the lifetime of these benefits is likely to be limited to only a few years. This tree has an already reduced value that will continue to reduce rapidly over the coming five to ten years at the same time as the Risk of Harm is expected to increase. There will be changes in the benefits provided by the tree as it degrades. Visual qualities are likely to reduce while the decaying wood provides habitats for a range of species, for a short while at least. There are no hard and fast measures of these benefits and it is for the tree manager to decide what is locally important and how it might be balanced with the risks.

Where a risk is within the Tolerable Region and the tree confers lower than average benefits, it might be appropriate to consider implementing risk control while taking account of the financial cost. Here, VOSL can be used to inform a decision on whether the cost of risk control is proportionate. Example 3 below puts this evaluation into a tree management context.

There will be occasions when a tree is of such minimal value and the monetary cost of risk reduction so low that it might be reasonable to further reduce an already relatively low risk. Conversely, a tree might be of such considerable value that an annual risk of death greater than 1 / 10 000 would be deemed tolerable.

Occasionally, decisions will be made to retain elevated risks because the benefits from the tree are particularly high or important to stakeholders, and in these situations, it might be appropriate to assess and document the benefits in some detail. If detailed assessment of benefits is required, there are several methodologies and sources of information (Forest Research 2010).

Delegating Risk Management Decisions


Fig. 3

Understanding of the costs with which risk reduction is balanced can be informed by the risk assessor's knowledge, experience and on-site observations, but the risk management decisions should be made by the tree manager. That is not to say that the tree manager should review and agree every risk control measure, but when delegating decisions to surveyors and other staff or advisors, tree managers should set out in a policy, statement or contract, the principles and perhaps thresholds to which trees and their associated risks will ordinarily be managed.

Based on the tree manager accepting the principles set out in the QTRA Practice Note and or any other specific instructions, the risk assessor can take account of the cost / benefit balance and for most situations will

be able to determine whether the risk is ALARP when providing management recommendations.

Table 4. QTRA Advisory Risk Thresholds

Thresholds	Description	Action
	Unacceptable Risks will not ordinarily be tolerated	• Control the risk
1/1,000		
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Review the risk
1/10 000		
	Tolerable (where imposed on others) Risks are tolerable if ALARP	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at reasonable cost • Review the risk
1/1 000 000		
	Broadly Acceptable Risk is already ALARP	• No action currently required • Review the risk

QTRA Informative Risk Thresholds

The QTRA advisory thresholds in Table 4 are proposed as a reasonable approach to balancing safety from falling trees with the costs of risk reduction. This approach takes account of the widely applied principles of ALARP and ToR, but does not dictate how these principles should be applied. While the thresholds can be the foundation of a robust policy for tree risk management, tree managers should make decisions based on their own situation, values and resources. Importantly, to enable tree assessors to provide appropriate management guidance, it is helpful for them to have some understanding of the tree owner's management preferences prior to assessing the trees.

A Risk of Harm that is less than 1/1 000 000 is Broadly Acceptable and is already ALARP. A Risk of Harm 1/1 000 or greater is unacceptable and will not ordinarily be tolerated. Between these two values, the Risk of Harm is in the Tolerable Region of ToR and will be tolerable if it is ALARP. In the Tolerable Region, management decisions are informed by consideration of the costs and benefits of risk control, including the nature and extent of those benefits provided by trees, which would be lost to risk control measures.

For the purpose of managing risks from falling trees, the Tolerable Region can be further broken down into two sections. From 1/1 000 000 to less than 1/10 000, the Risk of Harm will usually be tolerable providing that the tree confers 'average benefits' as discussed above. As the Risk of Harm approaches 1/10 000 it will be necessary for the tree manager to consider in more detail the benefits provided by the tree and the overall cost of mitigating the risk.

A Risk of Harm in the Tolerable Region but 1/10 000 or greater will not usually be tolerable where it is imposed on others, such as the public, and if retained, will require a more detailed consideration of ALARP. In exceptional circumstances a tree owner might choose to retain a Risk of Harm that is 1/10 000 or greater. Such a decision might be based on the agreement of those who are exposed to the risk, or perhaps that the tree is of great importance. In these circumstances, the prudent tree manager will consult with the appropriate stakeholders whenever possible.

5. EXAMPLE QTRA CALCULATIONS AND RISK MANAGEMENT DECISIONS

Below are three examples of QTRA calculations and application of the QTRA Advisory Thresholds.

Example 1.

	Target		Size		Probability of Failure		Risk of Harm
Range	6	x	1	x	3	=	<1/1 000 000

Example 1 is the assessment of a large (Size 1), unstable tree with a probability of failure of between 1/100 and >1/1 000 (PoF 3). The Target is a footpath with less than one pedestrian passing the tree each week (Target 6). The Risk of Harm is calculated as less than 1/1 000 000 (green). This is an example of where the Target is so low consideration of the structural condition of even a large tree would not usually be necessary.

Example 2.

	Target		Size		Probability of Failure		Risk of Harm
Range	1	x	4	x	3	=	1(2T)/50 000

In Example 2, a recently dead branch (Size 4) overhangs a busy urban high street that is on average occupied constantly by two people, and here Multiple Target occupation is considered.

Having an average occupancy of two people, the Risk of Harm 1(2T)/50 000 (yellow) represents a twofold increase in the magnitude of the consequence and is therefore equivalent to a Risk of Harm 1/20 000 (yellow). This risk does not exceed 1/10 000, but being a dead branch at the upper end of the Tolerable Region it is appropriate to consider the balance of costs and benefits of risk control. Dead branches can be expected to degrade over time with the probability of failure increasing as a result. Because it is dead, some of the usual benefits from the branch have been lost and it will be appropriate to consider whether the financial cost of risk control would be proportionate.

Example 3.

	Target		Size		Probability of Failure		Risk of Harm
Range	3	x	3	x	3	=	1/500 000

In Example 3, a 200mm diameter defective branch overhangs a country road along which travel between 470 and 48 vehicles each day at an average speed of 50kph (32mph) (Target Range 3). The branch is split and is assessed as having a probability of failure for the coming year of between 1/100 and 1/1 000 (PoF Range 3). The Risk of Harm is calculated as 1/500 000 (yellow) and it needs to be considered whether the risk is ALARP. The cost of removing the branch and reducing the risk to Broadly Acceptable (1/1 000 000) is estimated at £350. To establish whether this is a proportionate cost of risk control, the following equation is applied. £2 000 000 (VOSL) x 1/500 000 = £4 indicating that the projected cost of £350 would be disproportionate to the benefit. Taking account of the financial cost, risk transfer to arborists and passers-by, the cost could be described as being grossly disproportionate, even if accrued benefits over say ten years were taken into account.

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