



Tree Risk Management Appraisal

at



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

Prepared by:

Bowland 
Tree Consultancy Ltd

November 2023

TREE RISK MANAGEMENT APPRAISAL BROCKHALL VILLAGE, OLD LANGHO

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TREE RISK MANAGEMENT APPRAISAL BROCKHALL VILLAGE, OLD LANGHO

Project Details

Project No.:	BTC2829
Site:	Brockhall Village, Old Langho, BB6 8AR
Survey Type:	Negative Recording Walkover Tree 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:	26 October 2023
Surveyor:	Joseph Lambert BSc (Hons) FdSc MArborA MICFor
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Date of Issue:	17 November 2023
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 trees at the site and the associated risk of harm that they pose to persons and/or damage that they pose to 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:
- Target* (something with potential to be harmed and/or damaged by the mechanical failure of tree parts);
 - Impact Potential*; and
 - 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;
- Unacceptable* (i.e. $>1/1,000$), which is unacceptable and will not ordinarily be tolerated;
 - 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
 - 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, above, 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. SUMMARY OF SURVEY FINDINGS AND RECOMMENDATIONS

- 3.1 A 'Negative Recording Walkover Tree Survey' (see 'Schedule of Operations' appended to agreed project quote) was carried out on 26 October 2023 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 during 2016, 2020, 2021 and through a set of ownership plans shared with the surveyor by the agent relating to part of the woodland area to the east.
- 3.2 The survey identified 22 individual trees, nine groups of trees and five woodlands, as detailed in the appended Tree Survey Schedule and on the Tree Survey Plan.
- 3.3 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.
- 3.4 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.
- 3.5 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.
- 3.6 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.
- 3.7 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.
- 3.8 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.

3.9 In turn, as highlighted with the colour orange in the appended Tree Survey Schedule and in Table 2 (overleaf), the risk assessment established that trees T4, T6, T9, T19, T22, group G2 and woodland W1 have calculated QTRA risk indices that fall within the unacceptable risk threshold range of 1/10,000 or over (please refer to Table 1, on the previous page, with regard to advisory tree risk thresholds). Consequently, as also detailed in Table Two, remedial works are recommended in order to negate the risk that these trees currently present.

3.10 However, as also detailed in Table 2 (overleaf), various works have also been recommended to several of the surveyed trees with calculated QTRA risk indices that fall within the tolerable and broadly acceptable risk threshold ranges (as highlighted with the colours yellow and green, respectively), either for general non-risk management related reasons (as denoted with the suffix (M)) or, where applicable, to enable applicable trees to be inspected in further detail for risk assessment purposes (as denoted with the suffix (I)).

Table 2: Tree Work Recommendations:

No.	Species	Management Works Recommended*	Responsible Professional	Work Priority
T1	Common Oak	1. Prune to remove broken hanging branch due to identified increased risk of failure.	1. Tree contractor	1. High
T2	Common Ash	1. Prune to approximately 7m high standing stem (i.e. just above first primary union) and retain as either managed pollard or standing dead stem of habitat value due to identified increased risk of failure.	1. Tree contractor	1. High
T4	Common Beech	1. Remove tree due to identified increased risk of failure and subsequent unacceptable risk of harm to persons. NB: stem could be retained at suitable height as standing deadwood of habitat value, if appropriate. NBB: Recommended that adjacent Sycamore (see comments) is removed with tree T4 due to significantly altered wind exposure.	1. Tree contractor	1. High
T6	Crack Willow	1. Prune to approximately 8m high stem and subsequently manage as high pollard, due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	1. Tree contractor	1. High
T7	Leyland Cypress	1. Remove tree due to long term unsuitability for location.	1. Tree contractor	1. Low
T8	Common Horse Chestnut	1. Prune to attain approximately 2m clearance to adjacent building (M).	1. Tree contractor	1. High
T9	Whitebeam	1. Remove tree due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	1. Tree contractor	1. High
T10	Red Oak	1. Undertake detailed further inspection utilising decay detection equipment to evaluate extent of basal decay and make subsequent management recommendations following this.	1. Tree consultant	1. High
T11	Sugar Maple	1. Prune to attain appropriate clearances to garage roof and bin store area, and prune appropriately to reduce canopy overhangs. NB: Tree located on neighbouring third party land and, as such, all works should be undertaken from within site curtilage following notification to applicable tree owner(s).	1. Tree contractor	1. Low

Table continued overleaf

Table 2: Tree Work Recommendations (Continued):

No.	Species	Management Works Recommended*	Responsible Professional	Work Priority
T12	Mountain Ash	1. Remove tree as is evidently dead (M).	1. Tree contractor	1. Moderate
T13	Sycamore	1. Prune tree to remove upper branch structure to approximately 10m high standing dead stem of habitat value, due to identified increased risk of failure and subsequent risk of harm to persons.	1. Tree contractor	1. Moderate
T14	Common Alder	1. Instruct tree contractor to prune tree to 6m high standing dead stem of habitat value due to identified increased risk of failure and subsequent risk of harm to persons.	1. Tree owner	1. Moderate
T15	Sycamore	1. Prune to remove basal growth and sever ivy prior to next cyclical inspection, to allow detailed inspection of buttresses and lower stem (I).	1. Tree contractor	1. Low
T16	Ash	1. Prune tree to approximately 4-5m height (i.e above first primary union) and retain as standing dead stem of habitat value due to identified increased risk of failure and subsequent risk of harm to persons.	1. Tree contractor	1. Moderate
T17	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.	1. Tree contractor	1. Moderate
T18	Common Alder	1. Remove deadwood >75mm diameter directly over desire line due to identified increased risk of failure.	1. Tree contractor	1. Moderate
T19	Common Beech	1. Prune tree to remove upper canopy using veteranisation techniques to reduce height by approximately 8-10m and retain remaining tree for habitat value within wooded area due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	1. Tree contractor	1. High
T21	Ash	1. Remove tree due to projected increase in failure risk on expected further continued decline.	1. Tree contractor	1. High
T22	Common Alder	1. Remove tree, leaving stem as fallen deadwood, due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	1. Tree contractor	1. High
G2	Sycamore, Horse Chestnut, Lime, Goat Willow and Lawsons Cypress	1. Prune group to remove deadwood >35mm diameter over parking area and footpaths to east due to identified increased risk of failure and subsequent unacceptable risk of damage to property. 2. Prune group to: 1. Attain 2m clearance to building and prune tertiary branches to attain approximately 0.5m clearance to overhead telephone lines. 2. Remove broken out Lawsons Cypress branch over footpath. 3. Attain approximately 5m clearance over The Drive to north (M).	1. Tree contractor 2. Tree contractor	1. High 2. Moderate

Table continued overleaf

Table 2: Tree Work Recommendations (Continued):

No.	Species	Management Works Recommended*	Responsible Professional	Work Priority
G3	2no. Beech, 2no. Oak	1. Prune to raise Beech to south, by pruning tertiary branches, to attain approximately 4m clearance over private access to Longwood House (M).	1. Tree contractor	1. Moderate
G4	1no. Ash, 1no. Holly	1. Prune Holly tree to attain 1.5m clearance to adjacent garage (M).	1. Tree contractor	1. Moderate
G5	1no. Beech, 1no. Oak	1. Prune trees to approximately 6m high standing dead stems of habitat value due to identified increased risk of failure and subsequent risk of harm to persons.	1. Tree contractor	1. Moderate
G7	Common Ash	1. Remove all semi mature Ash from areas adjacent to neighbouring gardens and evident desire lines due to identified increased of failure.	1. Tree contractor	1. Moderate
G9	3no. Common Beech	1. prune to remove deadwood from central tree >50mm diameter and prune to attain 2m clearance above shed roof.	1. Tree contractor	1. Moderate
W1	Various Species	1. Remove all paint marked Ash and Alder stems (see comments) due to identified increased risk of failure and subsequent unacceptable risk of harm to persons. 2. Prune paint marked semi mature Crack Willow stems to approximately 4m height standing stems, and subsequently manage as pollards. 3. Undertake cyclical severance and removal of Ivy from applicable stems >250mm diameter to allow future detailed inspections (I).	1. Tree contractor 2. Tree contractor 3. Grounds maintenance staff	1. High 2. Moderate 3. Low
W2	Various Species	1. Remove all paint marked stems, as identified by surveyor, due to identified increased risk of failure. NB: Felled stems should be left on ground as fallen deadwood of habitat value where appropriate.	1. Tree contractor	1. Moderate
W3	Ash, Pine, Spruce	Instruct forestry/tree contractor to undertake woodland management works to include: 1. Removal of all Ash succumbing to ADD due to identified increased risk of failure. 2. Silvicultural thinning of remaining species as appropriate 3. Re-planting and restocking with appropriate species to replace areas of removed Ash. NB: It is strongly recommended that the above works be undertaken as part of a long term woodland management plan.	1. Client	1. Moderate
W4	Various Species	1. Remove all semi mature Ash from woodland area due to identified increased of failure subsequent of evident decline. 2. Re-establish boundary fencing along western side bordering residential properties to prevent continued encroachment of garden curtilages and continued disposal of debris within woodland.	1. Tree contractor 2. Woodland owner	1. Moderate 2. Moderate

Table continued overleaf

Table 2: Tree Work Recommendations: (continued):

No.	Species	Management Works Recommended*	Responsible Professional	Work Priority
W5	Various Species	1. Prune applicable trees to attain suitable clearance to adjacent all weather pitch fencing (M). 2. Undertake cyclical severance and removal of Ivy from applicable stems >250mm diameter to allow future detailed inspections (I). 3. Discontinue debris disposal in woodland area (M).	1. Tree contractor 2. Grounds maintenance staff 3. Grounds maintenance staff	1. Moderate 2. Low 3. Low

*Note: it shall be the client's responsibility to arrange contact with the applicable local council's planning department in order to check for the presence of any statutory tree protection measures, such as the site's location within a Conservation Area and/or the presence of any Tree Preservation Orders, prior to scheduling or carrying out any tree works

- 3.11 In turn, Table 3, below, details trees that are recommended for more detailed inspections for risk management related reasons following any works recommended in Table 2, along with their accompanying re-inspection schedule. In consideration of the above, it is recommended various trees be reviewed during late summer 2024 when in leaf (see Table 3 below) in order to appraise their canopy condition and vitality.

Table 3: Tree Re-Inspection Recommendations:

No.	Species	Re-Inspection Recommendations*	When?
T3	Common Alder	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
T20	Common Beech	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
G1	Horse Chestnut, Lime	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
G3	2no. Beech, 2no. Oak	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
G4	Ash	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
G6	2no. Ash	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
G9	3no. Beech	Review tree canopy in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024
W1	Alder, Beech	Review trees marked W1a and W1b in order to appraise canopy vitality and make subsequent recommendations.	Summer 2024

*Note: Unless otherwise specified, all inspections detailed in Table 3 are to be carried out by the project consulting arboriculturist upon instruction by the client/agent

- 3.12 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.
- 3.13 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.
- 3.14 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.

- 3.15 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.
- 3.16 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 Summer 2025.
- 3.17 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	Surveyor:	Joseph Lambert Chartered Arboriculturist	Page: 1 of 15
Agent for Client:	HDAK	Survey Date:	26 October 2023	
Brief:	Carry out a negative recording 'Walkover Tee Survey' within area specified by agent, report on risk posed to persons and property, and make management recommendations where appropriate	Viewing Conditions:	Overcast with periods of rain	
		Job Reference:	BTC2195	

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	Common Oak	M	25	1100	20	G	▪ Broken hanging branch of approximately 120mm diameter, adjacent to evident desire line, in north east side of canopy at approximately 18m height.	▪ Tree contractor to prune to remove broken hanging branch due to identified increased risk of failure.	P = Branch of approximately 120mm diameter. T = Persons using wooded area.	3	3	2	N/A	50K	H
T2	Common Ash	M	18	550	12	P	▪ Canopy colonised by Ash Dieback Disease (ADD) with remaining canopy falling into Class 3 (See paragraph 3.6) and located adjacent to evident desire line within woodland.	▪ Tree contractor to prune to approximately 7m high standing stem (i.e. just above first primary union) and retain as either managed pollard or standing dead stem of habitat value due to identified increased risk of failure.	P = Dead and moribund branches up to approximately 150mm diameter. T = Persons using desire lines.	3	3	2	N/A	50K	H
T3	Common Alder	M	20	550	12	P	▪ Canopy showing a severe reduction in vitality, although onset of autumn leaf senescence may have exaggerated condition. ▪ Basal growth part impeding inspection but no signs of active fungal decay fruiting bodies at time of survey.	▪ Tree consultant to review tree during Summer 2024 to review physiological condition and make subsequent appropriate management decision. NB: QTRA risk index may be re-evaluated following subsequent review.	P = Dead branches up to approximately 100mm diameter. T = Persons using neighbouring residential garden to east.	3	4	2	N/A	500 K	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

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

Surveyor:	Joseph Lambert Chartered Arboriculturist
Survey Date:	26 October 2023
Viewing Conditions:	Overcast with periods of rain
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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
T4	Common Beech	M	21.5	810	18	P-MD	- Tree evidently in late stages of progressive terminal decline. - Some small areas of necrotic bark at base, but basal ivy part impeding inspection. - Number of part decayed and dead branches have failed up to approximately 150mm diameter. - Semi mature Sycamore of approximately 180mm diameter arises below tree canopy with highly biased canopy and significant stem lean west towards road.	Tree contractor to remove tree due to identified increased risk of failure and subsequent unacceptable risk of harm to persons. NB: stem could be retained at suitable height as standing deadwood of habitat value, if appropriate. NBB: Recommended that adjacent Sycamore (see comments) is removed with tree T4 due to significantly altered wind exposure.	P = Dead and moribund branches up to 150mm diameter. T = Persons using woodland area.	3	3	1	N/A	5K	H
T5	Common Alder	M	15	440	12	G	- Basal cavity with opening of approximately 600mm height, 120mm width and up to 200mm depth, to south side of stem. - Woodpecker hole present on south-east side of stem at a height of approximately 6m, thereby indicating an extension of hollowing into stem. <i>Previously noted as tree T11 in 2021 survey, with no major changes noted during 2023 survey.</i>	Tree consultant to monitor progression of basal and stem decay and monitor tree's canopy vitality as components of future cyclical inspections.	P = Main stem at ground level. T = Persons using wooded area.	3	2	4	N/A	1M	L
T6	Crack Willow	EM	18	1x520 1x350 (ts)	16	G	- Stem bifurcates at approximately 1.2m height with secondary attenuated stem arising to south. - Moderate stem lean to South from ground level and moderately highly biased canopy south due to likely past partial root plate failure. - Crack arising from just above ground level to 1m height on compression side of secondary stem, to south, indicating progressive subsidence and likely partial vertical failure below secondary stem.	Tree contractor to prune to approximately 8m high stem and subsequently manage as high pollard, due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	P = Secondary stem of 350mm diameter. T = Persons using woodland area.	3	2	2	N/A	10K	H
T7	Leyland Cypress	EM	14	520	12	G	- Canopy significantly encroaching onto access road to west and evidently contacting passing vehicles. - Upper canopy conflicting with better quality beech above.	Tree contractor to remove tree due to long term unsuitability for location.	P = Branches up to approximately 60mm diameter. T = Vehicles and occupants using road.	2	4	6	N/A	<1M	L

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Agent for Client:	HDAK
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Surveyor:	Joseph Lambert Chartered Arboriculturist
Survey Date:	26 October 2023
Viewing Conditions:	Overcast with periods of rain
Job Reference:	BTC2195

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
T8	Common Horse Chestnut	M	16	610	16	G	Canopy contacting adjacent building to west.	Tree contractor to prune to attain approximately 2m clearance to adjacent building (M).	P = Deadwood up to approximately 60mm diameter. T = Persons using footpath below.	3	4	2	25%	<1M	H
T9	Whitebeam	M	11	450	9	M	- Multiple fruiting bodies around entire stem base and in main primary union at approximately 2m height and moderately significant hollowing when sounded with nylon mallet. - Vertical incremental strips on west side indicating partial past occlusion of longitudinal failure in stem.	Tree contractor to remove tree due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	P = Stem at ground level. T = Vehicles and occupants using road.	2	2	3	N/A	10K	H
T10	Red Oak	EM	15	470	11	M	- Previously noted as tree T16 in 2021 survey. - Fungal fruiting bodies of white rot decay causing <i>Ganoderma</i> sp. on south east side and evident mark from previous fungal fruiting bodies on south. - Areas between south east and south west probed to approximately 150mm depth below buttresses. - Canopy highly biased to south east over road junction with moderately significant stem lean south-east. - Canopy moderately low over road.	Tree consultant to undertake detailed further inspection utilising decay detection equipment to evaluate extent of basal decay and make subsequent management recommendations following this. NB: Tree consultant to undertake above additional works upon instruction by client. NBB: QTRA risk index to be re-evaluated following detailed investigation.	P = Stem at ground level. T = Vehicles and occupants.	3	1	4	N/A	400 K	H
T11	Sugar Maple	SM	10	180	10	G	- Located in neighbouring garden and not accessed to inspect in detail. - Canopy overhangs bin store area with overhangs approximately 2m clear of ground. - Canopy contacting garage roof to north west. - Understood, from information provided by agent for client, area below used for hanging washing by adjacent apartments with overhanging canopy impeding this use. - Not excessively low, overhangs could be reduced by up to 1.5m length and canopy raised to 3m by pruning of branches <30mm diameter.	Tree contractor to prune to attain appropriate clearances to garage roof and bin store area, and prune appropriately to reduce canopy overhangs. NB: Tree located on neighbouring third party land and, as such, all works should be undertaken from within site curtilage following notification to applicable tree owner(s).	N/A	-	-	-	N/A	<1M	L

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T12	Mountain Ash	SM	12	210	5	MD	Largely dead tree adjacent to neighbouring residential garden.	Tree contractor to remove tree as is evidently dead (M).	P = Stem at ground level. T = Persons using neighbouring garden area.	3	3	2	N/A	50K	M
T13	Sycamore	M	23	800	18	P	- Moribund tree evidently displaying a severe reduction in vitality. - Tree within falling distance of evident desire line within woodland area. - Stem paint marked with yellow dot by surveyor to aid identification.	Tree contractor to prune tree to remove upper branch structure to approximately 10m high standing dead stem of habitat value, due to identified increased risk of failure and subsequent risk of harm to persons.	P = Stems at ground level. T = Persons using evident desire lines within woodland area.	4	1	3	N/A	400 K	M
T14	Common Alder	EM	18	400	9	D	- Dead stem of Alder. - Stem not paint marked by surveyor as close to indicated ownership boundary change within woodland.	Applicable tree owner to instruct tree contractor to prune tree to 6m high standing dead stem of habitat value due to identified increased risk of failure and subsequent risk of harm to persons.	P = Stem at ground level. T = Persons using woodland area.	4	2	2	N/A	100 K	M
T15	Sycamore	M	21	1x600 1x180 (ts)#	20	G	- Dense basal growth and ivy impeding inspection. - Tree evidently within falling distance of two adjacent residential properties.	Tree contractor to prune to remove basal growth and sever ivy prior to next cyclical inspection, to allow detailed inspection of buttresses and lower stem (I).	P = Stem at ground level. T = Property and occupants.	2	P	6	N/A	<1M	L
T16	Common Ash	M	25	850	18	P	- Canopy colonised by ADD with remaining canopy leaf cover falling into Class 4 (See paragraph 3.6). - Canopy overhangs neighbouring garden and desire line to south. - Stem paint marked with yellow dot by surveyor to aid identification.	Tree contractor to prune tree to approximately 4-5m height (i.e above first primary union) and retain as standing dead stem of habitat value due to identified increased risk of failure and subsequent risk of harm to persons.	P = Dead and moribund branches to approximately 150mm diameter. T = Persons using desire lines and neighbouring residential garden.	3	3	2	N/A	50K	H

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T17	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. - Tree consultant to review tree during Summer 2024 to re-appraise physiological condition and make subsequent recommendations if appropriate.	P = Deadwood up to approximately 150mm diameter. T = Persons using evident desire lines.	4	3	2	N/A	500 K	M
T18	Common Alder	PM	13	3x550 (ms)	15	P	- Severe reduction in vitality. - Dead branches up to approximately 200mm diameter over evident desire line to west. - Saprophytic white rot decay fungi <i>Stereum</i> sp. present to base of central stem indicating dysfunctional wood area.	Tree contractor to remove deadwood >75mm diameter directly over desire line due to identified increased risk of failure.	P = Deadwood up to 200mm diameter. T = Persons using evident desire lines.	4	3	2	N/A	500 K	M
T19	Common Beech	M	23	790	20	M	- Tree within falling distance of road to South. - Significant area of decay below stem base with moderately significant hollowing when sounded with nylon mallet from ground to approximately 2.5m height. - Openings visible on south east side and south side and significant necrotic bark areas on west side from ground level to approximately 0.5m height. - Further opening below buttress root to north extending under buttress area. - Multiple stem bleeds from ground level up to approximately 1m height indicating reduced vitality. - Moderate reduction in canopy vitality. - Tree benefits from mutual shelter of adjacent woodland.	Tree contractor to prune tree to remove upper canopy using veteranisation techniques to reduce height by approximately 8-10m and retain remaining tree for habitat value within wooded area due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	P = Stem at ground level. T = Vehicles and occupants using road to south.	2	1	3	N/A	4K	H

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T20	Common Beech	M	21	730	14	M-P	- Small area of necrotic bark on south east side at ground level approximately 100mm height and 50mm diameter. - South west similar necrotic area approximately 100mm diameter and 60mm width. - Upper canopy showing a moderately severe reduction in vitality indicating overall progressive decline. - No significant hollowing when sounded with nylon mallet and no fungal fruiting bodies apparent at time of survey.	Tree consultant to review tree during Summer 2024 to re-appraise physiological condition and make subsequent recommendations if appropriate.	P = Stem at ground level. T = Vehicles and occupants using road to north.	2	1	4	N/A	40K	M
T21	Common Ash	SM	14	5x110 (ms)	8	M/P	- Multiple stems from ground level. - Canopy colonised by ADD with remaining canopy leaf cover falling into Classes 2-3 (See paragraph 3.6).	Tree contractor to remove tree due to projected increase in failure risk on expected further continued decline.	P = Dead and moribund branches up to approximately 90mm diameter. T = Persons using footpath.	3	4	2	N/A	500 K	M
T22	Common Alder	EM	11	370	2	D	- Standing dead stem with significant colonisation of basal decay fungi <i>Armillaria</i> sp. to base. - Stem within falling distance of road and footpath to south.	Tree contractor to remove tree, leaving stem as fallen deadwood, due to identified increased risk of failure and subsequent unacceptable risk of harm to persons.	P = Stem at ground level. T = Person using footpath to south.	3	2	2	N/A	10K	H

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G1	Common Horse Chestnut, Lime	M	≤ 15	≤ 650	≤ 12	M-G	- Linear group of Horse Chestnut and Lime with buttresses in contact with footpath edge on east side and causing minor displacement in parts. - Lime (3rd mature tree from south) has fungal fruiting bodies of white rot decay causing <i>Ganoderma</i> 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 <i>Pholiata squarrosa</i> likely associated with previous root damage. - Tree to south of group (previously referenced as tree T8 in 2021 survey) has historic unoccluded 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 consultant to review group during Summer 2024 to re-appraise physiological condition, and make subsequent recommendations if appropriate. NB: QTRA risk index may be re-evaluated following reinspection.	P = Deadwood up to approximately 50mm diameter. T = Vehicles and occupants using road.	2	4	3	50%	1M	L

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G2	Sycamore, Horse Chestnut, Lime, Goat Willow and Lawsons Cypress	M	≤ 21	≤ 820	≤ 15	G-P	- Linear group of early mature to mature trees to north and east of open grassed area. - Ivy part impeding inspection of one mature Lime stem to South. - Horse chestnut to north evidently previously historically topped at approximately 4m height, with wood/sticks stacked around base obscuring view. - Canopies in very close proximity to building to south east and conflicting with overhead telephone lines. - Sycamore to centre north showing moderately significant reduction in vitality with deadwood up to approximately 150mm diameter over adjacent parking area to east. - Lawsons Cypress to north has one broken out stem of approximately 80mm diameter to north east at approximately 6m height over footpath. - Canopies low over The Drive to north.	- Tree contractor to prune group to remove deadwood >35mm diameter over parking area and footpaths to east due to identified increased risk of failure and subsequent unacceptable risk of damage to property. - Tree contractor to prune group to: 1. Attain 2m clearance to building and prune tertiary branches to attain approximately 0.5m clearance to overhead telephone lines. 2. Remove broken out Lawsons Cypress branch over footpath. 3. Attain approximately 5m clearance over The Drive to north (M).	P = Deadwood up to approximately 150mm diameter. T = Parked cars below	3	P.	2	N/A	3K	H
G3	2no. Beech, 2no. Oak	M	≤ 17	≤ 900	≤ 16	M-G	- Group previously referenced as trees T17 to T20 in 2021 survey. - Beech both showing a moderate reduction in vitality with deadwood up to approximately 100mm diameter, largely over evidently lower use shrub area. - Leyland Cypress understorey cleared recently below all trees, except Oak to south east. - Oak to north has some staining and necrotic bark areas, part occluded, on lower stem. - Beech to south has moderately low canopy over private access to Longwood House.	- Tree contractor to prune to raise Beech to south, by pruning tertiary branches, to attain approximately 4m clearance over private access to Longwood House (M). - Tree consultant to review group during Summer 2024 to re-appraise physiological condition, and make subsequent recommendations if appropriate. NB: QTRA risk index may be re-evaluated following reinspection.	P = Deadwood up to approximately 100mm diameter. T = Persons using footpath.	3	4	2	50%	1M	M

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G4	1no. Common Ash, 1no. Holly	M	≤ 23	≤ 700	≤ 20	G	- Very closely spaced pair. - Holly canopy is contacting garage roof to east. - Ash canopy showing signs of moderate reduction in vitality due to likely colonisation by ADD, with remaining canopy falling into Class 2 (See paragraph 3.6).	- Tree contractor to prune Holly tree to attain 1.5m clearance to adjacent garage (M). - Tree consultant to review Ash during Summer 2024 to re- appraise physiological condition.	P = Deadwood up to approximately 60mm diameter. T = Persons using footpath.	3	4	2	25%	<1M	M
G5	1no. Beech, 1no. Oak	M	≤ 22	≤ 700	≤ 16	M	- Extensive bark necrosis and stem decay from ground level to approximately 2m height in both adjacent trees. - Group located adjacent to evident desire line through woodland. - Stems paint marked with yellow dot by surveyor to aid identification.	Tree contractor to prune trees to approximately 6m high standing dead stems of habitat value due to identified increased risk of failure and subsequent risk of harm to persons.	P = Stems at ground level. T = Persons using evident desire lines within woodland area.	4	1	2	N/A	40K	H
G6	2no. Common Ash	M	≤ 23	≤ 700	≤ 18	M	- Closely spaced pair overhanging and adjacent to neighbouring garden. - Out of leaf at time of survey, which subsequently impeded inspection.	Tree consultant to review group during Summer 2024 to re- appraise physiological condition and make subsequent recommendations if appropriate.	P = Dead and moribund branches up to approximately 100mm diameter. T = Persons using neighbouring residential garden.	3	4	3	N/A	<1M	L
G7	Common Ash	SM	≤ 12	≤ 200	≤ 6	P-D	- Multiple areas of young to semi mature Ash within falling distance of desire lines and potentially neighbouring garden edges. - All colonised by ADD with remaining canopy leaf cover falling into Classes 3-4 (See paragraph 3.6).	Tree contractor to remove all semi mature Ash from areas adjacent to neighbouring gardens and evident desire lines due to identified increased of failure.	P = Dead and moribund stems up to 200mm diameter. T = Persons using evident desire lines.	4	3	2	N/A	500 K	M

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G8	28no. Beech, 2no. Ash	EM	≤ 16.5	≤ 490	≤ 12	M-G	- Previously referenced as group G6 in 2021 survey. - Beech trees planted as two closely spaced rows on either side of single-track gravel drive to cemetery. - Seventh Beech from drive entrance, on eastern side, has an approximately 90mm diameter <i>Ganoderma applanatum</i> white rot decay causing fungal fruiting body on eastern side of stem base and a younger approximately 75mm diameter fruiting body below this, but has signs of adaptive growth around basal area and is showing no noticeable reduction in vitality. - Two Ash trees are evidently self-set and are growing in a managed Hawthorn hedge on eastern edge of group, with canopies colonised by ADD. - Remaining canopy leaf cover falling into Class 2 (See paragraph 3.6) - Both are multi-stemmed from bases, and have evidently been coppiced as part of hedge's previous management.	- Tree consultant to monitor progression of basal decay of Beech (see Comments) as a component of subsequent cyclical inspections. - Client to consider removal of Ash within group due to projected increase in failure risk on expected continued decline.	P = Beech tree with basal decay at ground level. T = Property within neighbouring residential garden.	4	P	4	N/A	<1M	L
G9	3no. Common Beech	M	≤ 17	≤ 670	≤ 16	M	- Group located to north of gardeners' compound area. - Some debris on ground part impeded access. - Central tree has dieback to western upper stem with deadwood up to approximately 280mm diameter. - No fungal fruiting bodies observed, or basal decay noted when sounded with nylon mallet, at time of survey. - Canopy low over shed roof to south.	- Tree contractor to prune to remove deadwood from central tree >50mm diameter and prune to attain 2m clearance above shed roof. - Tree consultant to review group during Summer 2024 to re- appraise physiological condition and make subsequent recommendations if appropriate.	P = Deadwood up to approximately 280mm diameter. T = Equipment and out buildings below.	4	P	2	N/A	30K	M

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W1	Common Alder, Oak, Beech, Ash, Horse Chestnut, Lawson Cypress, Sycamore, Silver Birch, Norway Maple, Scots Pine, Willow	M	22	890	20	G-D	- Mixed wooded area with evident moderate usage throughout by persons as outdoor amenity space. - Approximately 25no. Ash all colonised by ADD with remaining canopies falling into Classes 3-4 (see paragraph 3.6) and stems paint marked with yellow dot by surveyor to aid identification. - Two Alders evidently dead or in late stages of decline have stems paint marked with yellow dot by surveyor to aid identification. - Approx 3no. semi mature Crack Willow have necrotic bark strips up stems some with rhizomorphs indicative of saprophytic colonisation by basal decay fungi <i>Armillaria</i> sp. - Ivy to some stems impeding inspection, as noted during 2021 survey. - Moderate deadwood to 100mm diameter. - Mature Beech, marked W1a, has small area of soft rot decay causing <i>Kretzschmaria deusta</i> on south east side at approximately 750mm height in old part occluded wound, with colonisation evidently confined to previously dysfunctional wood, and canopy displaying good vitality at time of survey. - Mature Alder, marked W1b, has buttress area colonised by unidentified fungal fruiting bodies on east side at ground level with moderate hollowing when sounded with nylon mallet and moderate reduction in canopy vitality, but evidently has significant mutual shelter from adjacent larger Oak trees.	- Tree contractor to remove all paint marked Ash and Alder stems (see comments) due to identified increased risk of failure and subsequent unacceptable risk of harm to persons. - Tree contractor to prune paint marked semi mature Crack Willow stems to approximately 4m height standing stems, and subsequently manage as pollards. - Grounds maintenance staff to undertake cyclical severance and removal of Ivy from applicable stems >250mm diameter to allow future detailed inspections (I). - Tree consultant to review trees marked W1a and W1b during Summer 2024 to review physiological condition and make subsequent management recommendations where appropriate. NB: QTRA risk index may be re-evaluated following subsequent review.	P = Dead and moribund Ash branches up to 250mm diameter. T = Persons using woodland area and footpaths within.	3	3	1	N/A	5K	H

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W2	Common Alder, Oak, Beech, Ash, Horse Chestnut, Sycamore, Silver Birch, Holly, Scots Pine, Wild Cherry, Norway Spruce, Wych Elm	M	≤ 24	≤ 950	≤ 18	P-G	- 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 rootplate 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. - Number of semi mature Ash, succumbing to ADD and dead/hanging stems of various species paint marked with yellow dot by surveyor to aid identification. - 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 contractor to remove all paint marked stems, (approximately 20no. stems) as identified by surveyor, due to identified increased risk of failure. NB: Felled stems should be left on ground as fallen deadwood of habitat value where appropriate. - Woodland owners to consider creation of woodland management plan to include silvicultural thinning, promotion of regenerative younger growth and potentially new tree/understory planting, habitat improvements and formalising frequently used pathways through woodland and blocking unofficial desire lines with brash barriers to control target usage.	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

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W3	Ash, Spruce, Scots Pine, Sycamore, Beech, Oak, Cherry, Hawthorn	M	≤ 12	≤ 350	≤ 9	G-P	- Young plantation of predominantly Scots Pine, Spruce and Ash. - Several main paths lead from cemetery area towards river and Great Wood. - Evidently little silvicultural management of plantation has been undertaken in recent years. - Areas of Ash within plantation showing severe colonisation by ADD with majority of remaining leaf cover now falling into Class 4 (See paragraph 3.6). - Woodland area borders adjacent caravan park to west, with species predominantly Pine and Spruce in this area. - Unable to access wider woodland areas due to dense undergrowth, and largely viewed from central path crossing woodland.	- Client to instruct forestry/tree contractor to undertake woodland management works to include: - Removal of all Ash succumbing to ADD due to identified increased risk of failure. - Silvicultural thinning of remaining species as appropriate. - Re-planting and restocking with appropriate species to replace areas of removed Ash. - NB: It is strongly recommended that the above works be undertaken as part of a long term woodland management plan.	P = Dead and moribund Ash stems up to approximately 200mm diameter. T = Persons using unmade paths through woodland.	4	3	2	N/A	500 K	M

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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
W4	Oak, Holly, Silver Birch, Sycamore, Ash, Hawthorn.	SM-M	≤ 21	≤ 800	≤ 16	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. - Approximately eight semi mature Ash stems colonised by ADD with remaining canopy leaf cover falling into Classes 3-4 (See paragraph 3.6) and stems theoretically within falling distance of training pitch edge to east and neighbouring residential gardens to west. - Canopies in close proximity to all weather pitch fence to east.	- Tree contractor to remove all semi mature Ash from woodland area due to identified increased of failure subsequent of evident decline. - Woodland owner to re-establish boundary fencing along western side bordering residential properties to prevent continued encroachment of garden curtilages and continued disposal of debris within woodland. - Woodland owner to strongly consider creation of long-term woodland management plan to ensure continued long term canopy cover of woodland and maintain subsequent wider benefits of woodland.	P = Deadwood up to approximately 100mm diameter over neighbouring gardens. T = Persons using residential gardens below tree canopies.	3	4	2	50%	1M	M

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

Surveyor:	Joseph Lambert Chartered Arboriculturist
Survey Date:	26 October 2023
Viewing Conditions:	Overcast with periods of rain
Job Reference:	BTC2195

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
W5	Common Oak, Beech, Alder, Silver Birch, Scots Pine, Hazel, Holly, Rowan	M	≤ 20	≤ 850	≤ 18	M-G	- Woodland belt between football training pitches and Old Langho Road. - Areas within woodland are evidently being used to dispose of garden waste and woodchip, which has been deposited in northern and eastern areas. - Ground to east partially waterlogged at time of survey. - Several Oaks showing moderate reductions in canopy vitality. - Large central gap from previous removal and failure of several mature Beech. - Canopies to north contacting fence of all-weather football training pitch to north. - Dense Ivy to base of several mature Oak and dense bramble in some parts impeding inspection.	- Tree contractor to prune applicable trees to attain suitable clearance to adjacent all weather pitch fencing (M). - Grounds maintenance staff to undertake cyclical severance and removal of Ivy from applicable stems >250mm diameter to allow future detailed inspections (I). - Grounds maintenance staff to discontinue debris disposal in woodland area (M). - Woodland owner to strongly consider creation of long-term woodland management plan to ensure continued long term canopy cover of woodland and maintain subsequent wider benefits of woodland.	P = Deadwood up to approximately 100mm diameter. T = Vehicles and occupants on Old Langho Road.	2	4	2	50%	100 K	M



T = Individual Tree, G = Group of Trees, W = Woodland

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- (Yellow) = Tree/Group/Woodland with Risk of Harm between 1/10,000 and 1/1,000,000
- (Green) = Tree/Group/Woodland with Risk of Harm less than 1/1,000,000

* 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.: BTC2829

Scale: Not to Scale

Paper Size (for printing): A3

Date: November 2023

TREE SURVEY **Bowland**

PLAN

(Overview)

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



T = Individual Tree, G = Group of Trees, W = Woodland

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

Job No.: BTC2829

Scale: Not to Scale

Paper Size (for printing): A3

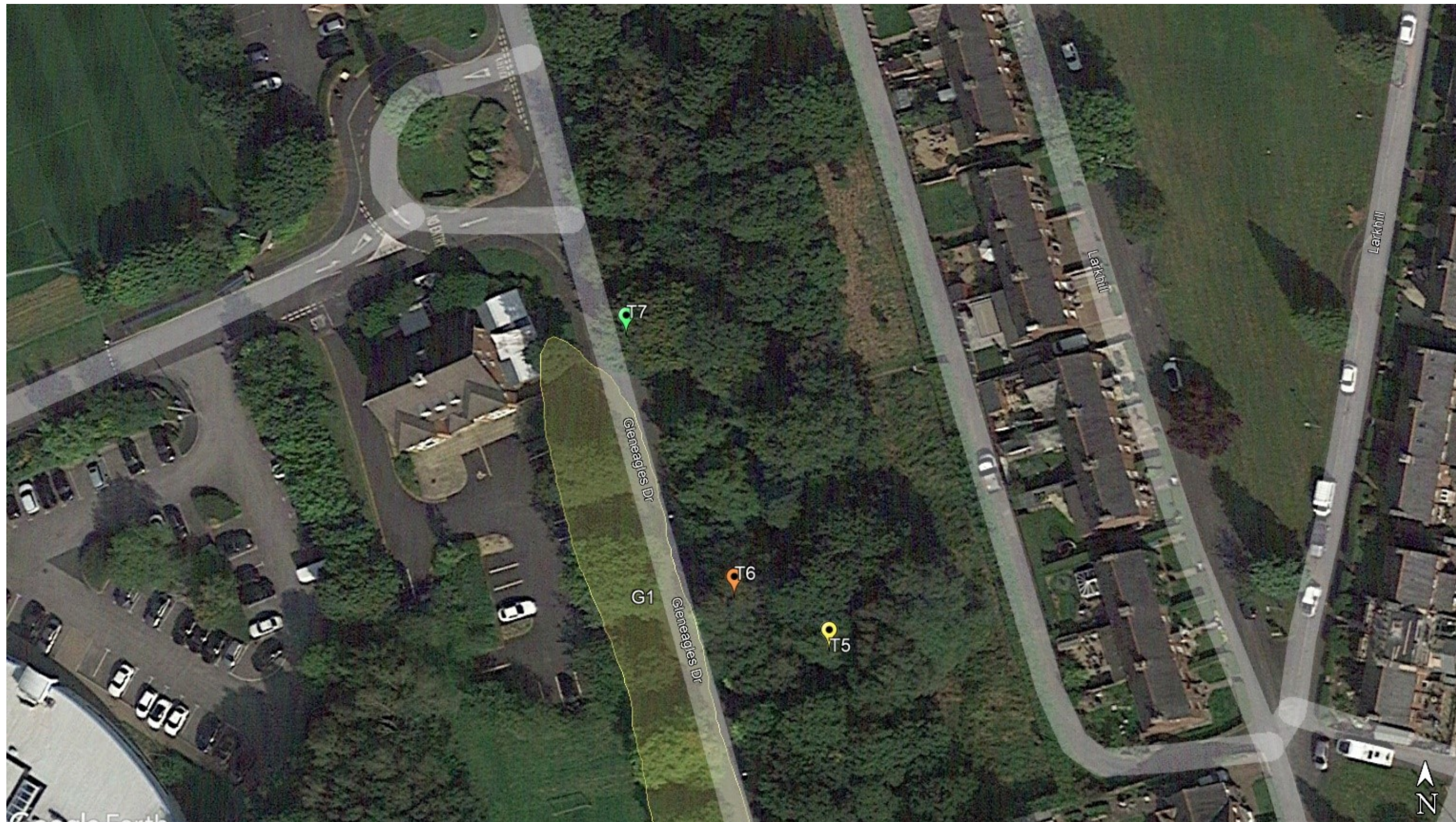
Date: November 2023

TREE SURVEY **Bowland** Tree Consultancy Ltd

PLAN

(Plan 1 of 11)

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



T = Individual Tree, G = Group of Trees, W = Woodland

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

Job No.: BTC2829

Scale: Not to Scale

Paper Size (for printing): A3

Date: November 2023

TREE SURVEY **Bowland** **PLAN** **Tree Consultancy Ltd** (Plan 2 of 11)

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



T = Individual Tree, G = Group of Trees, W = Woodland

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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.: BTC2829

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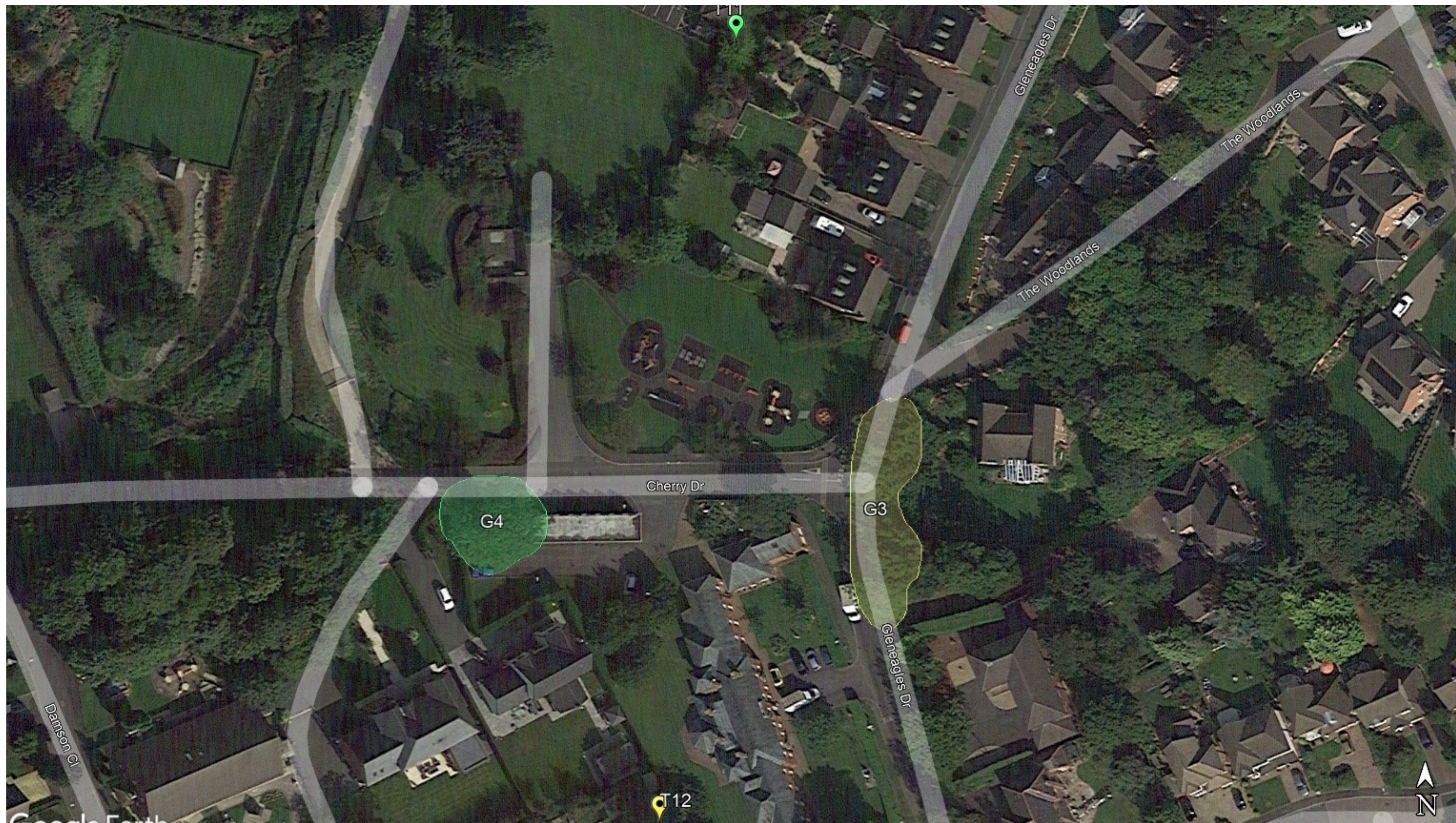
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TREE SURVEY **Bowland** Tree Consultancy Ltd

PLAN

(Plan 3 of 11)

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

Job No.: BTC2829

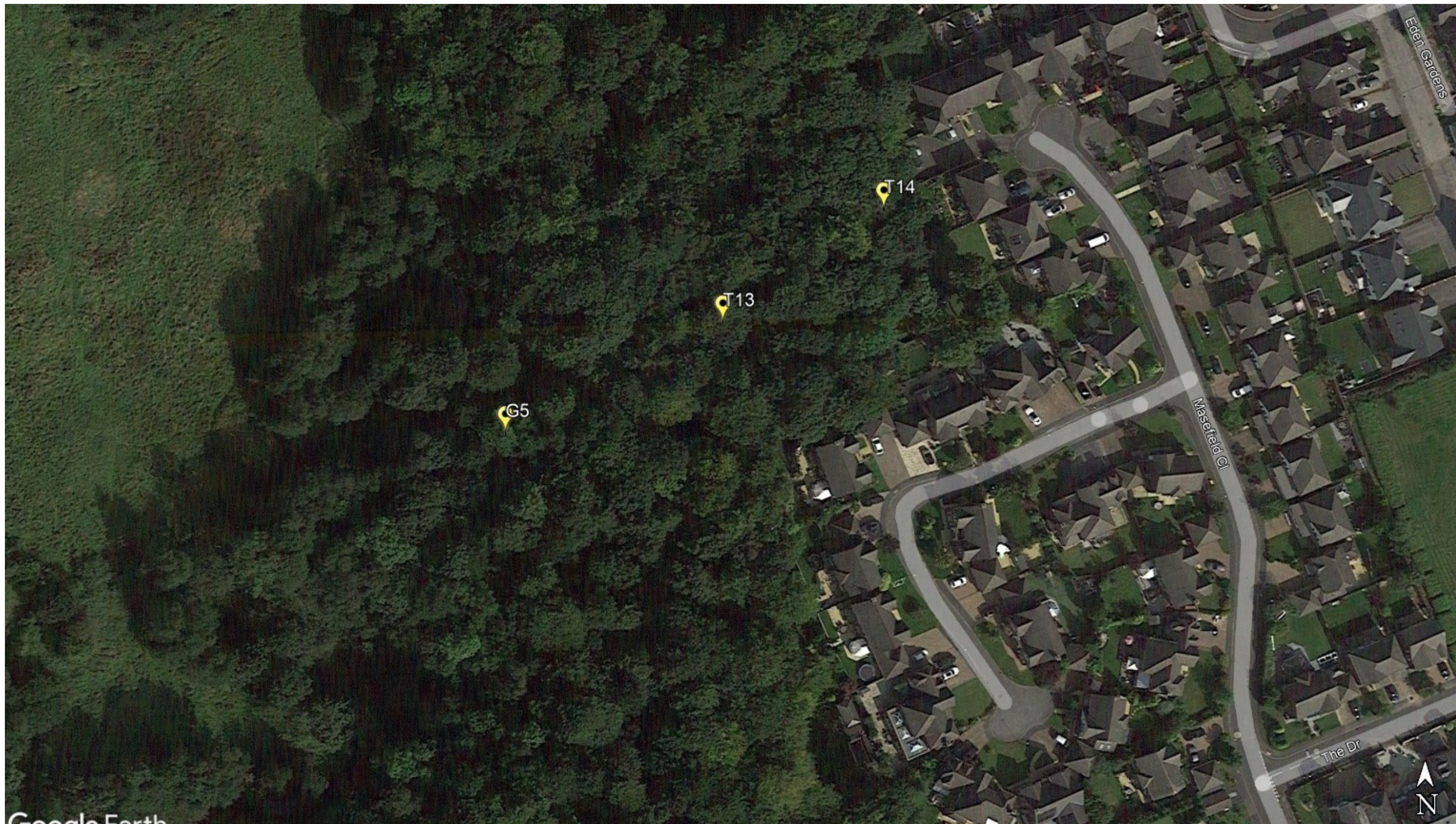
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Date: November 2023

TREE SURVEY **Bowland** **PLAN** **Tree Consultancy Ltd** (Plan 4 of 11)

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

Job No.: BTC2829

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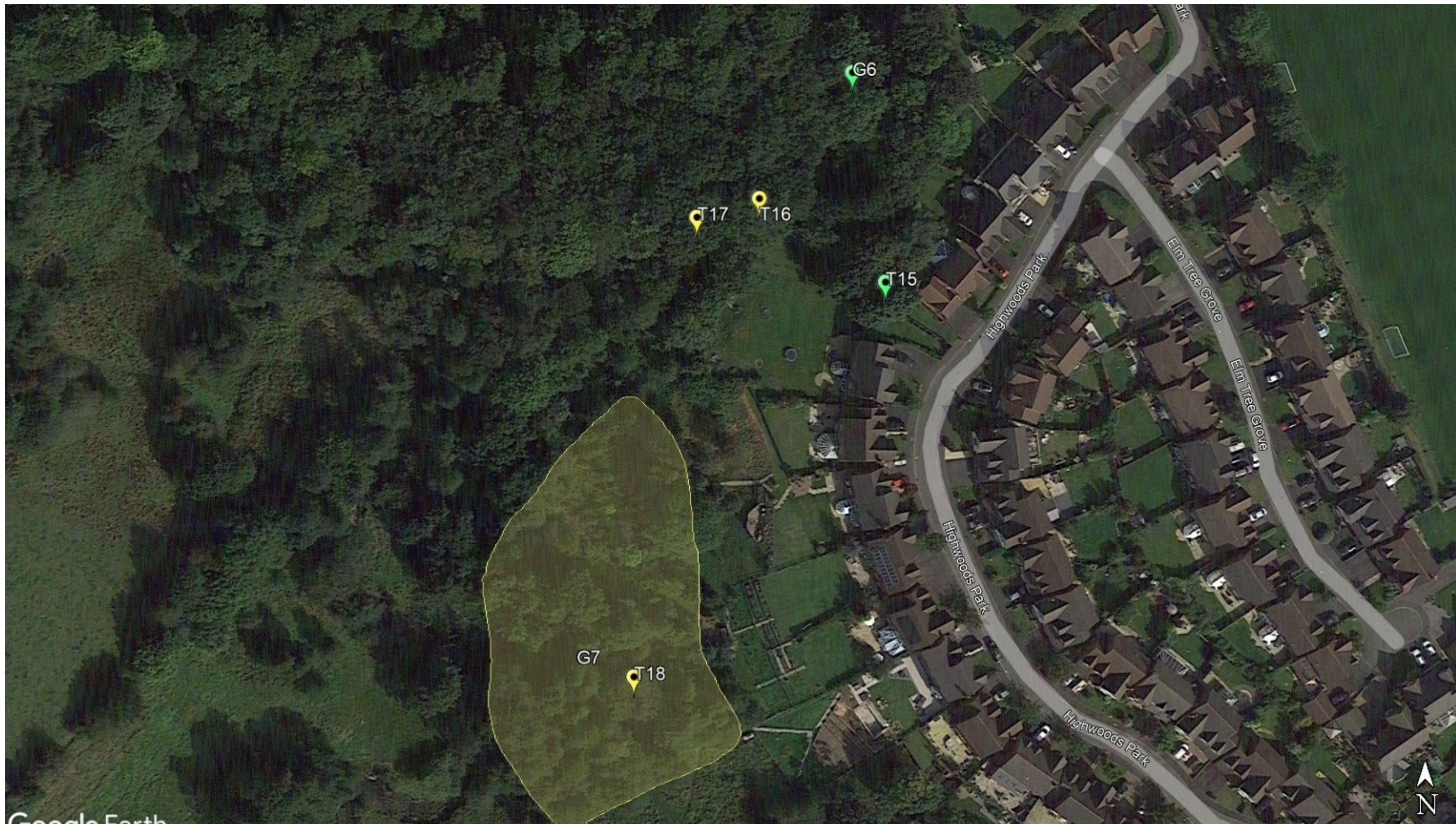
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TREE SURVEY **Bowland**

PLAN

(Plan 5 of 11)

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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.: BTC2829

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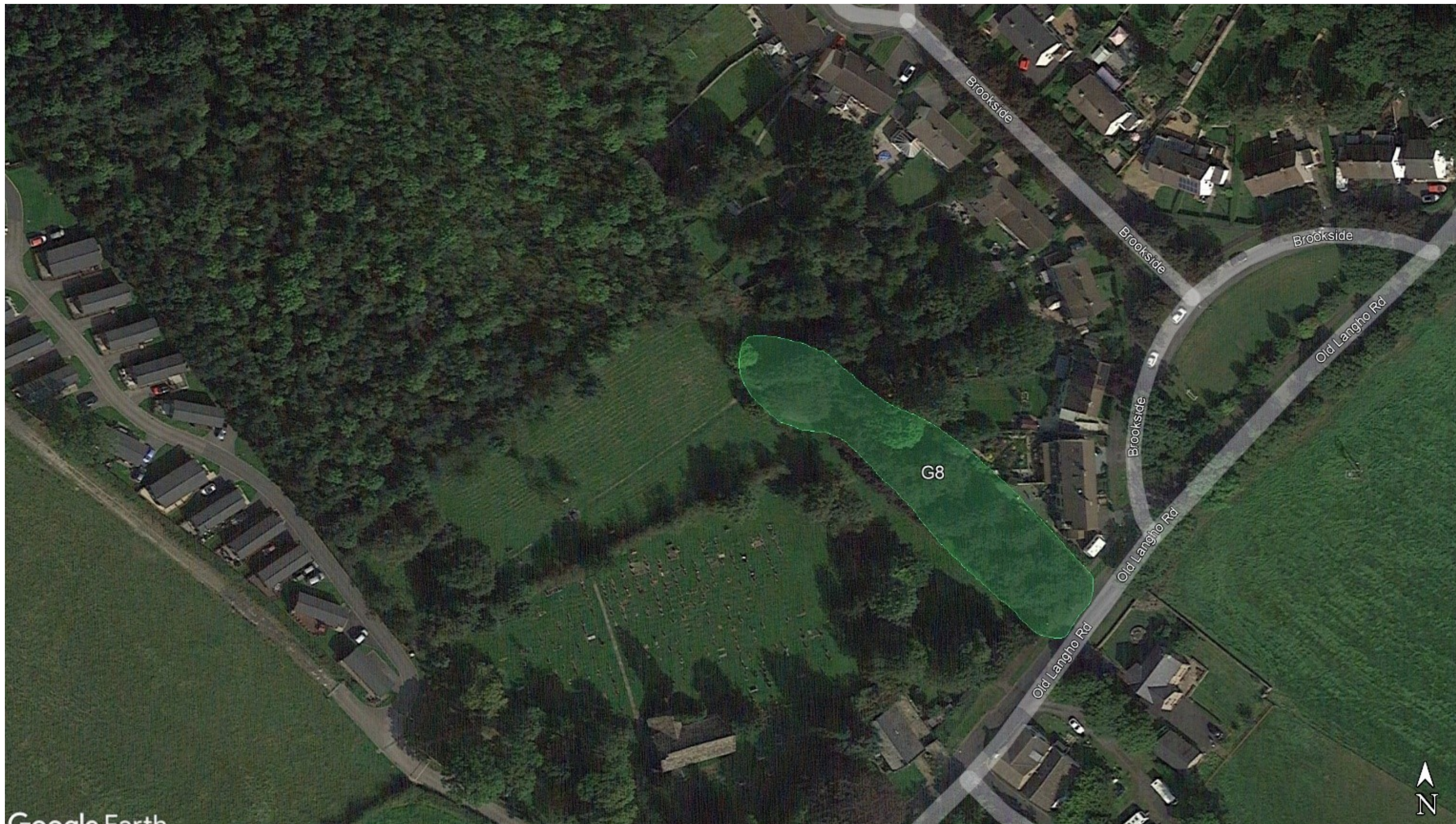
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TREE SURVEY **Bowland** Tree Consultancy Ltd

PLAN

(Plan 6 of 11)

e: info@bowlandtreeconsultancy.co.uk
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**Site: Brockhall Village,
Gleneagles Drive, Old Langho,
Lancashire, BB6 8AR**

Job No.: BTC2829

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Date: November 2023

TREE SURVEY **Bowland** **PLAN** **Tree Consultancy Ltd** (Plan 7 of 11)

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

Job No.: BTC2829

Scale: Not to Scale

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Date: November 2023

TREE SURVEY **Bowland** 
PLAN
(Plan 8 of 11)

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



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Lancashire, BB6 8AR**

Job No.: BTC2829

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Date: November 2023

TREE SURVEY **Bowland** 
PLAN
(Plan 9 of 11)

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**Site: Brockhall Village,
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Lancashire, BB6 8AR**

Job No.: BTC2829

Scale: Not to Scale

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Date: November 2023

TREE SURVEY **Bowland**

PLAN

(Plan 10 of 11)

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Lancashire, BB6 8AR**

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Paper Size (for printing): A3

Date: November 2023

TREE SURVEY **Bowland**

PLAN

(Plan 11 of 11)

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

DISCLAIMER

Survey Limitations: Unless otherwise stated all trees are viewed from ground level using non-invasive techniques. The disclosure of hidden crown and stem defects, in particular where they may be above a reachable height or where trees are ivy clad or in areas of ground vegetation, cannot therefore be expected. All obvious defects, however, are reported. Where the QTRA Risk Index is calculated as Tolerable or Broadly Acceptable, but the tree(s) have not been adequately inspected (e.g. due to the presence of ivy and/or ground vegetation which impeded the inspection), then it is essential to follow the recommendations made in the Management Recommendations column and to have the applicable tree(s) re-inspected as recommended.

Detailed tree safety appraisals are only carried out under specific written instructions. Comments upon evident tree safety relate to the condition of said tree at the time of the survey only. The level of detail of the survey is as per the brief detailed on the Tree Survey Schedule and as per the specifics set out in the associated fee estimate for the project.

Unless otherwise stated all trees should be re-inspected annually in order to appraise their on-going mechanical integrity and physiological condition. It should, however, be recognised that tree condition is subject to change, for example due to the effects of disease, decay, high winds, development works, etc. Changes in land use or site conditions (e.g. development that increases access frequency) and the occurrence of severe weather incidents are also significant considerations with regards tree structural integrity and trees should therefore be re-assessed in the context of such changes and/or incidents and inspected at intervals relative to identified and varying site conditions and associated risks.

Where trees are located wholly or partially on neighbouring private third-party land then said land is not accessed and our inspection is therefore restricted to what can reasonably be seen from within the site. Any subsequent comments and judgments made in respect of such trees are based on these restrictions and are our preliminary opinion only. Recommendations for works to neighbouring third-party trees are only made where a potentially unacceptable risk to persons and/or property has been identified during our survey. Where significant structural defects of third-party trees are identified and associated management works are considered essential to negate any risk of harm and/or damage then we will first attempt to inform the site occupier of the issues and, if not possible, then inform the relevant Council. Where a more detailed assessment is considered necessary then appropriate recommendations are set out in the Tree Survey Schedule.

The potential influence of trees upon existing or proposed buildings or other structures, resulting from the effects of their roots abstracting water from shrinkable load-bearing soils, is not considered herein.

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Statutory Tree Protection: It is the client's responsibility to check for the presence of any statutory tree protection measures, such as the site's location within a Conservation Area and/or the presence of any Tree Preservation Orders, directly with the applicable Council's planning department prior to scheduling or carrying out any tree works. In turn, it is also the client's responsibility to check for the need for a felling licence with the Forestry Commission prior to scheduling or carrying out any tree works. Bowland Tree Consultancy Ltd cannot be held responsible for any decisions made by the client to prune or remove trees where any such statutory protection exists.

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Validity: The findings and recommendations contained within this report are, providing its recommendations are observed and the site conditions are retained as per the date(s) of the survey, valid for a period of twelve months from the last survey date. This period of validity may be reduced should there be any changes in factors affecting both the surrounding environment and/or built structures in relative proximity to the trees. The condition of trees should be re-appraised directly, through a site survey, following major weather events such as storms, changes undertaken to the site's conditions, inclusive of demolition and/or ground works, or the removal of existing site vegetation, including trees.



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 values¹, 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.

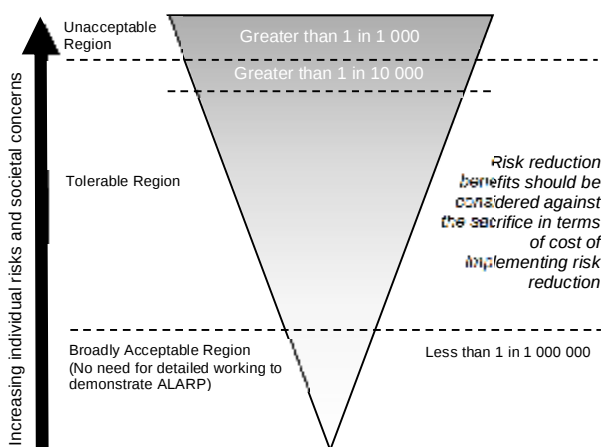


Figure 1. Adapted from the Tolerability of Risk framework (HSE 2001).

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 ranges³ 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 720/hour – 73/hour & cyclists:	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 72/hour – 8/hour & cyclists:	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 7/hour – 2/hour & cyclists:	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 1/hour – 3/day & cyclists:	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 2/day – 2/week & cyclists:	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 1/week – 6/year & cyclists:	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 simulations⁴. 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
1/1,000	Unacceptable Risks will not ordinarily be tolerated	Control the risk
	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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