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Walk Through Assessment of Trees

Site: Kirby House, Bridlington Road, Driffield YO25 5JF.

On Behalf of: Railway Housing Association.

Date: 04/07/2020
Reference: BA10040

SUMMARY OF TREE INFORMATION

I have undertaken a ground-based tree survey to identify the general condition of the trees and their relationship with significant targets at Kirby House, Bridlington Road, Driffield YO25 5JF.

My assessment identified the coniferous woodland to the rear of Kirby House and found that the woodland appears to have had little management.

The trees are assumed to offer a Broadly Acceptable Risk and are assumed to be at a point where the risk is already 'As Low as Reasonably Practicable' (ALARP) when considered over the coming year. Overall, the risk offered by most the trees are low and within the boundaries of tolerability that might ordinarily be applied by a reasonable and informed landowner.

I recorded a range of issues, which are currently or could affect a tree's condition and may result in potential damage or elevated management costs and these are set out in the report.

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WALK THROUGH RISK ASSESSMENT

This ground-based visual assessment was carried out to detail the current condition of trees located on-site and assess their condition and include recommendations both for current and future works required to maintain or improve the condition of trees or to improve safety.

Its purpose is to provide initial information on the condition of trees, management requirements and the risk offered by trees, based upon their condition, location, the likelihood of failure and potential to impact property and people.

This assessment has been undertaken by a qualified arboriculturalist.

This arboricultural assessment includes general information on tree condition and management. The report includes:

- a **visual tree assessment**, which is prepared in line with best practice.
- a **tree assessment of risk trees**, detailing significant issues with suggested works.
- a **tree schedule & survey plan** within the appendices, which details the principle management issues and trees that pose an elevated risk to the site users and neighbours.

INTRODUCTION

1.1 **The Terms of Reference.** This report is based upon a ground-based assessment and is based upon the Visual Tree Assessment (VTA) methodology, as devised by Mattheck (1993) in addition to Hazard Evaluation devised by Matheny & Clark (1993). Guidance is also taken from Lonsdale (1999) Principles of Tree Hazard Assessment and Management. The format of the survey follows the guidelines of British Standard 5837:2012 'Trees in relation to design, demolition & construction - Recommendations' & The ISA Tree Risk Assessment Manual (2017).

1.2 **Objective.** To carry out an assessment on the condition of trees and to identify the trees which pose a threat to site users and neighbours, and where such trees are located propose management to enable reasonable risk levels to be achieved. The assessment and report are primarily aimed at reviewing the risks from the structural failure of the trees.

1.3 **Surveyor:** My name is Matt Metcalfe; I am an Arboricultural Consultant, hold *FdSc* Arboriculture and a professional member of the Arboriculture Association. I have included further details on my experience in appendix A. My area of expertise is tree and woodland management in both urban and rural environments. I frequently carry out assessments and provide risk management advice to a wide range of government, private and commercial clients. I have based this report on my site observations and the provided information; I have come to conclusions considering my experience.

1.4 **The scope of this report:** This preliminary assessment is concerned with the health and risk offered by the trees, additional comments relating to general management requirements are included; remedial recommendations are included.

1.4.1 The statements made in this report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire. Barnes & Associates cannot, therefore, accept any liability about these factors, nor where prescribed work is not carried out correctly and professionally in accordance with current good practice. The authority of this report ceases at any stated time limit within it, or if none stated after two years from the date of the survey, or when any site conditions change, or pruning or other works unspecified in the report are carried out to, or affecting, the Subject Tree(s), whichever is the sooner.

1.4.2 Assessment of the potential influence of trees upon buildings or other structures resulting from the effects of trees abstracting water from shrinkable load-bearing soils was not included in my instruction and is not considered here.

METHODOLOGY.

2.0 **Visual Tree Assessment (VTA)**, relies upon a tree's response and adaptation to weakness to help provide details of the tree internal condition and stability. As the stress distribution in a tree is changed in response to the presence of a defect, the tree attaches or lays down more wood in overloaded locations to strengthen that area. As a result, bulges or dents are formed near decayed hollows and ribs near cracks etc. Leading to changes in the tree's appearance or its body language, which is interpreted during the assessment process.

2.1 Visually examining a tree and a tree response to its environment, an arboriculturalist can gather information on the condition of its roots, trunk, main branch structure, crown, buds and leaves to make an assessment and draw conclusions about the general condition, health and vitality.

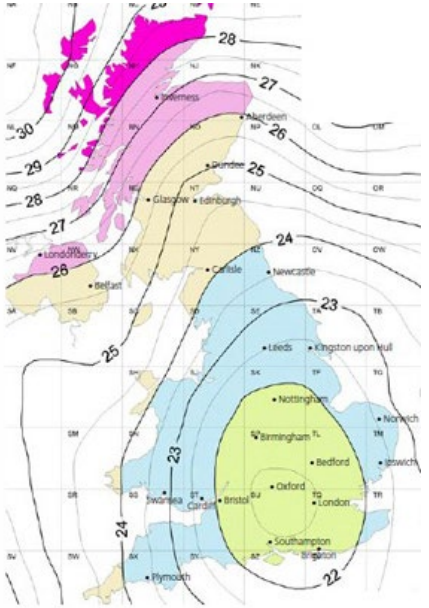
2.2 Additional, biological signs, such as undersized leaves, discoloured foliage, dead branches, large or numerous cankers and fungal fruiting bodies, help inform the assessment which can be compared to typical growth patterns and appearance of the tree involved.

2.3 If mechanical weakness is suspected, there may be a need for more detailed investigation using specialist decay detection and measuring equipment.

2.4 **Potential Risk from Trees**. Trees, unlike built structures, are a dynamic structure and offer several specific management issues that need to be considered. Reasonable risk management generally aims to provide trees that can be regarded as stable in a normal/foreseeable, storm event.

2.5 **Wind Speed.** In general, the windiest parts of the UK are the north and west. This is because the prevailing west to south-westerly winds across the UK lead to northern and western areas being typically more exposed than the south and east.

2.5.1 There are also a lot of localized effects with most hills, mountains and coasts being windier than low-lying inland areas. Wind speed increases as you go upwards away from the friction caused by the earth's surface. This also explains the windier coasts as the sea surface produces less friction than the land.



2.5.2 In this region, we expect to receive peak wind speeds around of 22 to 24 m/s based upon information published in the UK National Annex to Eurocode 1 - Actions on structures Part 1-4: General actions - Wind actions. This equates to a force 9 Strong Gale on the Beaufort Wind Scale. I have included further general information upon the Tree & Risk in - appendix E.

2.6 **Target evaluation.** To enable a balanced approach to the site assessment I undertook an initial assessment of the associated risks on-site to identify areas of high public access, areas where trees are within striking range of valuable or fragile structures or high human occupancy locations. Targets are broadly zoned in the 'Target' ranges based on the levels of occupation, population and value. These were assumed to be generally low target areas with the site having occasional to frequent occupation.

2.7 **Risk Assessment.** The assessment follows the general principles of Risk Assessment; to reduce the risk of injury to people, property damage or disruption of services. The International Society of Arboriculture (ISA) Tree Risk Assessment Methodology takes a qualitative rather than quantitative

approach to risk assessment. The system uses the output of matrix 1 (below) to compare the likelihood of failure of a tree or tree part, the likelihood of impacting the target with the potential consequences of failure, which is output in matrix 2 (below),

Matrix 1. Likelihood of failure

Likelihood of failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk Rating matrix

Likelihood of failure & impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate.	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

2.8 The Advisory Risk Threshold provides information upon priority with trees with the highest risk rating with the greatest target values requiring work urgently. Where the priority of trees is recorded as being low and a low target value, works required to improve the trees risk of harm, are expected to be undertaken as part of the normal estate management.

2.9 **Tree Management.** We take a balanced approach to managing trees taking account of their contribution to biodiversity, the environment, human health, safety and quality of life. An appropriate response to tree risk takes account of the human and financial costs involved in controlling risks. It also gives due regard to the value of trees in the widest sense, and how wholesale tree removal impoverishes our environment.

2.10 At the same time, we aim to provide holistic management guidelines to help both maintain and improve the condition of a tree, whilst attempting to predict management or structural problems or where trees are inappropriately located and offer a foreseeable nuisance. In doing so we hope to strike a balance between cost-effective management, timely intervention and the guidelines of current best practice.

SITE ASSESSMENT

3.1 **The purpose of this report.** This is an arboricultural assessment outlining the current condition and safety of the trees on-site and aims to recommend works to improve the trees condition, pre-emptive works to simplify tree management and identify the trees offering an elevated risk of harm. Its purpose is to provide initial information on potential risks offered by trees, their condition and to suggest either further assessment or works to improve safety and extend their safe life.

3.2 **Background Information.** Subject to physical access being available, to assess all the significant trees on site from ground level.

3.3 Trees are tagged using a numbered Arbor-Tag system which uses a single nail to attach the tag to the tree at roughly head height or just above.

3.4 Information on the trees is recorded and their details are discussed in the tree schedule, which is included in appendix B.

3.5 **Weather conditions.** The weather was bright and warm with good visibility.

3.6 **Boundaries:** The outer site boundaries are well defined by fencing.

3.7 **Brief site description.** The woodland area appears to have been untouched for many years.

3.8 **Tree Population.** The trees are composed of moderate growing mature and semi maturing monoculture.

3.9 **Amenity Value.** The trees filter views between the construction site and the site, based on the level of visibility the trees are assumed to have a relatively high visual amenity value.

3.10 **Principal Targets.** The trees are located adjacent to Kirby house and the back access hard standing, these are deemed the principal targets.

3.11 **Pedestrian Access.** Pedestrian access is possible around the entire site.

3.12 **Vehicle Access.** Vehicle access around the site is restricted to the metaled roads.

3.13 **Condition of Trees.** This inspection provides an assessment of the condition of the principal trees, within the existing site along with landscape and environmental constraints. The trees have been assessed from ground level only. Information upon the trees is in the Tree Schedule in appendix B.

3.14 **Identification and location of the trees.** I have illustrated the location of the recorded trees on the site plans included and referenced **BA10040**
A numbered copy is included in - appendix C. Trees are shown on the plan, which is for illustrative purposes only and should not be used for directly scaling measurements.

3.15 **Visual assessment of trees.** The assessment of the trees was undertaken from ground level using Visual Tree Assessment (VTA), this is a non-invasive method of examining the health and structural condition of individual trees. The assessment provides information on the condition of the roots, trunk, main branch structure, crown, buds and leaves together providing an assessment of general tree health and vitality.

3.15.1 Basic decay detection tools such as mallets and probes were utilised to determine whether further investigation is required.

3.15.2 Other than where the height of a tree is critical to the outcome of the assessment, approximately 1 in 10 trees are measured using a clinometer

and the remainder estimated against the measured trees. Where possible canopies are measured using either tape or measuring wheel, where access is restricted, they are estimated. Stem diameters are measured using a rounded down diameter tape to avoid variations due to stem shape, otherwise where trees are in a group and/ or not accessible the stem's mean stem diameters are estimated to provide a reasonable basis for ageing.

3.16 **Risk Assessment.** I have undertaken a tree survey to identify the general nature of the trees and their relationship with significant targets. The level of detail with which the trees have been assessed is informed by their relationship with targets. Based on these larger trees adjacent to higher-value targets were more closely assessed than smaller trees adjacent to a lower value target when viewed over the next year.

3.17 The trees are assumed to offer a **Broadly Acceptable Risk** at which point the risk is already **'As Low as Reasonably Practicable' (ALARP)**.

3.18 **General Site Issues**. Whilst on-site there appears to be a range of general arboricultural issues which have the potential to affect the development of trees and may result in future problems or which may result in elevated management costs for the site in the future these are discussed below.

3.19 G978 (Pines) are growing on the southwest of the woodland within proximity (400mm) of hard standing. This proximity is a concern as the stem diameter are 600mm, this makes the estimated root plate diameter of 2400mm (2.4m), within this root plate area is the hard standing, and therefore this is within a critical zone of tree stability, this is of more importance as the trees stand on the prevailing wind side of the site. It is recommended that the trees nearest the hardstanding are tested to check root plate stability using either a tree pull or Dyna root system.

Photograph below shows G978 and the hardstanding proximity.

3.20 T979 and T982 are growing on the southern edge of the woodland and as such their canopies are biased to the southeast towards the building. It is recommended that the trees are crown reduced away from the building to provide a clearance of 2m in line with BS3998.

Photograph below showing the canopies extending close to the building.

3.21 T980 and T981 are growing on the southern edge of the woodland and as such their canopies are biased to the southeast towards the building. As both trees are showing either obvious decline or poor form and unlikely to fully mature without the ongoing pressure to prune it is recommended that the trees are removed.

3.22 Ongoing woodland management- the woodland itself is in reasonable condition and contains some standing deadwood and ivy which supports ecological value, however, the Ivy is also likely to obscure tree defects and increase tree canopy sail areas. It is recommended that the ivy is severed and that the woodland has an understory planting scheme of shade loving y planting to further promote wildlife and ecology whilst increasing privacy from the new development site.

Photograph below shows the woodland interior.

CONCLUSION

4.1 **Generally,** the trees are in a very natural state suggesting very little management has taken place.

4.2 **Tree Management**. Unfortunately, many of the trees appear to be at much the same point in their life cycle and this should ideally be amended through a tree management programme centred around improving immediate safety in addition to the phased establishment of replacement trees and removal of problem trees which would be beneficial to maintain tree cover. In addition, to improving the appearance of some areas and the broad range of benefits offered by the trees.

4.2.1 Ideally, a management plan should be prepared to help provide a more detailed insight into the population of the trees. To provide appropriate forthcoming works, planting opportunities and to help identify both immediate and ongoing management to help stabilise the tree population.

4.1.1 Trees potentially live for many generations their environment and people's attitudes can change significantly over their life spans, and management practices can change. Plans and procedures should be reviewed regularly to ensure they remain effective and current, particularly in relation to climate change issues and current best practice.

4.2 **Remedial Tree Works.** Several trees contain defects and require works to improve their current condition or require further investigation. These works are detailed within the schedule of the trees listed in appendix B.

4.3 **Additional and ongoing requirements.** The site will require ongoing assessment to maintain a reasonable level of safety.

4.4

4.5 **Limiting Site Access.** It is reasonable to assume a 'Storm' of force 10 using the Beaufort Scale (55 - 63 miles per hour of wind speeds on land) will occur annually and such a risk should be built into the site management. Recent work has shown even sound trees that would typically be regarded as safe can fail during high winds through several factors relating to wood physiology, dynamics and the relationship between the root system and the supporting soils.

4.5.1 Typically, trees have evolved to fail in part, i.e. twigs and branches are sacrificed/fail from a parent tree rather than the tree being lost entirely. Observations at various sites have found that twigs and branches, can break from trees at wind speeds of as little as 31 miles per hour, the upper limit of a 'strong breeze' as detailed in Beaufort Scale 6 (25 - 31 miles per hour).

4.5.2 Such branch failures are difficult to predict with any great level of detail and as such, I would recommend a defensive position is best adopted. Considering this, I would suggest that changes to the opening/access arrangements or warning signage are considered.

4.5.3 Ideally, access to the site is restricted when the wind speeds approach 'Near Gale' or 'Moderate Gale' - Beaufort Force 7, 32-38 miles per hour or 30mph based upon normal broadcast weather forecasts. Where this is not possible owners are likely to be required to maintain an elevated level of management to help ensure safety.

4.6 **Trees subject to statutory controls.** If the trees are covered by a tree preservation order, located in a conservation area, other legal planning constraints or on neighbouring land works may be restricted. The works specified are necessary for reasonable management and should be acceptable to the local authority.

4.7 **Implementation of works.** I would always suggest that you get at least three fixed priced quotations before deciding upon a contractor to undertake the works on your behalf. We can often advise on a suitable contractor.

4.7.1 You should ensure that any contractor employed for the above works is suitably qualified and experienced, familiar with current best practice and covered by current, public, products, and employee liability insurance, to an adequate level. I would advise that any Arboricultural work is carried out by a reputable contractor one approved by the Arboricultural Association. (www.trees.org.uk) is advisable.

4.7.2 The contractor should carry out all tree works to BS3998 (2010) Tree Work – Recommendations and/or the European Tree Pruning Guide - European Arboricultural Council (English Version) and the Industry Code of Practice for Arboriculture: Tree Work at Height (Edition 1, February 2015). Works should be undertaken in strict accordance with current arboricultural best practice ensuring that any pruning works accord with current target pruning methodology. They should be fully conversant with current Arboricultural best practice and adhere to all relevant legislation including the New Road & Street Works Act 1991 for works in the proximity of highways, and The Working at Heights Regulation 2005. In addition to the dangers & legislation associated with working close to Electrical Supplies.

4.7.3 Additionally, they should be aware of the Wildlife and Countryside Act 1981. In addition, the amendments of 1985 and its implications for tree works. Works should be planned to avoid times when birds are nesting and be aware that a bat survey may be needed on significant tree hollows. If bats are discovered during inspection or subsequent work, Natural England must be informed immediately.

4.8 **Legal Duty.** Tree owners have a statutory duty of care under the Health and Safety at Work Act 1974 and the Occupiers Liability Acts of 1957 & 1984 in addition to the Management of Health and Safety Regulations 1999, to ensure that members of the public and staff are not to be put at risk because of any failure by the owner and to take all reasonable precautions to ensure their safety.

4.9 **Future considerations.** Trees are living organisms whose health and condition can change rapidly. The health, condition and safety of trees should be checked on a regular basis. In addition to professional inspection, a tree owner should inspect their trees personally on a regular basis, particularly after stormy weather or high winds.

APPENDICES

APPENDIX A – CONSULTANT BRIEF QUALIFICATIONS AND EXPERIENCE

Mr Ian Barnes - Director
RCArbor.A, F.Arbor.A, C.Hort, CEnv,
Arboricultural Association Registered Consultant, Fellow Arboricultural Association, Chartered Horticulturalist, Chartered Environmentalist.
Professional member Consulting Arborist Society.
BSc (Hons) Arboriculture, HND Arboriculture,NDHt/Arb, Tech.Cert (ArborA), ISA TRAQ Qualified, QTRA Licensed

Ian has been in the horticulture and Arboricultural industry since 1985, he has experience in commercial horticulture, local authority and highway authority tree surveying. He has been a commercial Arboricultural climber. He ran in partnership a tree and landscape contracting business for over 15 years. He has been a full time Arboricultural consultant since 2007. His main area of works are trees and development (BS5837) and advanced tree assessments using various advanced techniques. He is also director of a hi-tech arborist/ landscape equipment and training company Tree Diagnostics Ltd providing training in advanced assessments.

Mrs Sue Barnes- Director
CMLI, F.Arbor.A, C.Hort, CEnv, MBALI
Chartered Landscape Architect, Fellow Arboricultural Association, Chartered Horticulturalist, Chartered Environmentalist, Registered Designer BALI
FdSc Arboriculture, NDHt/Arb
Professional Member Consulting Arborist Society, Affiliate member RIBA,

Sue has been in the horticulture / Arboricultural industry since 1986. She has experience in amenity parks and gardens and she has been a head gardener for local health authority. In partnership she ran a tree and landscape design and build company for 15 years, she has been a tree and landscape consultant full time since 2007. Her main area of works are detailed planting design and Arboricultural and landscape management.

Mr Matt Metcalfe - Consulting Arborist:
M.Arbor.A
Professional member of the Arboriculture Association, City and Guilds NPTC assessor/ Instructor
FdSc Arboriculture,National Diploma in Arboriculture, Level 5 Certificate in Education.
VALID tree risk assessor

Practical experience:
Matt has worked in the Arboricultural Industry since 2000. Firstly, as a climbing arborist in both the public and private sector. He became a teacher at a land-based college in York in 2009 where he taught Arboriculture at level 2/3 and then course manager in Arborist apprenticeships and internal verifier. He became a City and Guilds NPTC Assessor in 2012, in ground based and aerial Arboriculture and NPTC City and Guilds Instructor/Assessor in land-based industries. In 2018 he became a fulltime consulting arborist and provides advanced tree assessment training assistance and is a trained tree risk assessor.

APPENDIX B – TREE SCHEDULE & EXPLANATORY NOTES

The following survey has been prepared from a visual assessment taken from ground level without any detailed investigation. Observations are based upon the body language of the trees and any visual indicators present at the time of inspection. This survey should be regarded as a preliminary overview; ongoing inspections will be required as specified individually. In most situations the health, condition and safety of trees should be checked on a cyclic basis, alternating between early and late seasons to ensure a full picture of tree health is established. Inspections should only be carried out by a suitably qualified arborist.

Similarly, numerous potential defects may not be detectable dependent upon timing of inspection, in particular, wood decay fungi, which may only occasionally produce external fructifications annually (rather than perennially), or may not provide external symptoms until an advanced state is achieved.

Reasonable risk management generally aims to provide a tree that can be regarded stable in a normal / foreseeable, regularly experienced storm events i.e. force 10 storms. The level of risk offered by the tree will be significantly greater as the wind speed that the tree is exposed to increases beyond this level. Additionally the threat from aerial parts i.e. Tight unions may remain even following works, although failures of such parts are likely to be limited to small diameter branches and to periods of extreme weather.

As an arborist, I am a tree specialist and use my knowledge, education, training and experience to examine trees, recommend measures to enhance their beauty and health, and attempt to reduce the risk of living near trees. As a client, you may choose to accept or disregard these recommendations, or seek additional advice.

As an arborist I cannot detect every condition that could possibly lead to a tree or limb failure. Trees are living organisms that may fail in many ways, some of which we do not fully understand.

Conditions are often hidden within the tree and below the ground. As arborists, we cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Sometimes trees may appear "healthy," but may be structurally unsound. Likewise remedial treatment, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the arboricultural perspective, such as property boundaries and ownership, disputes between neighbours, planning issues, sight lines, landlord-tenant matters etc. Arborists cannot take such issues into account unless complete and accurate information is given to them. Likewise, as an arborist I cannot accept any responsibility for the authorization r non-authorization of any recommended treatment or remedial measure.

Furthermore, certain trees are borderline cases as to whether they should remain or be removed. If conditions change a tree may need further monitoring in the future to determine its health and structure. Trees can be managed, but they cannot be controlled, and to live near a tree is to accept some degree of risk.

Mathematical abbreviations: > = Greater than, < = Less than.

Measurements / estimates: All dimensions are estimates unless otherwise indicated. Measurements taken with a tape or clinometer are indicated with a '#'. Less reliable estimated dimensions are indicated with a '?'.

Tree number: Numbered Tag attached to each stem usually on the inside face of the stem at roughly 2.5 metres. Where the number is followed by a C or G this demotes that the tag refers to a Compartment or Group.

Name: Tree species are detailed by their common name- Latin ca ne provided upon request.

Age: I record the age as an estimate of the tree likely span for guidance only i.e:

Y	Young	Recently established/planted tree.
SM	Semi Mature	Fully established and growing with high vigour
EM	Early Mature	The first third of its likely expected life span
M	Mature	The middle one third of its likely expected life span
EOM	Early Over Mature	Clear reduction in vitality, typically small deadwood early canopy retrenchment.
OM	Over Mature	The later one third of its likely expected life span with sign of canopy retrenchment.
V	Veteran	An aged example of the species, typically with defects & conservation value
S	Senescent	Beyond its expected Life span possible of historical interest or in a state of decline

Height: I estimate height to the nearest metre to the mean height.

Height to underside: I estimate height to the nearest half metre to the mean underside of the canopy.

Diameter: These figures relate to a measurement of the stem at 1.5m above ground level recorded in millimetres, measured with a rounded down diameter tape. Figures prefixed with MS denote trees or shrubs with multiple stems.

Canopy (N S E W): I estimate the distance of the canopy radius to the nearest metre to provide a mean distance of separation between the stem and the outer canopy.

Vitality: Is a personal assessment of the tree's growth rate in the current season, in comparison to other trees within the locality, region and an indicator of the tree likely response to site change.

Dead	A dead or very low vitality tree	**Low / Declining**	A tree in noticeable poor state	**Normal**	A tree of typical vitality
Poor	A tree of low vitality	**Fair**	A tree of lower vitality	**Good**	A tree of high vitality

Safe Life: Is a personal assessment of the trees likely expected remaining safe life span in years, assuming the site management continues as it is at present or the tree is protected from significant environmental change. Trees can reverse even enter into serious decline with site changes, likewise the expected safe life can be significantly improved following changes / improvements to site management and following remedial works.

40+	Good vitality a tree a tree with high potential.	**10+**	Early reduction in vitality / reducing foliage cover.	**<5**	Serious decline or very low vitality tree
20+	Normal vitality a tree in good health.	**<10**	Marked decline / reduced foliage cover.	**<1**	A dead or almost dead, unstable tree with very low vitality.

Category: I included a method-adopted from BS5837 to enable rapid assessment of a trees quality detailed below.

Category and definition	Criteria (including subcategories where appropriate)			Colour Code
Trees unsuitable for retention (see Note)				
Category U Trees that cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse and are not expected to respond to pruning. Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline or infected with pathogens of significance to the health ***NOTE*** *Category U trees can have existing or potential conservation value, which it might be desirable to preserve though canopy reduction or removal.*			Red on Plan
Trees to be considered for retention	**1 Mainly arboricultural qualities**	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups.	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Green on Plan
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees downgraded because of impaired condition, or having remediable defects, such as unsympathetic past management or damage.	Usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals	Trees with material conservation or other cultural value	Blue on Plan
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands,	Trees with no material conservation or other cultural value	Grey on Plan

Comments / Observations: General comments referring to tree health, structure and condition.

Management Options: Comments detailing remedial works required improving immediate safety or improve the management of the tree.

Priority: Guidance for the time scale in which works should be completed, from the date of the report.

Tree Risk Assessment: The International Society of Arboriculture (ISA) Tree Risk Assessment Qualification (TRAQ) takes a qualitative rather than quantitative approach to risk assessment. It uses matrices to compare the likelihood of failure of a tree or tree part, the likelihood that it will impact the target and the potential consequences of failure. **Unless stated otherwise the risk assessment assumes the risk offered Over the next year.**

Matrix 1. Likelihood of failure

Likelihood of failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk Rating matrix

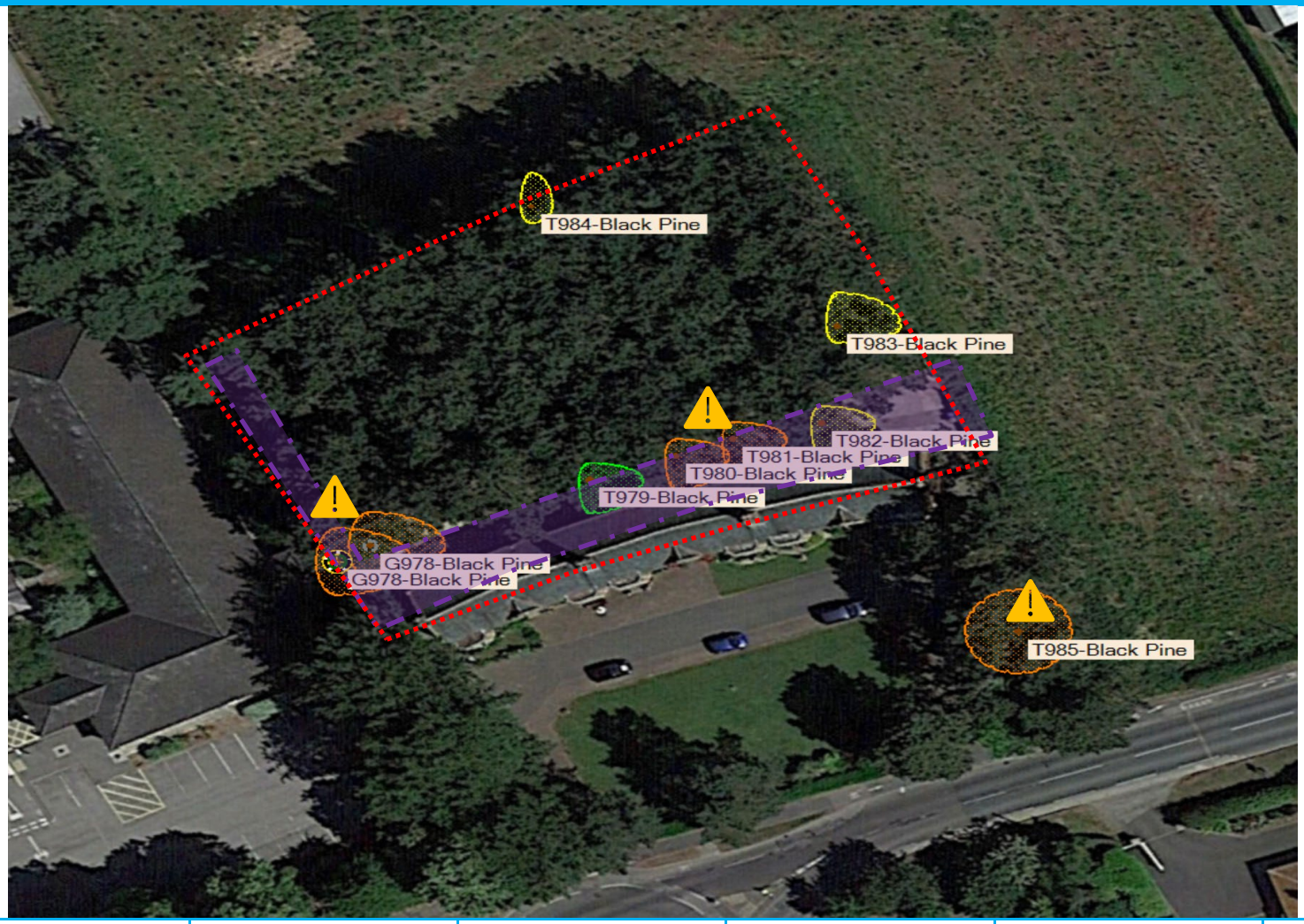
Likelihood of failure & impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate.	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Preliminary Arboricultural Assessment - This should not be referred to as a specification of Arboricultural Works.

Pos	Tag No.	Species	Age	Height	Height to canopy	North	South	East	West	Vitality	Safe Life	Category	Stem Dia (mm)	No. Stems	Observations	Management Options	Risk
Est Pos	G978	Black Pine (Pinus nigra)	M	20	8	4	7	4	2	Fair	10+	C	600	1	Growing as part of woodland. Rootzone previously compromised by the level change. Hard surface within root plate 400mm from stems.	Assess the stability of the tree.	High
Est Pos	T979	Black Pine (Pinus nigra)	M	20	8	2	5	4	1	Good	20+	B	650	1	Growing as part of woodland with a slight lean. Canopy develops close to the building.	Reduce from building to provide 2m clearance.	Low
Est Pos	T980	Black Pine (Pinus nigra)	M	20	8	2	5	4	1	Good	20+	U	450,400	2	Growing as part of woodland. Biforked close to ground level with a significant lean. Developing included union visible. Canopy develops close to the building. A poorly developing tree. A limited safe life. Retention is likely to damage better nearby trees and not thought to be sustainable.	Remove the tree.	High
Est Pos	T981	Black Pine (Pinus nigra)	M	20	8	2	5	4	1	Good	20+	C	650	1	Growing in a shrub bed. Large diameter deadwood within the canopy. This tree is suffering decline.	Remove the tree.	High
Est Pos	T982	Black Pine (Pinus nigra)	M	20	8	2	5	4	1	Good	20+	C	650	1	Growing as part of woodland. High-end loading can be seen on branches. Canopy develops close to the building.	Reduce from building to provide 2m clearance.	Moderate
Est Pos	T983	Black Pine (Pinus nigra)	M	20	8	4	6	2	1	Good	20+	C	600	1	Growing as part of woodland. Large hollow visible in the main stem. Crown distorted due to group pressure.	As the tree is on the sheltered side of the woodland it is recommended that the defect is monitored.	Moderate

Pos	Tag No.	Species	Age	Height	Height to canopy	North	South	East	West	Vitality	Safe Life	Category	Stem Dia (mm)	No. Stems	Observations	Management Options	Risk
Est Pos	T984	Black Pine (Pinus nigra)	M	20	8	4	2	2	1	Poor	<10	U	500	1	Growing as part of woodland with trunk shooting. A poorly developing tree unlikely to survive. A poor elongated tree with a poor suppressed canopy. Retention not thought to be sustainable.	Remove the tree.	Moderate
Est Pos	T985	Black Pine (Pinus nigra)	M	20	8	5	5	5	5	Poor	<10	U	650	1	Growing as part of woodland. Biforked close to ground level with a significant lean. Developing included union visible. Canopy develops close to the building. A poorly developing tree. Limited safe life. Retention likely to damage better nearby trees. Retention not thought to be sustainable.	Remove the tree.	High

APPENDIX C – SITE PLAN



NOTE: This plan should be viewed in COLOUR. Please do not scale form this drawing.

Base image courtesy of © Google and third-party suppliers.

Assessment Boundary

High Target Area

Moderate Target Area

Low Risk Tree

Moderate Risk Tree

High Risk Tree

Extreme Risk Tree

Extreme Risk Tree

High Risk Tree

Moderate Risk Tree

Invasive Plants

Management Issues

Planting opportunity

Title: Tree Location Plan

Drawing No: BA10040/A

Date: 04/07/20

Drawn By: MM

Scale: Not to Scale.

APPENDIX D – FURTHER ASSESSMENTS

Detailed below are the further assessments that have been identified during the initial site appraisal, these include both more detailed assessments to confirm the actual level of risk of trees highlighted in the report as well as the regular and seasonal assessment associated with normal site management.

Further Assessments:

G974	Tree stability testing.	Advisory

None Urgent Further Assessments:

Whole site	Reassess periodically and particularly after high winds.	Advisory

Ongoing Assessment

Risk Assessment	Assess the areas populated by Trees and the risk offered by them to structures and site users.	Undertake on an 18 or 30 month cycle alternating assessments between periods when the trees are in and out of leaf.

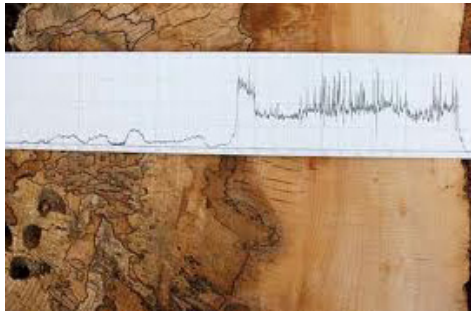
DETAILS OF FURTHER ASSESSMENT METHODS.

Please find below a brief outline of methods that can be employed to provide additional information in relation to possible internal decay and help make decisions on tree safety.

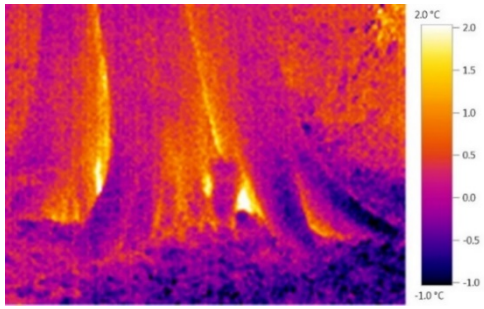
INCREMENT BORE - After screwing the tube into the tree, an extractor is used to remove the wood core. The thickness of sound wood can be measured accurately. Increment borers provide good information but create a significant hole (up to 1cm or so) that can breach a trees internal defence mechanism, we typically only use this where there is a significant safety concern or as a last resort.

RESISTOGRAPH - This measures the drilling resistance of a needle drill. Data can be displayed as a paper trace (shown opposite) or as a digital output for a more detailed assessment of the internal condition of the tree.

Again this method can breach a trees internal defence mechanism and as a result we only use this method where there is strong suspicion of decay or to confirm other test results.



THERMAL IMAGING CAMERA (TI) - Produce images upon the amount of infrared energy emitted, transmitted, and reflected by an object. A thermal imaging camera will show subtle temperature changes when the tissues of the wood or bark are altered or destroyed by physical actions or pathogens in addition to identifying areas of restricted vascular activity or destroyed tissues below the surface.



CHLOROPHYLL FLUORESCENCE

By measuring the capacity of a plant to carry out photochemistry this can provide a measure of health and identify impacts from a range of issues including stresses caused by environmental conditions.

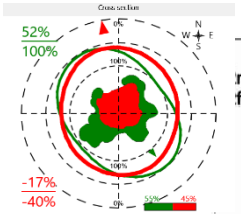
It is used as a means of detecting physiological damage caused by biotic or abiotic stress factors.

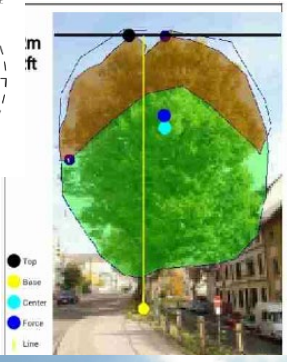
STRESS WAVE TIMER - Stress wave techniques are the equivalent of a single shot Tomograph. The time taken for a sound wave to travel across a known distance give an insight into the deterioration in wood structure. Deterioration in tree stems increases the time taken for the signal as the sound wave needs to travel around faults of decay or holes between the two sensors. The reference velocity depends on tree species.

STABILITY MODELLING – Key dimensional information is used to compute various factors in relation to tree stability, enabling determination and comparative evaluation of:

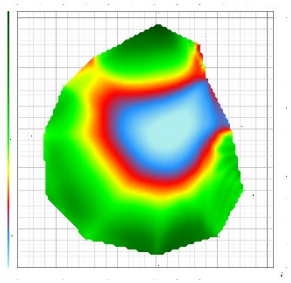
- Tree wind load and centre of gravity.
- Safety improvement following crown reduction.
- Stability reduction by decay.
- Tipping-stability reduction by root decay and/or trenching.
- Enable safety-balancing between the retained stem cross-section and wind-load experienced by the tree.

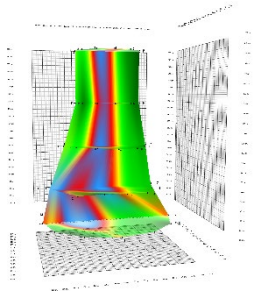
This allows the determination of strength loss due to structural defects in the cross sections of stems and branches and anchorage plate losses in relation to canopy size and expected wind-loads. In addition, the method enables evaluation of load reduction by crown reduction pruning to further achieve higher safety in damaged trees.



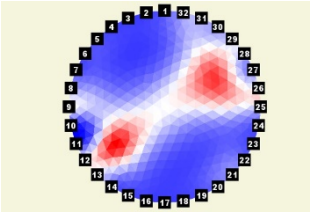


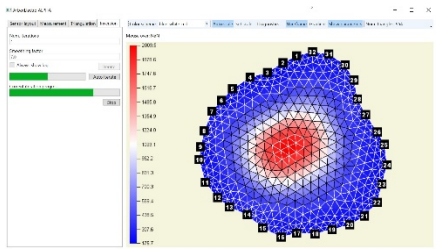
SONIC TOMOGRAPHY (SOT) - A non-invasive tool for assessing decay in trees – shown to the right. It works on the principle that sound waves passing through decay move more slowly than sound waves traversing solid wood. Sonic tomogram sends sound waves from a number of points around a tree trunk to the same number of receiving points, the relative speed of the sound can be calculated, and a two-dimensional image of the cross-section of the tree, 'a tomogram', can be generated. Using the differences in the transit times between each pair of sensors, the analysis software constructs a two-dimensional picture (acoustic tomogram), which show zones of differing sound transmission properties within the stem. These results can be combined with other scans in a 3D representation to provide a better understanding of the internal condition of the stem.



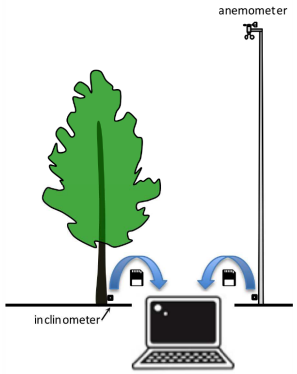


ELECTRICAL IMPEADANCE TOMOGRAPHY (EIT) – This method gathers chemical information about the wood such as water and/or ion concentration and physical properties that provides information about the internal condition of the stem. Low resistivity can identify increased moisture content, whereas hollowed structures cause increases in resistance. After collecting all the measurements, the information is displayed in the form of a coloured distribution plan for analysis as shown opposite. Again, these results can be combined with other scans in a 3D representation to provide a better understanding of the internal condition of the stem.



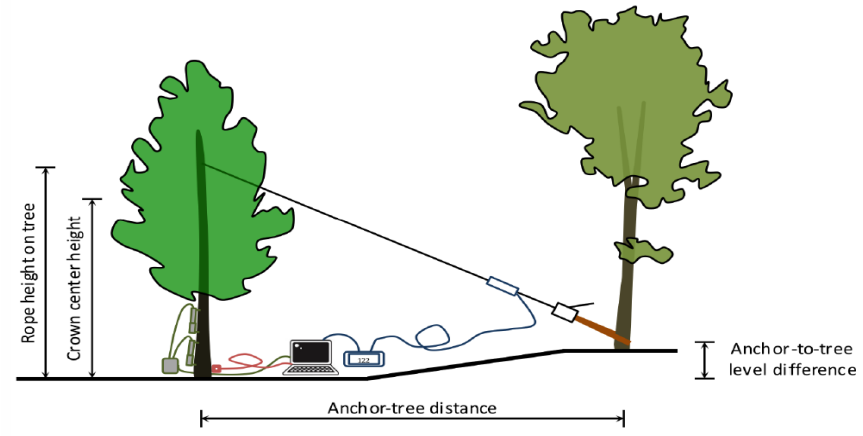


SWAY MONITORING - Sensors attached to the base of the tree enable us to test the root anchorage & stem stability. When wind blows trees start to sway and this load is transmitted into the ground via the stem and root plate - transferred to the root plate. We use sensors to record sway motion of trees in natural winds. The motion of the tree shows the real response of a tree to the natural conditions and enable identification of excessive movement and helps identify weak trees.



STATIC PULLING TEST - The tree-pulling test provides information about the breaking stability of the trunk and the stability of the roots. It is used to assess a tree's stability with regard to stem fracture and uprooting precisely and non-invasively.

In a pulling test, a load (substituting for the wind) is exerted on a tree using a winch and a steel cable. The reaction of the stressed tree under this defined load is measured with high resolution devices (elastometer and inclinometer), and the data obtained are compared with those of sound trees. The major components to be considered in such calculations are the wind-load (the surface of the load-bearing structure, tree height, etc.) and the material properties of green wood.



Please see the table below, which provides a comparison of the methods used in advanced tree assessment and their suitability to assessing particular features and an indication of relative cost.

	Tipping Safety	Fracture Safety	Tree Vitality	Damage to Tree	Cost per test
Increment Bore	Red	Red	Yellow	Red	Low
Resistograph	Red	Yellow	Yellow	Yellow	
Thermal Imaging Camera	Red	Red	Blue	Blue	
Chlorophyll Fluorescence	Red	Red	Blue	Blue	
Stress Wave Timer	Red	Blue	Red	Blue	
Stability Modelling	Yellow	Yellow	Red	Blue	
Sonic Tomography	Red	Blue	Red	Blue	
Electrical Resistance Tomography	Red	Blue	Red	Blue	
Sway Monitoring	Yellow	Yellow	Red	Blue	
Static Pulling Test	Blue	Blue	Red	Blue	High

Comparison of methods in advanced tree assessment

Blue Good Yellow Fair Red Unfavourable

Adapted from Roloff (2016)

APPENDIX E – TREES & RISK

Tree owners should take a balanced and proportionate approach to tree management

It is recognised that trees are managed for a variety of reasons and therefore that the expectation of a "suitable and sufficient risk assessment" referred to by the HSE varies with context. In general, the risk from trees has certainly reached the situation where residual risks (those that remain after management for safety) are sufficiently low that investment in additional measures is likely to be disproportionate to any safety benefit. As the HSE itself notes in *Reducing risks, protecting people*:

> *"Any informed discussion quickly raises ethical, social, economic and scientific considerations, for example: … how to achieve the necessary trade-offs between benefits to society and ensuring that individuals are adequately protected; the need to avoid the imposition of unnecessary restrictions on the freedom of the individual."*

Extremely low risk of harm

HSE guidance for its inspectors and local authority enforcement officers on the standard of tree risk management and the DARM research commissioned by the NTSG on behalf of landowners confirm that the overall real risk of serious harm from trees in the UK is "extremely low". Indeed, the levels of risk are so low that they are "comparable to those that people regard as insignificant or trivial in their daily lives", near the bottom of the spectrum of what the HSE considers as an acceptable risk:

> *"Risks falling into this region are generally regarded as insignificant and adequately controlled. We, as regulators, would not usually require further action to reduce risks unless reasonably practicable measures are available. The levels of risk characterising this region are comparable to those that people regard as insignificant or trivial in their daily lives. They are typical of the risk from activities that are inherently not very hazardous or from hazardous activities that can be, and are, readily controlled to produce very low risks."*

Reasonable risk management generally aims to provide trees that can be regarded stable in a normal / foreseeable, regularly experienced storm event in relation to the situation / context of the tree. In this region, this is reasonable to assume a 'Storm' of force 10 using the Beaufort Scale (55 - 63 miles per hour) of wind speeds on land will occur annually. It should be realised that all trees do pose a risk; recent work in Germany has shown even sound trees that would typically be regarded as safe can fail during high winds through various factors relating to wood physiology, dynamics and the relationship between the root system and the supporting soils. It should be remembered that for any given tree regardless of its stability, there will always be a wind load that has the potential to break or uproot a tree regardless of its condition.

Typically, trees have evolved to fail in part, i.e. twigs and branches are sacrificed / fail from a parent tree rather than the tree being lost entirely. Observations at various sites in this country have found that twigs and branches, can break from trees at wind speeds of as little as 31 miles per hour, the upper limit of a 'strong breeze' as detailed in Beaufort Scale 6 (25 - 31 miles per hour). This has led to a recommendation for certain sites with grounds open to the public, being closed when the wind speeds approaching 'Near Gale' or Force 7, as detailed by the Beaufort Scale (32-38 miles per hour). Such failures are difficult to predict with any great level of detail and a general position is best adopted. Typically, the level of risk offered by trees will be significantly greater as the force of the wind increases, the threat from aerial parts i.e. deadwood, tight unions and elongated branches may remain even following remedial works. Typically, branch failures are likely to be limited to small diameter branches and to periods of extreme weather, though as often seen in any natural model, exceptions to the rule can be expected. Therefore, in managing trees we are aiming to limit or reduce the risk to nearby features, unfortunately it is not possible to remove the risk offered by a tree entirely.

As an arborist, I am a tree specialist and use my knowledge, education, training and experience to examine trees, to recommend measures to enhance their beauty and health, and attempt to reduce the risk of living near trees. As a client, you may choose to accept or disregard these recommendations, or seek additional advice. As an arborist, I cannot detect every condition that could possibly lead to a tree or limb failure. Trees are living organisms that may fail in many ways, some of which we do not fully understand.

Conditions are often hidden within the tree and below the ground. As arborists, we cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period, of time. Sometimes trees may appear "healthy," but may be structurally unsound. Likewise, remedial treatment, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the arboricultural perspective, such as property boundaries and ownership, disputes between neighbours, planning issues, sight lines, landlord-tenant matters etc. Arborists cannot take such issues into account unless complete and accurate information is given to them. Likewise, as an arborist, I cannot accept any responsibility for the authorization or non-authorization of any recommended treatment or remedial measure. Furthermore, certain trees are borderline cases as to whether they should remain or be removed. Also, conditions change, and a tree may need further monitoring in the future to determine its health and structure.

Even healthy trees unaffected by defects can fail in extreme weather conditions.
Trees can be managed, but they cannot be controlled, and to live near a tree is to accept some degree of risk.

Tree Surveys & Condition Reports

Tree Health & Safety Reports

Tree Risk Assessments

Tree Population Site Inventories

Estate Tree Management

Woodland Management

Tree Work Specification & Tenders

Insurance & Mortgage Reports

Decay Detection & Mapping

Wind load & Stability Assessments

Development Site Tree Reports to BS5837

Arboricultural Implication Assessments (AIA)

Arboricultural Method Statements (AMS)

Construction Exclusion Zone Management

Tree Protection Plan Design

Tree Valuation & Replacement Costing

TPO Objections & Appeals

Tree planting Schemes

Landscape visual impact assessment

Landscape architecture

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