[Front Cover]

NATIONAL TREE SAFETY GROUP

COMMON SENSE

RISK MANAGEMENT OF TREES

Guidance on trees and public safety in the UK for owners, managers and advisers

[Inside Cover]

'Safety is but one of many goals to which we aspire; the mistake that is often made is to focus on safety as if it is the only goal'

Professor David Ball, Centre for Decision Analysis and Risk Management, Middlesex University

NATIONAL TREE SAFETY GROUP

COMMON SENSE
RISK MANAGEMENT OF TREES

SECOND EDITION

Guidance on trees and public safety in the UK for owners, managers and advisers

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www.NTSG.org.uk

National Tree Safety Group

N T S G

The National Tree Safety Group (NTSG) is a broad partnership of organisations that have come together to develop nationally recognised guidance on tree safety management that is proportionate to the actual risk from trees. NTSG membership is open to all interested stakeholder organisations and groups. The NTSG can be contacted at: www.ntsg.org.uk

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[H1]INTRODUCTION

Trees are a fundamental component of most natural land-based ecosystems, and they provide vital greenspace in man-made and urban environments. In addition to their role in supporting biodiversity, they provide a wide range of benefits to people. Trees and woodland help mitigate the harmful effects of climate change as well as assisting with climate adaptation. Trees are an important part of the economy, providing timber and other forest products. The benefits to public health of exposure to nature are also increasingly recognised, as is the fact that such exposure brings communities together, playing a part in amenity, cultural values and aesthetic appreciation. The importance of trees is recognised in international, national and local government policies, and many non-governmental organisations have policies dedicated to conserving trees and their biodiversity.

There are over three million hectares of woodland in the UK and, while not all trees are actively managed, there are very few places in the UK which are untouched by human activity. Tree management means many different things, depending on the context and underlying purpose. For example, a tree grown to supply timber is not regarded in the same way as a tree on a busy, urban street. The safety of people is undoubtedly an important consideration whether trees are managed for their cultural, amenity, heritage or environmental benefits, or for timber production or some other commercial interest. After all, trees are living organisms and, unlike man-made structures, it is natural for trees to shed parts and eventually fall. This is a particular challenge of tree management as the approach taken must strike a balance between the benefits and the risks from trees.

At a societal level, we have become accustomed to thinking in terms of risk and public safety rather than of the benefits of related activities, which are generally taken for granted and therefore less at the forefront of the mind. There has been widespread concern about how tree management addresses public safety, and a fear of litigation has caused many landowners to remove trees for 'health and safety' reasons. This fear can affect how landowners make judgements, shifting the focus away from the benefits and the overall extremely low risk involved. The tendency to remove trees from an unreasonable fear of them failing and causing harm disregards evidence that associated deaths and injuries are rare: despite millions of people passing under trees every day, on average less than five deaths each year are caused by trees. This does not mean that trees do not need to be managed for public safety. Rather, this guidance advocates that good management will consider both tree-related safety and tree-related environmental and social benefits.

The National Tree Safety Group (NTSG) has produced this publication in response to growing concerns regarding the unnecessary felling of trees. It aims to develop an approach that is proportionate to the actual risks from trees and recognises the importance of trees to society and the natural environment. The spirit of health and safety legislation that addresses public safety recognises that tree owners and managers are best placed to assess risk and take the necessary actions to reduce that risk to a reasonable level. The NTSG believes that the evaluation of what is reasonable will fit into a tree management strategy that considers the benefits that those trees bring. This calculation can only be undertaken in a local context, since trees provide many different types of benefit in a range of different circumstances and pose a range of risk levels, from negligible to significant.

[H2]Aim and scope

Managing the risk from trees is the responsibility of the duty holder. This guidance has been developed to support the duty holder, including householders, landowners and others involved in the management of trees, whether connected with streets, parks, public open spaces, businesses such as hotels or farms, private estates, woodland, commercial forestry, utilities or private gardens. This edition of the guidance integrates and updates issues concerning trees and their management for public safety, and the environmental, social and economic benefits trees provide.

This document brings together concepts from several other national and international guidance documents, such as those related to general tree surveying,[1] and covering specific issues connected with tree hazard assessment and management[2] and tree-related risk.[3] Several national and specialist organisations have also produced guidance for forestry[2] and nature conservation,[4,5] as well as for health and safety regulators.[6] There is also policy guidance for wider sector interests in trees, including for parks,[7] greenspaces[8] and access to the countryside.[9]

The guidance is based on a set of five key principles established by the NTSG for considering and managing tree safety in the public interest:

- Trees provide a wide variety of benefits to society.

- Trees are living organisms that naturally lose branches or fall.

- The overall risk to human safety is extremely low.

- Tree owners have a legal duty of care.

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

Section 1 provides an overview of tree risk management. It outlines the general context in which tree risks and benefits are considered and the basis for making a balanced judgement.

Section 2 explores the wide-ranging benefits provided by trees in the UK and their contribution to our environment, health, wealth and well-being. Consideration of these benefits is important and forms a key part of this guidance. However this does not override the duty holders' legal responsibilities for human safety.

Section 3 describes the natural features and characteristics of trees, as living organisms, which can, in rare instances, create hazards that may pose unacceptable risks to people or property. The management of trees needs to strike a balance between maximising the benefits of trees, as described in Section 2, and managing risks at a reasonable and acceptable level – the subject of the following sections.

Section 4 examines the specific risk to human safety from trees and provides a broad understanding of the contexts in which risks are considered, together with the reasonable protection of benefits and how these may be managed compatibly within the legal framework, as outlined in Section 5.

Section 5 sets out the legal framework in respect of an owner's and duty holders' liabilities for injury to others caused by the falling of a branch or tree in England, Scotland, Wales and Northern Ireland.

Section 6 outlines the basis for a balanced and proportionate approach to tree risk management that considers the role and function of trees as part of a wider complex ecosystem. While trees provide benefits and the overall risk is low, there is a clear responsibility for their risk management.

Section 7 outlines decision-making frameworks for duty holders followed by nine scenarios of different land holdings that illustrate reasonable and proportionate tree-safety management.

[H1]SECTION 1 – AN OVERVIEW OF TREE RISK MANAGEMENT

The presence of trees in rural and urban landscapes provide many different benefits depending on the local and regional context and what the land is used for. Not all trees are managed and, even for those which are, such management is one component of overall land management. The safety of people and property is one part of that management. It is therefore important to recognise that risk management can only be undertaken with an understanding of the value to people of trees in the setting within which they grow. This setting naturally includes their distribution in relation to people and property that might be harmed.

The law in relation to tree-related risk is covered by both civil and criminal law. Common sense principles of good management guide both civil and criminal contexts. Although risk is a feature of both civil and criminal law, the methodologies and approaches to risk assessment have been particularly developed in the context of health and safety in the workplace.

Under civil law the duty of care is to take reasonable care to avoid acts or omissions that cause a reasonably foreseeable risk of injury to persons or property. With regard to tree safety the standard expected for is that of the 'reasonable and prudent landowner' (see Section 5).

The *Health and Safety at Work etc Act* (HSWA 1974) sets out responsibilities in law for duty holders, i.e. the responsibilities of employers and the self-employed to employees and members of the public who may be affected by what they do. The Act requires duty holders to manage risks as low as reasonably practicable (ALARP) which means that "an employer does not have to take measures to avoid or reduce the risk if they are technically impossible or if the time, trouble or cost of the measures would be grossly disproportionate to the risk". The law requires "what good management and common sense would lead employers to do anyway: that is, to look at what the risks are and take sensible measures to tackle them".

The *Management of Health and Safety at Work Regulations* (MHSWR 1999) make explicit that the framework for carrying out risk assessments as part of managing risks 'so far as is reasonably practicable' should include a suitable and sufficient risk assessment to identify unacceptable risks and control these by reasonable and practicable measures[10,11].

The management of risk, when properly organised, enables a duty holder, among other things, to:

- increase the likelihood of achieving stated objectives
- make the most of available resources
- identify and control the risk
- comply with relevant legal and regulatory requirements
- improve stakeholder confidence and trust

[H2] 1.1 Striking a balance between obligations and benefits

Those who control tree management require a clear appreciation of their legal duties. However, a tree management strategy needs to consider both the reasonable control of risks from tree failure along with other factors. Other broader concerns, such as climate change and flood mitigation, public health and well-being, along with consideration of ecology, landscape and aesthetic value, may also be taken into account. The decision-making objective is to adequately protect individuals from harm whilst avoiding unnecessary loss of benefits.

In some cases risk management strategies can have multiple and complex consequences. For example, governmental decisions about the Covid 19 pandemic lockdown balanced the need to not only control risk of fatality alongside overwhelming the capacity of the National Health Service, but to also consider the effects of those control measures upon the economy, mental health and personal freedoms. The ultimate decision in such circumstances needs to be based upon a coherent and transparent method that is accountable and reasonable.

At an international level, the International Organization for Standardization's document ISO 31000 provides guidance on risk management principles[15] and advocates that effective risk management needs to be capable of a proactive response to changing circumstances, in turn underpinned by transparency and stakeholder participation. In the UK, HSE's Managing *for health and safety* (HSE 2005, updated 2013 ('HSG65')[12] also presents risk management as an inclusive process that is integral to strategic organisational aims. It advocates that risk management should achieve a balance between systems and a culture of organisational and personal awareness of health and safety issues that include obligations, practical understanding of risk, and the pitfalls of complacency and other obstacles to improvement practices. While a formal management system or framework can help manage health and safety, it is for the duty holder to decide whether to use one or not. In either case the HSG65 advocates a common sense and practical approach, 'Plan-Do-Check-Act' (Figure 1.1), that contributes to effective risk management.

Plan-Do-Check-Act is a four-step self-adjusting, cyclical approach summarised below and presented in Figure 1.1:

(1) **Plan:** Setting objectives (what is involved in risk management, current and intended position).

(2) **Do:** Identifying risks and priorities (how to deliver).

(3) **Check:** Benchmarking delivery of risk management (how well aims are being delivered).

(4) **Act:** Reviewing and learning from performance (what changes may be needed for improvement).

<INSERT FIGURE 1.1>

Figure 1.1 A model of the HSG65 framework for setting, managing and reviewing risk.
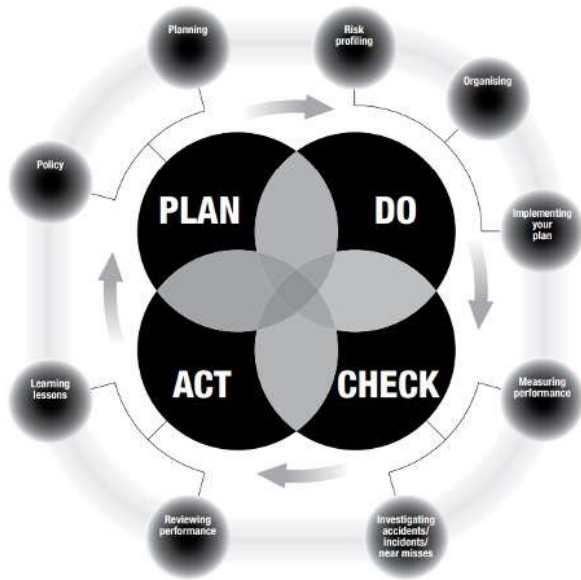
NF note: Alternative figure for 1.2 to illustrate and improve clarity

H2]**1.2 Balancing Benefit and Risk**

The HSE approach focuses on the sensible and proportionate control of real risks that arise from serious breaches of the law[*] (https://www.hse.gov.uk/entertainment/childrens-play-july-2012.pdf). The courts have made it clear that "when the legislation refers to 'risks', it is not contemplating risks that are trivial or fanciful…but rather "material risk to health and safety, which any reasonable person would appreciate and take steps to guard against".

Risk management in non-occupational settings involves an approach that reasonably weighs the benefits of an activity against the risks it poses. This approach recognises the inherent balancing considerations in risk decisions and is termed compensatory decision-making.[13,14] This is in contrast to non-compensatory decision-making that focuses on a single objective. Notwithstanding a primary legal duty to ensure the reasonable safety of the public, safety is one of many management considerations. While a primary goal is to manage material risks (risks that are neither trivial nor fanciful), risk management should not be considered in isolation or confused with risk elimination. Well-rounded decision making relies on and involves an appreciation of other management objectives, such as the requirement to safeguard benefits.

In the context of tree-related benefits, this entails accounting for the value of a specific tree or a given set of trees through their contribution to their owners' environment, their surroundings, and more broadly to society and the ecosystem (see Section 2). Looked at in this way, trees are both a

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[*] In its statement on 'Children's Play and Leisure-Promoting a Balanced Approach' the HSE articulates its view that risk needs to be balanced with the benefits accrued and that there should be a focus on the sensible and proportionate control of real risks. The HSE references R v Chargot (2009) All ER 660 [27]) to support this position.

'benefit generator' and also a 'risk generator'. Assessing and balancing the benefit with the risk requires understanding the values and outcomes that are desired in the local circumstances. At some level, this process depends on identifying priorities and making assessments in light of personal knowledge and experience. As trees age and grow, the benefits they contribute increase (see Section 3). But so too, in later life, the same qualities tend to increase risks of structural failure. Managing such trees to safeguard the benefits accrued over time, while keeping the safety risk as low as reasonably practicable, calls for a strategy that involves compensatory decisions at various times throughout their lives (see also Figure 1.2 and Section 6).

Figure 1.2 Balancing benefit and risk in the management process

Customise the risk management process to local requirements

BENEFITS (See sections 2 & 3)
- Landscape / Cultural / Historical
- Aesthetic / Amenity
- Environmental / Habitat / Biodiversity
- Climate / Flood control
- Social / Health and well-being
- Economic / Tourism / Timber
- Soil conservation / Water quality
- Air quality
- Noise abatement

Consider Scope & Context (6.4.2)

OBLIGATIONS (See sections 4 & 5)
- Legal / Statutory
- Duty holder responsibility
- National and local policy
- Ethical / Public opinion
- Financial / management costs
- Land use constraints
- Neighbourly relationships (e.g. avoiding nuisance)

Set Management Objectives and Strategy (See Figure 1.1: Plan, Do, Act, Check)

Risk Identification
List the threats to all the objectives, including safety

Risks to safety
- Tree location in relation to occupancy
- Zonation according to targets and levels of occupancy
- Survey, checks, inspection, where applicable
- Likelihood of failure of tree or part of tree and potential for harm

Risk Analysis
What is the level of risk for each item on the above list?

Risks to benefits listed above
- Individual trees and populations (qualities, properties & condition)
- Scale of benefits at local / national / global levels

Analysis & evaluation of benefit & risk decisions
- Analyse survey data (6.5)
- Distinguish between unacceptable and tolerable risks (6.5.1)
- Use ALARP criteria for public safety
- Identify costs of reasonable risk control, resource and capacity constraints
- Balance benefits and risk control to meet objectives (see section 7)
- Identify 'Red line' decisions – where benefit loss would be unacceptable to the owner, or where public safety levels would be unacceptable within the legal framework
- Evaluate ways to prioritise allocation of resources

Benefit and Risk Evaluation
Compare the level of safety risk in relation to the benefits gained to decide if and when further action is required.

Record, monitor and review

Tree management strategy
Maintain tree stock taking into account the risks *to trees* while considering safety risks *from trees* maintaining benefits at a level appropriate to resources

Tree benefit and risk management (See Section 6 & 7)
- Prioritisation of remedial tree work if necessary to reduce or remove identified risks
- Target management
- Decide on inspection method (if required) (6.4.5) and any subsequent management strategy (6.4)
- Review of retained trees
- Informal/formal recording

Key | Actions | Context to inform actions | Objective and review cycle

The concept of balancing benefit with risk has emerged over recent years in a number of areas of public life. Many of the benefits are intangible and are shared across a relatively large number of people. This relates in similar ways to the benefits and the value of play, sport and access to natural places.[9,16,17,18] This balancing approach contrasts with the traditional cost-benefit approach to health and safety, where the benefit is seen solely in terms of improved safety and cost calculations are relatively straightforward, with no need to consider wider, non-safety benefits.

In addition to duties under the HSWA 1974, management may also respond to other legislation and civil liabilities. While the duty holder's primary goal may be for the reasonable safety of people and property, this does not require the elimination of all risks, but rather to adopt a management strategy that reasonably weighs up and balances the risks and benefits. In this way objectives may broaden to incorporate management for amenity, conservation, and environmental value'[6]([†]). A parallel can be made with children's safety during play, [‡]*'Play is great for children's well-being and development. When planning and providing play opportunities, the goal is not to eliminate risk, but to weigh up the risks and benefits. No child will learn about risk if they are wrapped in cotton wool'.*

Balancing benefit and risk represents a 'compensatory approach', in which no single factor unreasonably dominates risk management decision-making. Safety whilst inevitably important will not be the only consideration. The approach has been developed to prevent unintended adverse consequences due to societal bias, where fear of accidental harm may lead to a risk-averse approach that relegates benefits to unreasonably low levels of importance when taking management considerations.

Practical experience and knowledge of the assessor, applied to real circumstances, are crucial to balancing risk and benefit. When the process is abstracted from real circumstances the judgement of the assessor may be influenced by trivial risks and over-reliance on formulaic approaches and organisational complacency. Quantitative approaches may well contribute to sensible risk assessment, however rational judgements to balance benefits and risks will inevitably rely on a measure of qualitative and descriptive processes and subjective judgement.[13][§]

[†] Along with HSWA, legislation relevant to the management of trees includes 'the Occupiers' Liability Acts 1957 and 1984, Occupiers Liability Act (Scotland)1960, Land Reform (Scotland) 2003, the Countryside and Rights of Way Act 2000 (CRoW), the Wildlife and Countryside Act 1981, the Marine and Coastal Access Act 2009, as well as legislation relating to Sites of Special Scientific Interest, planning issues and Tree Preservation Orders'[6]
[‡] *https://www.hse.gov.uk/entertainment/childrens-play-july-2012.pdf*

[§] Ryan W. Klein, Andrew Koeser, Richard Hauer et al at Florida and Wisconsin Universities undertook a worldwide review of literature on risk assessment and the perceptions of risk, exploring concepts of risk and the common themes and methodologies on how tree risk management was approached: Klein, RW et al (2019) Risk Assessment and Risk Perception of Trees: A Review of Literature Relating to Arboriculture and Urban Forestry, Arboriculture & Urban Forestry, ISA https://www.researchgate.net/profile/Richard-Hauer-2/publication/329874437_Risk_Assessment_and_Risk_Perception_of_Trees_A_Review_of_Literature_Relating_to_Arboriculture_and_Urban_Forestry/links/5cf7ba5992851c4dd02a427a/Risk-Assessment-and-Risk-Perception-of-Trees-A-Review-of-Literature-Relating-to-Arboriculture-and-Urban-Forestry.pdf

Tree owners and duty holders are responsible for their trees and management strategies need to be specific to each location. In satisfying that obligation they may obtain specialist advice as to inspection and maintenance of their trees. Section 7 gives examples of tree management arrangements for dutyholders.
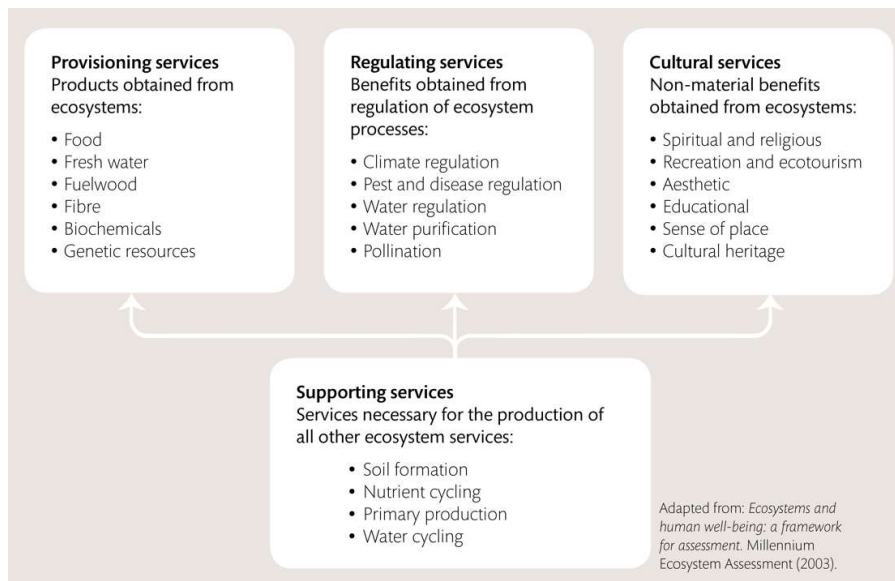
[H1] SECTION 2 – THE BENEFITS OF TREES

Trees provide an enormous range of social, economic and environmental benefits across the broad spectrum of urban and rural landscapes in the UK. Plans to sustain and maximise these benefits to enable us to tackle the climate emergency and biodiversity loss we are facing are outlined in the UK Government's 25 Year Environment Plan[19] and in the forest and tree strategies of England[20], Scotland[21], Wales[22] and Northern Ireland[23].

Apart from marketable timber and timber products, the value of the benefits provided by trees has not been readily quantifiable in monetary terms. Ten years ago, the UK's first National Ecosystem Assessment (UKNEA)[24] made the case for properly valuing the social and economic benefits of a healthy natural environment while continuing to recognise nature's intrinsic value. Such values can be expressed in terms of 'natural capital' and 'ecosystem services' – the links between nature and public well-being (Figure X).

The UKNAE concluded that while the natural world, its biodiversity and its ecosystems are critically important to our well-being and economic prosperity, these are consistently undervalued in conventional economic analyses and decision-making. Almost a decade later, the permanent removal of trees seldom takes account of the negative impacts on public health and well-being and our natural environment remains fragmented and fragile.

Figure X Ecosystem services can be thought of as the processes by which natural ecosystems, including trees, woodlands and forests, provide resources (used either actively or passively) that sustain and benefit people.

Provisioning services
Products obtained from ecosystems:

• Food
• Fresh water
• Fuelwood
• Fibre
• Biochemicals
• Genetic resources

Regulating services
Benefits obtained from regulation of ecosystem processes:

• Climate regulation
• Pest and disease regulation
• Water regulation
• Water purification
• Pollination

Cultural services
Non-material benefits obtained from ecosystems:

• Spiritual and religious
• Recreation and ecotourism
• Aesthetic
• Educational
• Sense of place
• Cultural heritage

Supporting services
Services necessary for the production of all other ecosystem services:

• Soil formation
• Nutrient cycling
• Primary production
• Water cycling

Adapted from: *Ecosystems and human well-being: a framework for assessment.* Millennium Ecosystem Assessment (2003).

[Margin pull-out/highlight box in this first section to make a general statement that benefits do not override legal responsibilities for human safety]

[H2] 2.1 Trees for health and well-being

Trees and greenspace are good for us. The quality of our local natural environment is one of the factors that shapes our health over a lifetime. There is a wealth of evidence on the positive effects that spending time in the natural environment has on the health and well-being of adults and children and this was evident during 2020 national lockdown response to COVID pandemic.[25] For example, access to nearby attractive greenspace and footpaths is likely to increase levels of walking, one of the simplest forms of physical activity that most people can enjoy.[26] In addition to the health benefits of increased levels of physical activity, such as a decrease in problems such as obesity, high blood pressure and cholesterol, choosing walking over other forms of transport reduces polluting vehicle emissions.[27, 28.]

Trees also improve air quality – their leaves and branches intercept harmful particulate matter and other airborne pollutants reducing their concentration in urban areas. This results in a reduction in the risk of pollution-related illness and considerable cardiovascular, respiratory and asthma-related health benefits[29,30]. This in turn reduces the cost of health care[31] – around 40 000 people in the UK die prematurely each year from the effects of outdoor air pollution.[32, 33.]

<infographic>

If every household in England had good access to quality greenspace then around £2.1 billion could be saved in health care costs each year.[34] London's greenspaces alone are estimated to reduce health care costs by £950 million per year due to improvements in residents' physical activity and mental health.[34]

In terms of our mental and emotional health, it has been demonstrated that contact with greenspace can reduce perceived levels of stress[35] and improve self-esteem and mood,[36] in addition to shortening rehabilitation and hospital recovery times.[37] Quality natural features and trees in a city can benefit children's learning and development and improve the cognitive performance of those suffering from attention deficit disorder.[38]

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The annual mental health benefits associated with visits to the UK's woodlands are estimated to be £185 million. [Forest Research report Valuing the mental health benefits of woodlands]

[H3] 2.1.1 The value of urban trees and woodland

The UK is densely populated, with nearly 90% of people living in towns and cities, where the pressures of modern living are often most evident. The importance of trees is growing as populations continue to increase, towns and cities expand and the climate changes. By the 2080s, summer and winter mean temperatures in the UK are projected to increase by 3°C to 4°C, and by 2°C to 3°C, respectively.[39] Increased winter rainfall, drier summers and more frequent heatwaves are also expected.[39] The impact of climate change will be felt most acutely in built-up areas where the 'urban heat island effect' will further increase air temperatures.

Urban trees can help to reduce urban temperatures and the urban heat island effect in two ways: they provide shade for buildings and city streets reducing absorption of infra-red and releasing this

heat at night and produce a cooling effect through the process of evapotranspiration. Even a small tree planted in an UK city can provide up to 7 kW of cooling through evapotranspiration in the hottest months; this is higher than the cooling capacities of most residential air conditioners, which range from 1 to 10 kW.[40]

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A 10% increase in the number of trees strategically placed around buildings can produce savings of 5–10% in heating and air conditioning costs.[41]

In some areas, tree planting can be used to manage increased flood risk, or to retain and recycle water naturally when we most need it. The hard, impervious surfaces found in towns and cities such as concrete and tarmac impede water infiltration, which increases the risk of surface water flooding. These effects are likely to increase in the future as the UK experiences more severe weather events. Trees intercept precipitation, and in urban areas this can help to reduce the pressure on the drainage system and lower the risk of surface water flooding and if located with a permeable surface, can act as SUDS.

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Urban forest in greater London was estimated to provide £132.7 million of annual benefits related to carbon sequestration, mitigation of some air pollutants and storm water alleviation.[42]

[H3] 2.1.2 Trees in culture and community

Our natural environment gives us a sense of place, pride and identity. Trees and woodland enhance the visual quality and appearance of our landscapes and contribute to the diversity and distinctive character of our local communities. In addition to providing a setting and vital resource for recreational activities such as walking, viewing wildlife and mountain biking, access to greenspace engenders positive feelings about local community[43], improves social cohesion and reduces crime[28].

The size and number of trees and the great age they can attain make them among the most visible and continuous aspects of our lives. Their beauty and majesty have inspired artists, poets and writers over centuries. Trees may also be significant to us personally, marking historical occasions, commemorating a birth, a family event or a celebration of a life. City dwellers can develop strong personal attachments to urban trees and often feel more relaxed in their presence.[44]

<infographic>

Around two thirds (69%) of respondents to the UK Public Opinion of Forestry Survey 2021 had visited forests or woodlands in the last few years. Of those, 36% reported an increase in the number of visits in the last 12 months. [Forestry Facts and Figures 2022]

[H2] 2.2 Employment and the economy

For centuries trees have provided timber for house building and shipbuilding as well as furniture-making, fibre for paper and cardboard, and biomass for renewable energy and heat. Trees and woodlands have an important role to play in supporting local enterprises and rural development that support local and national growth. Secondary industries utilising timber and other forest products contribute significantly to employment and wealth. As part of the development of a low-carbon economy, wood and wood products now play a major role as a renewable resource and provide a sustainable alternative to fossil-fuel based materials such as concrete and steel.

<infographic>

UK forests were estimated to have removed the equivalent of 15.7 million tonnes of atmospheric CO_2 in 2015,[45] about 10% of UK household emissions.[46] If 200 000 new houses were built with timber, this could help store an additional four million tonnes of CO_2 each year.[47]

Investment in new and expanded woodland not only plays an important role in brownfield and urban land regeneration and economic development,[48] but also in attracting inward investment. The UK's sawmilling sector is anticipated to receive more than £100m of investment from 2015–2020.[47]

<infographic>

Primary wood processors employ an estimated 7500 full-time members of staff[45] and the UK's forestry and timber sector supports more than 43 000 jobs.[49]

4450 forestry businesses, 515 sawmilling businesses, 140 wood-based panel businesses and 235 pulp and paper businesses were registered for VAT and/or PAYE purposes in the UK in 2021.

Trees and greenspace enhance property values. In London, greenspace area is the fifth most significant indicator explaining variations in house prices.[50] Furthermore, in northwest England, a city park can enhance property values of detached houses by almost 20%, whereas smaller local parks can increase the value of flats by more than 7% and non-detached houses by more than 9%.[51]

Greenspace with good levels of tree cover is much less costly to maintain than highly grassed areas. The annual maintenance costs of managing 1 ha of woodland in a greenspace can be up to £1200 less expensive than managing 1 ha of amenity grassland.[52]

[H2] 2.3 Environment and biodiversity

Trees and woodlands help to mitigate the effects of climate change, protect soil and maintain water quality. They are vital for biodiversity – upon which all life on earth depends.

[H3] 2.3.1 Climate change

Trees absorb carbon dioxide from the atmosphere and store carbon in wood as they grow. Planting trees is one of the biggest and cheapest ways of taking carbon dioxide out of the atmosphere to

tackle the climate crisis. Research has shown that planting trees and woodlands could make a significant contribution to meeting the UK's challenging emissions reduction targets. The Committee on Climate Change has recommended that we should be aiming to plant around 30,000 hectares of new woodland in the UK every year until 2050 to assist in efforts to meet Net Zero[53].

> <infographic>
>
> Large urban trees can store significant quantities of carbon. On average, a single mature large stature tree is estimated to store 2500 kg of carbon.[54]

The sustainable harvesting of trees for timber transfers carbon into wood products where it is stored, often over long periods. These can be used as substitutes for materials whose production involves high emissions of greenhouse gases. Wood products can also be used directly as sources of energy to replace fossil fuels. Trees and woodlands also play an important role in helping society adapt to climate change, particularly in the urban environment, by providing shelter, cooling, shade and run-off control.

Trees play an important role in supporting the adaptation of farming systems to a changing climate, including through the provision of shade for livestock and crops, reducing wind and rain damage and water loss[55] and encouraging crop pollination.[56] They may also reduce the incidence and severity of some crops' pests and diseases[55] and can help increase crop yields, particularly during dry conditions.[57] Trees also provide considerable benefits when they are integrated in agricultural and farming systems by providing critical habitat for wildlife, especially as they mature and help create connectivity between habitat remnants.[58]

[H3] 2.3.2 Soil protection

Soil is essential for the delivery of a range of ecosystem services and functions, including food production, carbon storage and climate regulation, water filtration, flood management and support for biodiversity and wildlife. Trees and woodland protect and stabilise soil and help to prevent erosion by slowing surface run-off and holding the soil in place. Run-off from farmland, brownfield and contaminated sites can lead to rivers and streams becoming clogged up and contaminated.[59,60] Trees in the landscape improve soil infiltration and fertility.

[H3] 2.3.3 Water quality

Trees reduce run-off by intercepting rainfall thus allowing the water to flow down the trunk and into the earth below the tree. Woodland can reduce floods from hill slopes and in headwater catchments and may have a marked impact on flood flows at a local level.[61] River basin management plans produced for England recognise the role of woodland planting in reducing the risk of surface water run-off and in retaining the quality of rivers and streams.[62]
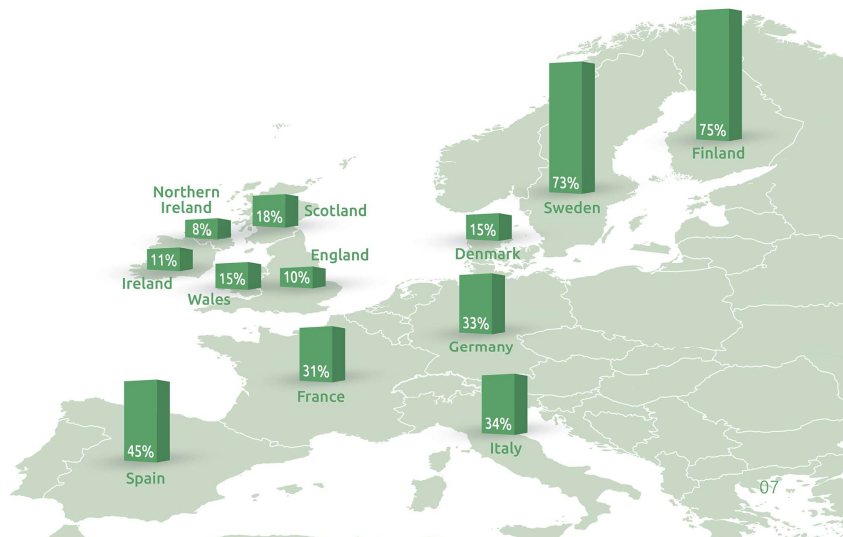
[H3] 2.3.4 Biodiversity

Trees are vital for biodiversity. The level and stability of ecosystem services generally improve with increasing levels of biodiversity. Trees are 'keystone species' in many ecosystems, which means that their importance is such that, when removed, the connections between the interdependent species

within the ecosystem break down and long-established biological systems may be disrupted and harmed or even collapse.

The progressive loss and fragmentation of the natural forest that once covered most of the British Isles has left the UK with a much smaller proportion of woodland than many European countries. This has had a dramatic effect on native biodiversity. Some species of large mammals have completely disappeared, while other groups such as fungi, lichens and invertebrates associated with old growth, wood pasture and parkland have become less diverse as the quality and extent of their habitat has declined.

[INSERT FIGURE Y – optional – Europe map showing tree cover percentages]

At around 13% forest cover, the UK is one of the least densely forested countries in Europe. This compares with 46% for Europe as a whole and 31% worldwide.

[H3] 2.3.5 Ancient and veteran trees and deadwood

A tree may be regarded as ancient due to its great age relative to others of the same species. A veteran tree, though not yet necessarily ancient, has special habitat qualities that have developed over time. Ancient and veteran trees have important biological value and will likely also possess aesthetic interest and contribute to our cultural and historical heritage. They provide continuity in a changing world and are often associated with historical events or characters. Ancient trees in particular have special ecological importance and offer rare terrestrial habitats with a continuity that may span many centuries. Veteran habitats are home to rare fungi, invertebrates, lichens, birds and bats. Their structural complexity provides niches not found on young trees[20,24,63].

[H1] SECTION 3 – the nature of living trees

'Three hundred years growing, three hundred years standing, three hundred years decaying.'

 Peter Collinson [1694-1768]: On the life cycles of English oak and sweet chestnut.

The capacity for long life and the ability to grow to great height and size give trees their importance for humans as well as biodiversity. When trees are allowed to go through their natural life cycle, their biodiversity value increases as they age. Dead and decaying wood, shedding branches, holes and cavities, fallen trees, and split branches all provide an important habitat supporting a diversity of dependent species. However, these natural features and characteristics may also present a hazard which may or may not be risky to people.

[H2] 3.1 Natural features and characteristics of trees

The natural features and characteristics of trees can lead to the perception that they are problematic and require intensive management. This is a particular challenge of tree management.

[H3] 3.1.1 Trees are natural shedders

Unlike man-made structures, it is entirely normal and natural for trees to shed parts and eventually to fall. Leaves and twigs are regularly shed. Branches die and live branches may become wind-damaged or prone to breakage, and occasionally fall to the ground. On rare occasions, roots can snap under wind load causing the entire tree to collapse. These types of structural tree failure are natural and can occasionally cause harm to people and damage to property.

[H3] 3.1.2 Young trees' strategy is to grow tall

When young, a tree puts energy into attaining height above the surrounding competition, expanding and ascending its stem, forming a trunk to support a crown with branches that can bear sufficient leaf capacity to create carbohydrate energy through photosynthesis. This energy supports not only growth, defence and seed production, but is also enough to attract and sustain the intricate life-supporting web of microorganisms, including mycorrhizal fungi that are associated with their roots and that are essential for healthy tree growth and survival.[64]

[H3] 3.1.3 Essential function of sapwood

Sapwood is fundamental to the tree's life support system. It connects the tree's roots within the soil to the atmosphere, transporting water (via outer woody xylem vessels) to the uppermost crown leaves for sugars to be manufactured through photosynthesis (using sunlight, water and CO_2). These sugars are then transported throughout the tree (via phloem tissue, located just beneath the bark) for growth and storage. Sapwood channels immense amounts of water within the tree via the xylem, moving groundwater and releasing excess into the atmosphere and onto the clouds,[64,65] inspiring the

idea that trees are living 'fountains of the forest'.[66] Additionally the outermost sapwood contributes to the tree's structural stability, responding to loads imposed by wind and gravity and changes in the body of the tree.

[H3] 3.1.4 Factors affecting tree growth

Sapwood is laid down each year over the entire outer body of the tree, from the furthest small root to the topmost branch, like a veneer or skin, and can be conceived as a new plant, spread just beneath the bark, over its predecessor. We tend to visualise these woody layers as two-dimensional annual 'rings'. While useful for assessing tree age and performance, the ring is two-dimensional as it only views the trunk in sawn cross-section. The growth of rings can vary year by year and their width is influenced by tree health and growing conditions, as well as climatic or disturbance events. Rings are typically reduced after drought or flooding or when the tree suffers physical damage such as bark loss, compaction or removal of soil within the rooting zone, root damage or factors impacting soil health.[67]

[H3] 3.1.5 Sapwood is key to tree growth and health

For sapwood to function, it needs the outer bark to 'lock in' water effectively. Thus, when wounding occurs and the seal of bark is broken, sapwood in the vicinity is disrupted and prone to drying out. This impairs the normal transportational and other life support functions and may lead to the death of living sapwood. The change in internal water conditions after bark loss and sapwood death creates dysfunctional tissue, which the tree is generally able to accommodate by incorporating and growing around the wound. Such circumstances favour the development of habitats in which different fungi may flourish, some of which break down and recycle woody tissue.[68]

[H3] 3.1.6 Mature trees mostly comprise non-living wood

During the early growth years of young trees, the wood under the bark is almost entirely comprised of conductive vessels. Oak and sweet chestnut wood may continue like this for 20 or so years, after which the oldest (innermost/first year) 'ring' dies off, becoming the first ring of the 'heartwood'. Each year thereafter with such heartwood species, a new outer layer of sapwood is laid down and the next, innermost ring dies off, and becomes (non-living) heartwood. When the tree is about 30 years old, its cross-sectional area is still mostly sapwood. But from then on, the ratio of the area of sapwood to heartwood reduces. After about 50 years, there are likely to be equal areas of sapwood and heartwood. Thereafter, as the tree increases in age it will be mostly composed of a non-living inner heartwood core, which is encapsulated within the relatively narrow living sapwood. For other species that do not have a distinct heartwood, such as beech, the time when the oldest rings die off is less obvious and can be gradual, perhaps up to 70 years. This is referred to as ripewood.

[H3] 3.1.7 Crown retrenchment

When fully mature, the water conducting system reaches a turning point and is no longer able to supply the needs for the continued expansion of the crown, after which trees compensate by diminishing their height and crown volume, a process described as crown retrenchment. This term is also used to describe the positive mechanism whereby trees reduce the sapwood transportation

distances (for water, nutrients and sugars) and over many years reorganise their crowns into a viable, reduced structure. The onset of crown retrenchment marks the beginning of the ancient phase, when trunks typically become hollow, within which rare terrestrial habitats and their colonisers are found. Retrenchment is a natural evolved tree survival strategy, which may be repeated, enabling the ancient state to be the longest phase of a tree's life.[69]

[H3] 3.1.8 Hollow trees can be healthy

A mature tree trunk is generally mostly composed of non-living wood with a small cross-sectional area of living outer sapwood. As long as the roots are able to function with healthy soil and mycorrhizal associations and the branches are not too shaded or damaged, it is likely that the life-giving functional sapwood can support the tree's survival needs. When old and large enough, an array of decay fungi colonises, digests and alters the wood quality. In this process, fungi are key organisms that create veteran tree habitats. The rate of decay and wood breakdown can be slow and generally takes place over many years, making conditions suitable for a succession of colonising organisms that establish and interact, each with their specialist lifestyles occupying different substrates.

Hollowing does not necessarily weaken old trees that have experienced a reduction in height, crown leverage and wind resistance due to natural retrenchment, provided they retain sufficient adaptive growth capacity to compensate for the loss of wood. This is particularly the case with trees that have a large girth in relation to their height, a common characteristic of ancient and other veteran trees. Old hollow trees are often found still standing after storm events, while nearby solid-stemmed younger trees may be uprooted. Old pollard trees with reduced crown height may similarly resist uprooting, although they may be more susceptible to shedding large pollard branches when management has lapsed over many years.

[H3] 3.1.9 Trees naturally incorporate decay

<OPEN BOX>

'If a healthy tree is defined as a plant without active infections, then there is no such plant as a healthy tree. Trees have hundreds, or even thousands, of active infections that are compartmentalized.'[70]

<CLOSE BOX>

We may think of a dead branch on a tree as a sign of ill health, but in the majority of cases this is an incorrect interpretation. Branch death and shedding are features of tree growth and ageing, and when occasional rather than extensive, they are normal and evolved survival strategies. Trees, when wounded (e.g. from storm damage), have a highly developed capacity to adapt by protecting the organism as whole. Dead branches, cavities and decay are normal features and a healthy tree generally responds by producing new wood where required for strength and support. Additionally a tree has a capacity to compartmentalise (i.e. wall off) decay and grow new healthy woody tissue around dead and decaying wood. This inherent response has evolved to such an extent that old trees can have entirely hollow trunks and enormous branch cavities, with no detriment to their vitality, particularly when the outer living sapwood has not been unduly damaged or compromised.

[H3] 3.1.10 Roots are easily damaged

Roots are essential to tree survival, anchoring the tree and drawing water and nutrients from the soil enmeshed with billions of microorganisms, all of which have a role to play in healthy below-ground ecosystems. While it is easy to have some idea of how a tree functions above-ground, much of the tree's life takes place below-ground within and around its roots. Here, special interactions take place, many of which remain poorly understood. Having evolved slowly and gradually over millions of years, trees and their roots are not particularly adapted to relatively rapidly changing human impacts and disruption that, for example, are found in some urban soils, or conditions that produce compaction, physical disturbance and severance (e.g. building works and utility trenching). Being hidden from view, roots are often unintentionally damaged and, in extreme cases, this can have severe consequences for anchorage and tree health. Such damage tends to be progressive, the first visible indications only becoming evident some years or decades later, when the crown shows poor leaf condition and dieback.[71] Being underground, invisible and with growth patterns that do not obviously equate to the structure of the crown, small diameter roots can assume far greater significance than is commonly appreciated. Unlike damage to small branches, damage to small-diameter roots can have serious health and vitality consequences for the entire tree over time.

[H3] 3.1.11 Trees live long lives

The tree is a highly evolved, resilient plant system that combines an ability to achieve self-supporting mass and to dynamically adapt to the forces of nature. Trees are specialised for survival over periods of time that far exceed human lifespans. Rather than in decades, tree lifespans are frequently measured in centuries and, in some cases, even in millennia. Given our relatively short lives

compared with those of trees, it is easy to see why tree longevity receives inadequate consideration in their management.[69]

[H3] 3.1.12 Trees do not need people

As many as 2000 species of British invertebrate fauna (approximately 6%) depend on other species that, in turn, depend upon decaying wood habitat for part of their life cycle.[72] These habitats are naturally generated through the ageing process and are the very features that are also commonly thought of as structural 'defects' and, by some, as equating to hazards in trees. It would be wrong to believe that management intervention is generally necessary, either for safety or for the tree's benefit. Trees have their own inbuilt mechanisms for dealing with damage and decline. *It is only where there is a close association between humans and trees that tree failure takes on safety significance, and that the concepts of hazards and risk from trees have any meaning*. Sections 4 and 6 explore the reality of the risks posed by trees and ways in which to achieve a balance between conserving their important qualities while managing risks at a reasonable and acceptable level.

[H1]SECTION 4 – UNDERSTANDING THE RISKS FROM TREES

From time to time tree owners, managers and local authorities may feel under pressure to follow a risk-averse approach. It was in this context that the NTSG originally came about to help reduce unreasonable pressure, through building a consensus over what constitutes a balanced understanding of risk and how this can be reasonably achieved.

Trees grow in many different situations that are subject to widely varying levels of public access or other human activity. Where appropriate, management should seek to enhance tree-related natural and societal benefits whilst reducing negative impacts such as risks to human safety and property. In those rare incidents when a tree falls and kills or severely injures a person, specific court cases along with media interest can generate public concerns that call into question how a duty holder is to arrive at rational judgements for reasonable public safety. Understanding what are the 'real' rather than imagined or unwittingly overstated risks is an important principle underpinning rational risk management.

The inherent value and enjoyment derived from being exposed to Nature and the experience of trees is impossible to fully comprehend or quantify. People accept a measure of risk from Nature, whether managed or in the wild state. However, human safety needs to be considered and, whilst management should not seek to eliminate all risk neither should people be exposed to unacceptable risk of serious harm.

Safety management does not necessarily require all trees to be inspected and/or treated, such as for example in remote and unfrequented areas. It is generally accepted that tree safety management should aim to manage risk as *low as reasonably practicable*, which does not require the elimination of all tree-related risk or even to reduce risks to the *lowest level possible*, but rather involves striking a reasonable balance between the costs and the benefits of risk reduction. In order to arrive at a reasonable balance, risk controls should take account of the level of risks on the one hand and, on the other hand, the potential costs - in time, effort and money – and the effectiveness of risk reduction measures.

What constitutes good practice, hinges on how we make rational judgements about assessing and managing risk in a reasonable and responsible way within the framework of the law. While the majority of us apply good common sense and make sound judgements about safety in everyday life, poor practice and inappropriate decisions nonetheless do take place. A better understanding of tree-related risk, the elements of risk exposure and reasonable safety practice is required to assist duty holders in making sound, cost-effective risk control decisions without undue detriment to the natural asset. An approach that is reasonable, balanced and proportionate should provide a sufficient measure of confidence in achieving good practice.

H2 4.1 Considering material risks and benefits

In seeking to understand how to make decisions that avoid unreasonable and unnecessary sacrifice of tree-related benefits, both risks and benefits need to be considered in the context of what is material, i.e. those that are more than trivial or fanciful. Material risks need to be assessed and effectively managed, but this does not mean that safeguarding tree-related material benefits that contribute to amenity, conservation and the environment should be neglected. Instead, where reasonably practicable, measures to control material risks should be adopted that do not entail unnecessary loss of material benefits (see Section 2). However, in some circumstances adequate control of tree-related risks will necessitate tree reduction or removal and, along with this, unavoidable loss of benefits.

Integrating management of risk *to* and *from* trees provides the most cost-effective approach, since protection of the benefits gives motive and resources for management, while there is both a moral and legal obligation to assess and protect the safety of those who may be at risk from structural tree failure. There can be no grounds for avoiding these obligations, but it is important to emphasise that it is the likelihood of somebody being

underneath the tree when it falls (or sheds a branch) that is the key to understanding the safety risk, just as much as the state of the tree itself. Thus management activities to enhance the benefits of the trees would usually only require additional measures to increase public safety where access levels are high, such as in many urban areas or on transport routes. In some circumstances, where adequate control of tree-related safety risks necessitates tree reduction or removal, this may result in unavoidable loss of material benefits. This would not be the case where risk assessment had shown there was a very low risk of serious harm.

The process of assessing the risks and benefits and making safety management judgements should consider the following factors:

- The level of risk of harm from observed hazards in the context of site circumstances and occupancy
- The material benefits
- Ways to manage material risks as low as reasonably practicable without disproportionately diminishing material benefits.

For example, a large mature tree in an urban park that has been competently inspected is considered to present a level of risk to the public such that some management is required. It is recognised that people benefit from the tree as a natural feature, which is linked to the reason why they visit the park. Options for management include removing the tree, severe or light pruning or avoiding treating the tree directly while reducing access to the vicinity. A poorly considered assessment of risk that overstated the tree's potential to cause harm could result in the unnecessary loss of valuable amenity and habitats. Conversely, underestimating the likelihood of tree failure could result in a tragic, avoidable accident. Where it is judged that the material risks are high and there is negligible scope for practicable mitigation, risk control could result in loss of tree-related benefits.

[H2] 4.2 Defining risk

The Royal Society of London proposes a general definition of risk as "the probability that a particular adverse event occurs during a stated period of time." (The Royal Society of London, 1983, p22)
The Health and Safety Executive define risk as "… the chance that someone or something that is valued will be adversely affected in a stipulated way by the hazard." ('Reducing Risk Protecting People') (HSE, 2001, p6) [73]. Taking these two definitions together, risk refers to the likelihood (or probability, or chance) of a specified harm (injury, fatality, or damage) occurring during an identified period of time[74]. This can be applied to overall, generalised risks or specific risks in a particular place at a particular time.

From an organisational point of view, risk has been further defined as the *effect of uncertainty on objectives* (ISO 31000)[15]. This recognises the fact that the world is an uncertain place and outcomes that we try to plan are often unpredictable with positive or negative results – or even both in some cases. ISO 31000's introduction of the effects of uncertainty on organisational decision making draws attention to how we use systems when assessing and managing risks, and the need to be aware of the advantages and limitations of those systems.

The effect of uncertainty on objectives is important when considering an integrated approach to risk management. Objectives of tree management commonly include conservation, implicitly or explicitly, and relate to controlling risks to the trees themselves, along with tree safety. Consider the management of trees alongside a railway for example: an integrated approach will be driven by multiple objectives that, together with passenger safety, include the maintenance of environmental benefits and avoidance of unnecessary delays. Each of these objectives has a measure of uncertainty and this poses risks to the fulfilment of the of the organisation's objectives.

The assessment of tree-related risk considers the likelihood of death, injury or damage to property from tree failure. Risk occurrences may be expressed in terms of a 'source' (a tree or part of a tree), a 'potential event'

(the loss of a branch), 'consequence' (type of harm to person or property), and a 'likelihood'. The final component 'likelihood' (or probability) is an essential element in risk assessment, which needs to examine both the probability of failure and the presence of targets.

With risks in relation to trees, we consider the likelihood of harm occurring *within an identified period of time*. In order to make reasonable decisions a distinction is drawn between 'hazards' (things with potential to harm) and 'risk' (actual likelihood of the hazard causing harm). While we know that every tree must eventually fall, it is only by the evaluation of the period of time in which this is likely to happen and the foreseeable chance that somebody will be underneath it that we are able to sensibly assess and respond to those risks that are sufficiently serious to warrant management. A common problem for those managing risk on a day-to-day basis is that they can lose sight of the risks and get drawn into seeing only the hazards.

Our systems and practices need to be geared to finding those particular trees that pose *reasonably foreseeable unacceptable levels of risk of harm*. Systems (i.e. principles, methodologies, procedures, recording etc) need to be able to distinguish particular trees from the generality and to respond appropriately when they present specific risks. While systems are important, so is judgement. To avoid losing sight of the real objectives involved in managing trees for public safety we must guard against the complacency that can arise from habitual processes. We need to consider firstly the trees' location in relation to people and property and then, where there is sufficient occupancy and proximity, assess their condition (this is explored further in Section 6).

[H2] 4.3 Risk tolerability

When assessing a tree, owners and managers need to judge whether the management measures they adopt will fulfil society's reasonable expectations. When considering levels of risk tolerability there needs to be a reasonably judged understanding of the current levels of risk, what level we aim to achieve and the effort this would entail. Reasonableness, which incorporates consideration of proportionality, is a key legal concept in both criminal and civil law when considering the risks from trees to the public and tree owners' obligations. When deciding what is reasonable, both local circumstances and the wider management objectives will influence risk management.

To illustrate the relationship between the likelihood of harm and the response expected of duty holders, the HSE developed the Tolerability of Risk Framework (ToR) in their seminal document, *Reducing Risk Protecting People*. The framework describes three regions of risk: *unacceptable*, *tolerable* or *broadly acceptable,* defined by the annual risk, in terms of a ratio of one individual to the overall population dying as a result of exposure to a particular hazard. These regions are then used to inform management decisions.
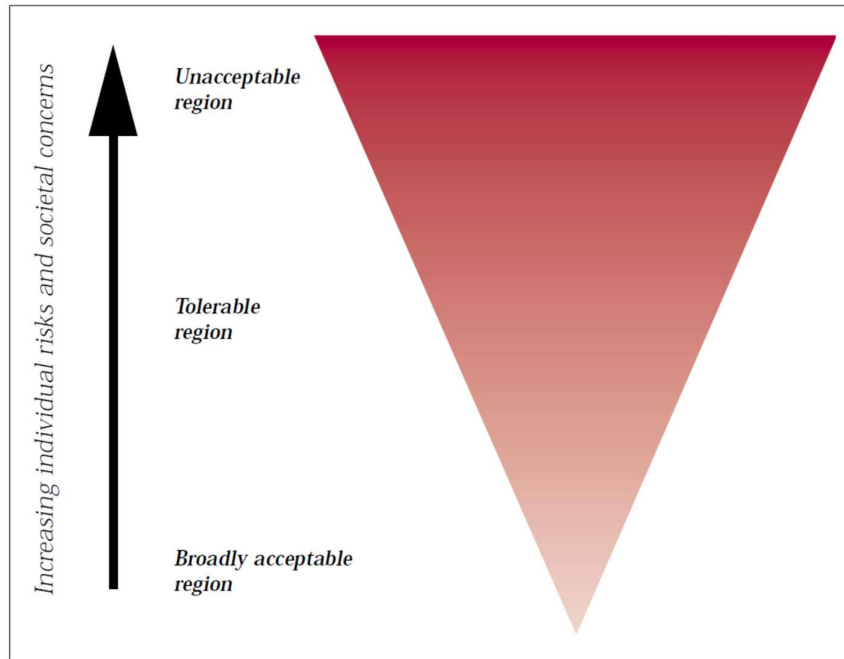
Figure 4.1 Tolerability of Risk framework (ToR)

In the Tolerability of Risk diagram (Fig 4.1), the light zone at the bottom represents the broadly acceptable region. Risks falling into this region are generally regarded as insignificant and adequately controlled. The HSE, as regulators, would not usually require further action to reduce risks unless reasonably practicable measures are available. They say "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. Nonetheless, we would take into account that duty holders must reduce risks wherever it is reasonably practicable to do so or where the law so requires it".

The same document states that "HSE believes that an individual risk of death of one in a million per annum for both workers and the public corresponds to a very low level of risk and should be used as a guideline for the boundary between the broadly acceptable and tolerable regions". The risk from trees is much lower than that figure at around one in 14 million (see section 4.4).

Of course it would be simplistic to rely on the overall probability of fatality, based on national statistics over a long time period, when considering the individual trees within a specific locality, for which a duty holder has responsibility:

> **It is important to recognise that, while the overall risk from trees to society is extremely low, risk posed by any particular tree can, in rare instances, be extremely high**[6]

However the principles of the tolerability of risk can also be applied to particular trees:
- where the risk level is deemed *unacceptable* by a competent inspector, the same decision to prohibit exposure to the risk would apply (control measures such as preventing access to the affected area, pruning or other tree work, or tree removal might be considered);
- for trees whose condition and situation present a *broadly acceptable* level of risk, no action would be expected (unless some reasonably practicable intervention could be seen to further lower the risk without loss of benefits);

- where competent judgement places trees in the *tolerable* level of risk then a risk assessment process would ensue with the aim of controlling risks, resulting in a residual risk level that is as low as reasonably practicable within the context of the benefits those trees provide.

[H2] 4.4 Level of risk in the UK

Risk management is context specific, i.e., landowners and duty holders are required to make management judgements about the trees for which they are responsible, in their locality. Nonetheless, in order to get an informed perspective on the risks it is helpful to refer to national data.

Research on behalf of the NTSG[**] explored the overall level of risk to human safety from trees. The evidence demonstrated that the average individual fatality risk from a falling tree to the UK public in the period 1999-2008 was less than *one in 10 million per year*.[6] Drawing on subsequent data[††] over the longer period 1997–2021, the level of risk was calculated to be *one in 14 million per year*. The overall low level of tree-related risk likely inspection, care and management by owners, duty holders and advisors across the UK over decades, due, in large measure, to a tree profession that includes an expanding body of local authority tree officers.

As previously mentioned, in those rare circumstances where tree risks may be extremely high and result in a serious accident, such events often attract media interest and influence public perceptions about threats from trees[6].

However, NTSG-commissioned research found that there was no evidence of widespread public concern. People normally regarded such risks to be amongst those ordinary, everyday risks of life[‡‡] Given these low levels of overall societal risk, it is unclear what additional or alternative management would result in a corresponding improvement in public health and safety. Nationally, while the management of trees needs to deal with specific high-risk trees, it also needs to respond reasonably to this, along with the demands generated by the widespread societal interest in the conservation and protection of trees.

The individual risk of death attributable to trees is 14 times less than the threshold of one death in one million per year that the ToR framework suggests people regard as insignificant or trivial in their daily lives. Because trees present a very low overall risk to people, owners and duty holders should be confident to make strategic decisions that avoid unnecessary intervention, survey and cost. As already set out above, this in no way reduces their requirement to assess levels of occupancy and any related foreseeable risk to human safety from specific trees in particular contexts, and take appropriate management action.

[**] https://ntsgroup.org.uk/wp-content/uploads/2016/06/NTSG-Report-1_Trees-and-the-Risk-of-Harm.pdf
[††] Daniels, M. Fatal Accidents to Members of the Public Caused by Falling or Fallen Trees, 1997 – 2021
[‡‡] https://ntsgroup.org.uk/wp-content/uploads/2016/06/Risk-perception-and-arboriculture.pdf

[H2] 4.5 A comparison of risks of death

Table 4.1 Annual risk of death from various causes averaged over a specified population.

Cause of death	Annual individual risk	Source/notes
All causes	1 in 107	Office for National Statistics UK (2018): **616,014** deaths
Cancer	1 in 400	Cancer Research UK: (2017) **165,000** deaths
Accidents/external causes	1 in 3,100	Office for National Statistics (2017) **21,226** cases among the total population
Agriculture, forestry and fisheries	1 in 13,000**	2019-20 **21** fatalities in total***
Transport	1 in 37,000	Department for Transport to June (2018) **1,770** transport-related fatalities in year
Lung cancer from radon in dwellings	1 in 60 000	Public Health England (2010) Based on an estimated **1100** deaths per annum in UK
London marathon	1 in 72,000	Average risk per race (1986–2018)[75]
Workplace accidents - All	1 in 238,000**	From HSE's workplace fatal injuries in GB (2018–9) * **147** fatalities in total 2019-20 **111** fatalities in total**
Fire-related	1 in 260,000	Home Office: **253** fatalities (2018–9) (Note: **339** in 2017–8 including the Grenfell Tower disaster)
Falling trees and branches	1 in 14,000,000	Average **4.4** p.a. for UK (1997-2019)[,76, 77]
Lightning	1 in 71,000,000	Average **less than 1** p.a. for UK (2007–16)[78]

Based on a table originally published by the HSE,[73] this is an updated version compiled and extended by D. J. Ball and J. Watt of Middlesex University's Centre for DARM.

Risk of injury

Between 2000 and 2010 with regard to non-fatal injuries, the number of accident and emergency cases attributed to being struck by trees (about 55 per year) is very small compared with the number of leisure-related accidents (~2.9 million per year).

Footballs (262 000), children's swings (10 900) and wheelie bins (2200) account for far more accidents than trees.

[H2] 4.6 The public perception of risk

In the decade since the first edition of the NTSG guidance, public interest in trees and their conservation has grown considerably. There are many examples of local concern following the removal or the threat of removal of trees on grounds of health and safety. The strength of feeling regarding this could deepen as more people realise that trees of significant stature and numbers are threatened. Local authorities have a legal duty to consult over local public interest matters over which they hold control. In the instance of trees, this may promote debate among stakeholders including local residents, and enable a two-way communication process that considers the advantages and disadvantages of retention or removal.

The efforts of ongoing risk management by many professionals and landowners, along with factors such as the low likelihood of the public being around trees in extreme weather, contribute to the low generalised level of risk from trees.

Similarly, as a consequence of the overall low risk of harm that they present, trees are not known to invoke societal concerns: on the contrary, there is more public desire for the retention and preservation of trees, and societal concerns are triggered when trees are felled, sometimes on alleged health and safety grounds or for infrastructure, development or other reasons.[79]

[H2] 4.7 Strategic approach to tree management

There are many reasons for managing trees, including for public safety. While the scale and context may vary, having a reasonable management framework appropriate to the circumstances, will inform a management policy. This may be either implicitly adopted or explicit and formal. The implementation of the policy will include sensible tree safety management, which will be one part of an overall tree management strategy.

The vast majority of UK local authorities employ Tree Officers as in-house arboriculturists to manage the tree stock including their responsibility to meet their legal duty of care. They proactively arrange to inspect tree population including zoning where appropriate, prepare and manage contracts to undertake identified works and replacement tree planting for those removed to ensure a sustainable stock. A strategy or policy may have been formally adopted or implied by these ongoing management programmes, able to evidence these actions in the event of any death or injury.

Where trees are grown for timber, this usually includes felling trees as part of routine operations, as could also be the case for other commercial operations and public utilities which incorporate trees on their site. Trees grown outside woodlands and non-commercial trees frequently have social and environmental value, and are important to public health and well-being. The NTSG's position is that, wherever practicable, such trees should be retained and allowed to complete their life cycles with a minimum of management interventions.

Organisations that maintain a tree strategy or management plan, part of which includes information regarding their risk management plan for the trees they own, are better placed to demonstrate that they have fulfilled their duty of care. In the view of the NTSG, following an incident, the existence of a tree safety strategy that reduces the risk to as low level as reasonably practicable should help protect the duty holder against litigation. It is important to note that this is an emerging area within the field of managing safety risks to the public. The way in which courts take benefits into account in civil and criminal cases is discussed in Section 5.

[H1]SECTION 5 – TREES AND THE LAW

Tree owners have a legal duty of care. Under both the civil law and criminal law, an owner of land on which a tree stands has responsibilities for the health and safety of those on or near the land and has potential liabilities arising from the falling of a tree or branch. The civil law gives rise to duties and potential liabilities to pay damages in the event of a breach of those duties. The criminal law gives rise to the risk of prosecution in the event of an infringement of the criminal law.

This section sets out the legal framework in respect of an owner's liabilities for injury to others caused by the fall of a tree or branch in England, Scotland, Wales and Northern Ireland. There are slight differences in terms of how the law in each country deals with trees and liabilities with respect to safety and the duty of care arising from tree-related incidents (see the Acts below). In general, due to a lack of case law in Scotland and Northern Ireland, much of the case law cited is from England and Wales. The advice given below is based on an evaluation of past court decisions. It is not intended to provide an exhaustive exposition of the law relating to trees or the ownership of land.[80]

Editor Note
Cases cited in this section are to be indicated by superscripts (separate to references) with full details are provided at the end of the section.

[H2] 5.1 The role of this guidance within the legal framework

This document, supported by a wide range of stakeholders involved in the ownership and management of trees, seeks to provide guidance for the checking, inspection and maintenance of trees that is reasonable and proportionate to the generally low risk posed by trees, to the benefits of trees, and to the health and safety obligations of those who are responsible for trees. This document may be presented to a court for consideration as supporting documentation in any case involving death or personal injury caused by a falling tree or branch. Reported judgments already demonstrate that courts will consider publications of this nature when addressing the duty of care.

The first edition of this NTSG publication was considered by the High Court in the case of *Stagecoach South Western Trains v Hind* [2014] EWHC 1891 (TCC), along with the HSE SIM.[6] In the case of *Witley Parish Council v Cavanagh* [2018] EWCA Civ 2232, the court focused its attention on the 2000 Forestry Commission Practice Guide.[2]

It must, however, be appreciated that the guidance in this document will not in itself determine a court's judgment in an individual case. First, all cases are sensitive to their own facts. Second, a court will always reserve to itself the decision as to whether a tree owner has acted as 'a reasonable and prudent landowner'. This guidance can, however, inform the court in the making of that decision.

[H2] 5.2 The civil law

The owner of the land on which a tree stands, together with any party who has control over the tree's management, owes a duty of care at common law to all people who might be injured by the

tree. The duty of care is to take reasonable care to avoid acts or omissions that cause a reasonably foreseeable risk of injury to persons or property.

If a person is injured by a falling/fallen tree or branch, potential causes of action may arise against the owner or occupier of the land on which the tree was standing at the time of the incident – where the injured person was on that land, under the Occupiers' Liability Acts of 1957 or 1984 (OLA 1957, OLA 1984) or, otherwise, in negligence, for a breach of the general duty of care, and in the tort of nuisance. For Scotland see the Occupiers' Liability (Scotland) Act 1960. For Northern Ireland see the Occupier's Liability (Northern Ireland) Act 1957 and Occupier's Liability (Northern Ireland) Order 1987.

[H2] 5.3 Negligence

[H3] 5.3.1 The duty holder

The duty of care is owed by the person who has control of the tree's management – whether as owner, lessee, licensee or occupier of the land on which the tree stands. The relevant highway authority is responsible for trees on land forming part of the highway.

[H3] 5.3.2 The person to whom the duty is owed

This is any person who can be reasonably foreseen as coming close enough to a tree that they might be injured or otherwise harmed by a fall of the tree or a branch from the tree. Those using highways, footways, footpaths, bridleways, railways and canals are likely to come within striking distance of trees on such land or on adjacent land. In public spaces, and semi-public spaces such as churchyards and school grounds, those working in or visiting them can be expected to come within range of falling trees. On private land, visitors and employees – and even trespassers – can be expected to come within the range of trees.

[H3] 5.3.3 The duty owed

This can be stated in general terms as being a duty to take reasonable care for the safety of those who may come within the vicinity of a tree. The courts have endeavoured to provide a definition of what amounts to "reasonable care" in the context of tree safety, and have stated that the standard of care is that of 'the reasonable and prudent landowner'.[a] The tree owner is not, however, expected to guarantee that the tree is safe, and only has to take reasonable care, such as could be expected of the reasonable and prudent landowner. Such a landowner does not have to take all possible safety measures , only those measures that are reasonable.

The duty owed under the tort of nuisance is owed by a tree owner to the occupier of neighbouring land. The duty, however, is no different to the general duty owed under the tort of negligence.

A highway authority has a potential liability for fallen trees and branches for which it is responsible by virtue of section 41(1) of the Highways Act 1980, which gives rise to a duty 'to maintain the highway'. It is open to question whether the duty extends to the maintenance of highway trees.[b] However, assuming the duty does so extend, the highway authority may, by section 58, defend itself

by proving 'that the authority had taken such care as in all the circumstances was reasonably required to secure that part of the highway to which the action relates was not dangerous for traffic'. The duty under section 41(1) is, therefore, little different to that which arises under the common law in negligence. Similarly, in respect of trees planted under Section 96 of the Highways Act 1980, the highway authority is required only to take 'reasonable' care. A highway authority also has the power under section 154(2) of the Highways Act 1980 (see also the s. 91 Roads [Scotland] Act 1984) to require trees growing on land adjacent to the highway that are dead, diseased, damaged or insecurely rooted, to be removed by those responsible for the trees and, in default of removal, to take action itself to have the trees removed. A failure to utilise the power in any particular case is unlikely to give rise to liability in the light of Stovin v Wise.[c] Similarly, it will not assist a person responsible for a tree growing adjacent to a highway to blame the highway authority for failing to require him to remove a tree that is found to have been dangerous (i.e. to have posed a significant hazard).

It is the duty holder's fundamental responsibility, in taking reasonable care as a reasonable and prudent landowner, to consider the risks posed by their trees. The level of knowledge and the standard of inspection that must be applied to the inspection of trees are of critical importance. It is at this point that the balance between the risk posed by trees in general terms, the amenity value of trees and the cost of different types of inspection and remedial measures, becomes relevant.

[H2] 5.4 The standard of inspection

The courts have not defined the standard of inspection more precisely than the standard of 'the reasonable and prudent landowner'. They acknowledge that this standard is harder to define in a real-life situation than it at first seems. It relies on the landowner possessing a degree of knowledge about trees that is less than that held by a professional arboriculturist but more than an ordinary urban layperson or even a resident of the countryside with no direct responsibility for their care or knowledge of tree defects.[d]

In individual cases, the courts have sought to apply this general standard to the facts of each case.[e] However, there is no clear and unambiguous indication from the courts in regard to the extent of the knowledge about trees a landowner is expected to bring to tree inspection or as to the type and regularity of inspections. Regular inspections should be carried out so that apparent defects can be identified and an appropriate response undertaken. Once made aware of a defect in a tree or trees, the courts expect a landowner to obtain the advice of a person with appropriate expertise on what action to take in respect of the risk presented (unless, of course, the landowner has sufficient expertise themselves). To some degree the courts appear to indicate that the standard of inspection is proportional to the size of and resources available (in terms of expertise) to the landowner.[f-j]

In section 6, a hierarchy of inspections is set out, with each type of inspection defined. This hierarchy is not one that has been formulated by the courts, but is one that is considered by the NTSG to be consistent with the general principles set out by the courts. The decisions of the courts do, however, often depend on the particular facts of each case.

The following guidance was given by the High Court in 2014[k] (in *Stagecoach South Western Trains v Hind*) in respect of a householder whose tree grew adjacent to a railway (Case A), and has subsequently been applied by the Court of Appeal[l] in *Witley Parish Council v Cavanagh*, in which a parish council owned a tree adjacent to a busy road (Case B):

- The owner of a tree owes a duty to act as a reasonable and prudent landowner.
- Such a duty must not amount to an unreasonable burden or force the landowner to act as the insurer of nature. But he has a duty to act where there is a danger which is apparent to him and which he can see with his own eyes.
- A reasonable and prudent landowner should carry out preliminary/informal inspections or observations on a regular basis.
- In certain circumstances, the landowner should arrange for fuller inspections by arboriculturists. This will usually be because preliminary/informal inspections or observations have revealed a potential problem, although it could also arise because of a lack of knowledge or capacity on the part of the landowner to carry out preliminary/informal inspections. A general approach that requires a close/formal inspection only if there is some form of 'trigger' is also in accordance with the published guidance referred to in the Stagecoach Judgment (paragraphs 53-55).
- The resources available to the householder may have a relevance to the way in which the duty is discharged.

The householder in Case A was found not to have been negligent in circumstances where she had some knowledge of trees, had carried out informal visual observations, and had caused tree surgeons to carry out works to her trees, but had not identified decay in the trunk of the tree in question because it was covered by ivy; the tree otherwise appeared to be entirely healthy. Conversely, the parish council in Case B was found to be negligent where it had not arranged for a formal two-yearly inspection of a large mature tree which could fall onto a busy road. Had the inspection been carried out, in the opinion of the Court, it would have identified a fungal bracket some 300 mm above ground level which had appeared shortly after the last inspection and which was indicative of internal decay.

Of fundamental importance in deciding upon an inspection regime is the extent of the risk posed by the tree in the event of it failing. If it is unlikely to harm a person, then the frequency of inspections can be of a low order or, in a woodland setting or areas where there is no access, it may be decided not to undertake any inspections. Whereas, if there is a high risk of injury to people, then the frequency of inspections should be greater. Similarly, the greater the risk then the more important it becomes to ensure that the person inspecting has sufficient knowledge to identify defects which are capable of being seen. A larger landowner can rely on inspections undertaken by contractors or employees, suitably trained or experienced, who have a working knowledge of trees and their defects, but who need not be an arboricultural specialist (see footnote[m] and other cases[n]). A householder with a reasonable knowledge of trees and the ability to identify obvious or apparent defects, and dangers, can rely upon informal and regular inspections.[o] An 'obvious' or 'apparent' defect, or sign of instability, can reasonably be described, as one that can physically be seen and which can also be identified as a potential defect or sign of instability.

[H2] 5.5 Breach of duty

For liability to be established in negligence there must have been a breach of the duty owed by the landowner to the injured person. In cases where there has been a failure to inspect the tree at all, the court will have to consider whether the defect which caused the tree to fail would have been apparent to the inspector if an inspection had been carried out.[p] In other words, the court must be satisfied that there has been a breach of duty which caused the injury or damage consequent upon the failure of the tree.

Where a tree has been inspected in accordance with a tree management policy, and the issue concerns whether the inspection was carried out with reasonable care in the particular circumstances, then, if the inspection was carried out by a trained / qualified tree inspector, the test is that of an ordinarily skilled tree inspector. Such a test has been applied in two cases in which the inspector was acting on behalf of a large organisation (Bowen v National Trust [2011] EWHC 1992 (QB), Parker v National Trust [2021] EWHC 1589 (QB), and Hoyle v Hampshire CC [2022] EWHC 934 (QB)).

[H2] 5.6 The Occupiers' Liability Act 1957

The Occupiers' Liability Act 1957 provides for the liability of an occupier of land when an accident occurs on the land to a person who is a 'visitor' to the land (for Scotland, see The Occupiers' Liability [Scotland] Act 1960; for Northern Ireland, see the Occupier's Liability [Northern Ireland] Act 1957). The occupier owes a duty to the visitor to 'take such care as in all the circumstances of the case is reasonable to see that the visitor will be reasonably safe in using the premises for the purposes for which he/she is invited or permitted by the occupier to be there'.[q] The duty of care under the Act is effectively the same as that at common law in respect of the torts of negligence or nuisance.

A person visiting land by virtue of the National Parks and Access to the Countryside Act 1949, the Countryside and Rights of Way Act (CROWA) 2000 or the Marine and Coastal Access Act 2009 is not classed as a 'visitor' within the meaning of OLA 1957.[r] They cannot, therefore, bring a claim under the OLA 1957. However, they may still potentially bring a claim in negligence or, if appropriate, under OLA 1984.

[H2] 5.7 The Occupiers' Liability Act 1984

The Occupiers' Liability Act 1984 provides for an occupier's liability to people other than visitors, in particular, trespassers, in circumstances where the occupier knows of the potential presence of such people on their land and of the risk posed to them by features of the land such as trees, and the risk is one against which, in all the circumstances, the occupier may reasonably be expected to offer them some protection. For Northern Ireland, see the Occupier's Liability (Northern Ireland) Order 1987.

The duty under section 1 of the Act to a person on 'access land' in the exercise of a right to roam conferred by section 2(1) of CROW A 2000 will be determined having regard to the fact that the

existence of the right ought not to place an undue burden upon the occupier, and having regard to the importance of maintaining the character of the countryside.[s]

The duty under OLA 1984 is also limited in that no duty will arise in respect of risks resulting from any natural feature of the landscape (which will include a tree), or from any river, stream, ditch or pond,[t] providing that the occupier does not intentionally or recklessly create the risk.[u]

[H2] 5.8 Warning notice

A warning notice that warns of a specific hazard posed by a tree (or trees) may be sufficient to absolve an occupier from liability in that they may, by such notice, have taken all reasonable care for the visitor's safety in the circumstances.[v] However, in general, a landowner should not rely upon warning signs alone to protect against a hazard. A business occupier cannot by reference to any contract term, or to a notice, exclude or restrict his liability for death or personal injury resulting from negligence or a breach of duty under OLA 1957,[w] save where the access to the land is given for educational or recreational purposes (unconnected with the purpose of the business).[x]

[H2] 5.9 The Compensation Act

Section 1 of the Compensation Act 2006 provides that:

> 'A court considering a claim in negligence or breach of statutory duty may, in determining whether the defendant should have taken particular steps to meet a standard of care (whether by taking precautions against a risk or otherwise), have regard to whether a requirement to take those steps might:
>
> a) prevent a desirable activity from being undertaken at all, to a particular extent in a particular way, or
>
> b) discourage persons from undertaking functions in connection with a desirable activity.'

The term 'a desirable activity' is not defined by the Act and is likely to be construed so as to give a wide meaning to the term. It is likely, therefore, that it includes an activity such as the growing of trees. While the Act reinforces the importance of being able to balance the amenity, health and other intrinsic biodiversity values of trees against the risk posed by a tree, it is uncertain whether it will materially alter the courts' approach to claims arising from falling trees. The Act only applies to civil claims and not to criminal prosecutions. It is, however, of note that in the County Court decision of Colar and Singh v Highways England the Judge stated "There are compelling biodiversity and aesthetic reasons to have our main carriageways lined up with trees. The courts should not seek to interpret the duties to which a highway, or another public, authority is subject in a way which may undermine the importance of those reasons. While this 'public interest' consideration must always be in a judge's mind, so must the principle that these duties are important duties, designed to protect the public. They must be performed and discharged properly and while, of course, they are delegable, there must be an element of monitoring retained by the highway authority to ensure that they are discharged properly".

[H2] 5.10 The criminal law

The Health and Safety at Work Act 1974 (section 3(1)), states that 'It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not exposed to risks to their health and safety'. This places a duty to ensure, so far as is reasonably practicable, that in the course of conducting their undertaking, members of the public are not put at risk (see also section 2 in respect of employees and section 3(2) in respect of self-employed persons). The acts of felling or lopping a tree clearly fall within the scope of this duty. It is also likely that the growing and management of trees on land falls within the scope of the duty if such operations fall within the employer's undertaking.

The duty is subject to the words 'so far as is reasonably practicable'. This proviso requires an employer to address the practical and proportionate precautions that can be taken to reduce a risk. The courts have generally been unwilling to take into account environmental or aesthetic values when considering whether a step is reasonably practicable, confining the consideration to whether a precautionary step can 'practically' be undertaken.[y] Nevertheless, in HSE v North Yorkshire County Council (20 May 2010) Wilkie J., when directing the jury as to the meaning of 'reasonably practicable', identified as a material consideration 'the benefits of conducting the activity':

> 'Now, in this context what does "reasonably practicable" mean? Well, as you have been told correctly, it is a narrower concept than what is physically possible. It requires a computation to be made by the employer in which the amount of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk, whether in terms of money, time or trouble, or the benefits of conducting the activity, are placed in the other. If there is a gross disproportion between them where the risk to health and safety is insignificant in relation to the sacrifice and/or loss of benefit involved in averting that risk then the defendant discharges the onus upon him and is entitled to be acquitted, but if the defendant does not persuade you of that on the balance of probabilities then you would convict.'

The Management of Health and Safety at Work Regulations 1999 require every employer or self-employed person, by regulation 3 to 'make a suitable and sufficient assessment of the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking'. This requires an employer, and a self-employed person, to undertake a risk assessment of the tree stock on the land which forms part of the undertaking.

Breach of the duty under the Act, or the regulations derived from the Act, can give rise to a criminal prosecution against the employer. Enforcement of the Act is vested in the HSE and, in some instances, local authorities. The HSE has provided guidance for its inspectors and local authority enforcement officers in connection with the inspection of trees.[6]

The responsibilities under criminal law primarily arise in respect of employers, self-employed persons and those who control a business undertaking. However, responsibilities under criminal law can also, in exceptional circumstances, arise in respect of manslaughter by corporate undertakings or

individuals, leading to a police investigation and possible prosecution (see the Work Related Death Protocol 2003). There have been no prosecutions for manslaughter in respect of falling trees.

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a. Caminer v Northern & London Investment Trust Limited [1951] AC 88.

b. Chapman v Barking and Dagenham LBC [1997] 2 EGLR 141.

c. [1996] AC 923.

d. Caminer v Northern & London Investment Trust Limited [1951] AC 88 at 100.

e. Noble v Harrison [1926] 2 KB 332; Shirvell v Hackwood Estates [1938] 2 All ER 1; Cunliffe v Bankes [1945] 1 All ER 459; Brown v Harrison (1947) 63 TLR 484; Lambourn v London Brick Co Ltd (1950) EG 28 July 1950; Lane v Trustees of the Tredegar Estate [1954] EGD 216; Quinn v Scott [1965] 1 WLR 1004; Knight v Hext [1980] 1 EGLR 111; Chapman v London Borough of Barking & Dagenham CA, unreported 13 July 1998 (1st instance [1997] 2 EGLR 141); Poll v Viscount Asquith of Morley 11 May 2006; Corker v Wilson 10 November 2006; Atkins v Sir James Scott 14 August 2008; Selwyn-Smith v Gompels 22 December 2009.

f. Chapman v London Borough of Barking CA 13 July 1998.

g. Quinn v Scott [1965] 1 WLR 1004.

h. Poll v Viscount Asquith of Morley 11 May 2006; Atkins v Sir James Scott 14 August 2008.

i. Caminer v Northern & London Investment Trust Limited [1951] AC 88.

j. Corker v Wilson 10 November 2006; Selwyn-Smith v Gompels 22 December 2009.

k. Stagecoach South Western trains v Hind [2014] EWHC 1981 (TCC).

l. Witley Parish Council v Cavanagh [2018] EWCA Civ 2232.

m. The HSE Sector Information Minute (SIM): Management of Risks from Falling Trees (2007) sets a standard for public authority landowners below which there may be criminal liability. The relevance of the HSE SIM to civil liability has been questioned by the Court of Appeal in Witley Parish Council v Cavanagh [2018] EWCA Civ 2232, while also being found to be relevant in the Court of Appeal judgment in Micklewright v Surrey County Council [2011] EWCA Civ 922, and in the High Court in Stagecoach South Western Trains v Hind [2014] EWHC 1981 (TCC).

n. Micklewright v Surrey County Council [2011] EWCA Civ 922; Atkins v Scott (14 August 2008; Aldershot & Farnham County Court; HHJ Hughes QC); Maclellan v Forestry Commission (15 October 2004; Nigel Wilkinson QC; Bristol District Registry).

o. Stagecoach South Western Trains v Hind [2014] EWHC 1981 (TCC); Corker v Wilson (10 November 2006; Mayor's and City of London Court; HHJ Simpson QC); Selwyn-Smith v Gompels (22 December 2009; Swindon County Court; Recorder Adrian Palmer QC).

p. Micklewright v Surrey County Council [2011] EWCA Civ 922.

q. See also the Occupiers' Liability (Scotland) Act 1960.

r. s. 1(4) Occupiers Liability Act 1957.

s. s. 1A Occupiers' Liability Act 1984.

t. s. 1(6A) of the Occupiers' Liability Act 1984.

u. s. 1(6C) of the Occupiers' Liability Act 1984.

v. s. 2(4) Occupiers' Liability Act 1957.

w. s. 2(1) Unfair Contract Terms Act 1977.

x. s. 1(3) Unfair Contract Terms Act 1977.

y. Hampstead Heath Winter Swimming Club v The Corporation of London [2005] EWHC 713 (Admin) paragraph 65 (contrast with s. 1 of the Compensation Act 2006 in respect of civil claims).

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[H1]SECTION 6 – REASONABLE, BALANCED, TREE RISK MANAGEMENT

The legal framework for those responsible for trees is discussed more comprehensively in Section 5.

In general, civil law imposes duties upon owners of land with trees (and any party who has control over tree management) to take care for the safety of people and property within the vicinity of those trees according to the standard of a reasonable and prudent landowner.

In criminal law, the HSWA 1974 imposes responsibilities on duty holders for the safety of employees and others affected by their activities . This includes tree owners and managers, as they are the people best placed to assess the risk and take the necessary action to reduce it to a reasonable level. The HSWA obliges them to reduce the risk as low as reasonably practicable. The law does not require the creation of a "risk-free" environment. Section 3 of this Act refers to duty holder liability for those affected by the undertaking, only applies where there is a "material risk" (i.e. more than trivial, fanciful or hypothetical).

Duty holders should assess the risks arising from their tree stocks and adopt reasonable measures to control those risks as low as reasonably practicable. This will include how frequently they will survey their trees and undertake their practical management and the level of competence of those involved.

This Section explores how these responsibilities can be met from a practical point of view.

When considering safety, what constitutes a "suitable and sufficient risk assessment" referred to by the HSE will vary with context and take account of the trees, their condition, health and setting[81].

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'Public safety aspects can be addressed by tree owners as part of their approach to managing tree health. A sensible approach will ensure the maintenance of a healthy tree stock, the sound management of the environment and will usually satisfy health and safety requirements'[76] (HSE 2001).

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- "Regarding the general low level of risk, the HSE states that, "Given the large number of trees in public spaces across the country, control measures that involve inspecting and recording every tree would be disproportionate to the risk."[6]. (HSE 2013).

Individual safety inspection and recording will apply to relatively few trees. However, regular assessments including tree surveys and inspections, such as those undertaken by local authorities and other managers of trees, operate across populations for a variety of reasons that also include safety.

Amongst the many reasons for which trees are managed, the safety of people and property is a fundamental consideration. When dealing with safety of particular trees, what is required is a reasonable understanding of the actual risks posed by them together with an appreciation of their importance locally to people and the environment.

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In a private garden, there is no presumption that it is reasonable to expect owners to do anything other than look for and react to obvious structural defects that pose a risk to people or property.

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When trees are managed primarily as a commercial crop, the focus is on planting, maintaining and harvesting them for the income they provide. In a simple model of a commercial forest, benefit can be equated to financial profit in the same way as in a factory or on a farm. In this case, one might expect a formal health and safety policy to primarily address workforce and visitor safety including public rights of way. Where the level of risk to the public is low, much of the investment in risk control will be focused on worker safety. Whether low or otherwise, the management of risk of harm will be at the expense of profit. Such risk calculations are common to commercial operations with trees on their sites including, for example golf courses, railways and zoo parks.

However, the evaluation is more complicated when it comes to considering the risk to the public from trees that do not form part of a commercial asset in urban and rural environments. In many cases, such trees are looked after by local government, public bodies, NGOs, farms and large estates, and the cost of their overall management includes management for reasonable safety.

When it comes to the many benefits trees provide, these are enjoyed not only by their owners but also the wider community including those in their immediate locality. Despite this fact, when it comes to the duty of care and the associated costs of managing the risks posed by those trees, these are borne solely by the owner.

The NTSG recognises that it is inappropriate to claim that because trees provide benefits and the overall risk is low, there is no responsibility for their risk management. Instead, when considering specific trees, an approach to the assessment and management of risk is needed that both achieves reasonable safety and the avoidance of disproportionate costs and unnecessary tree losses.

Legal obligations, individual tree circumstances, along with benefits, contribute to the context in which risks are managed. In situations where trees are extremely unlikely to fall on people or property, i.e. they pose a negligible likelihood of reasonably foreseeable harm, tree-related risk controls will be unnecessary unless circumstances change. However, in the contexts where trees are considered to pose a significant measure of risk, it is important to identify the elements of a suitable and sufficient risk assessment, one such, as outlined in the HSE SIM, states that an "overall assessment of risks from trees - identifying groups of trees by their position and degree of public access…will enable the risks associated with tree stocks to be prioritised, and help identify any checks or inspections needed[6]." As trees are managed for a variety of reasons, what constitutes a 'suitable and sufficient risk assessment' will vary. Effective management will be informed by, local context, tree condition, size and quality.

[H2] 6.1 Balance and proportionality

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'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.'[73]
(HSE, 2001)
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Proportionality is pivotal in this evaluation and can only be achieved by considering the place of trees in a wider management context and people's relationship to that context.

While tree safety inspections and risk management are usually only a small part of an organisation's wider remit of responsibility, these may have implications for broader tree management. For example, tree inspection is identified as necessary within the guidance for highway authorities as part of their overall responsibility for public safety.[82]

[H2] 6.2 Responsible management

Landowners who already sensibly manage their trees can be reasonably confident that there is no need for radical change driven by a fear of the law, although they may find this guidance useful when reviewing management practice. Responsible management should seldom result in large-scale tree removal and/or pruning for safety reasons. No tree can be guaranteed to be safe. As long as we retain trees, we cannot achieve zero risk but the risks can be managed to ensure that the residual risk is low.

A disproportionate response to the actual risks posed by trees introduces a different category of risk which can lead to unnecessary intervention including tree loss. This can particularly affect trees alongside roads and within public places. Such a response risks losing the benefits provided by trees to the environment, landscape and society. These considerations need to be reasonably balanced with underlying legal responsibilities for managing trees in relation to public safety.

[H3] 6.2.1 Essentials of a reasonable, balanced approach

The number of trees for which landowners are responsible varies enormously, as do the means available for their management. The NTSG guidance offers a framework for landowners to manage their trees reasonably, enabling them to establish a proportionate approach to practical tree management for the reasonable safety of visitors and passers-by. This approach is based on achieving a balance between the benefits that trees provide and the risks they pose to public safety. A proportionate approach will not require excessive risk management or undue intervention.

[H3] 6.2.2 Defendable good practice

A key element of good practice is to ensure that trees that are valued are not unnecessarily lost. Good practice involves inspections and other interventions as necessary for safety reasons while maintaining the quality of the tree stock. Good practice procedures do not need to be complicated. They can contribute informally to day-to-day practice or be incorporated within a formal proactive strategy. The overall low risk from falling trees must not obscure the reality that some trees can pose an unacceptable risk of harm, requiring safety management. Embedded in good practice is the duty for reasonable care, based on reasonable foresight in the control of tree-related risks at an acceptable level. Being reasonable involves taking actions proportionate to the risk of the particular circumstances. Good practice can include reactive and proactive aspects. While owners and duty holders may need to react to events involving dangerous trees as they arise, it is also prudent to sensibly plan the management of foreseeable risks as low as reasonably practicable (Figures 7.1 and 7.2).

[H3] 6.2.3 Management strategies

A strategy is a plan for achieving stated objectives and is a core aspect of good practice. At its simplest a strategy may be implicit. The effectiveness of a strategy will likely be evident in the condition of the trees. Explicitly formulated strategies, typically for large tree populations, are expressed through documents that describe and record past and planned management practice. If reasonably carried out, the strategy should contribute to meeting the duty of care, without the need for an overly bureaucratic approach or excessive paperwork.

[H2] 6.3 What is hazard, harm, risk, defect, obvious defect?

[H3] 6.3.1 Hazard

A hazard is an object, situation or condition with the potential to cause harm in particular circumstances. When applied to trees, any part (whether root, trunk or branch) that might fail and cause harm is a hazard. The consideration of safety involves looking at the likelihood of a particular hazard resulting in actual harm. Assessing hazards is an innate biological function that underpins human behaviour and survival. For most people this may be an intuitive process where obvious tree hazards are concerned; in other cases, specialist knowledge and methods may be required.

[H3] 6.3.2 Harm

Harm is an adverse impact on something or someone. In relation to trees, harm refers to injury or damage, most commonly when a tree or branch falls and impacts people or property. Other forms of harm may arise from the avoidable loss of trees. In the technical literature covering tree-related risk from falling parts[2,3,83], individuals or property that might be harmed are termed 'targets' and the area within a tree's potential falling impact range is referred to as the 'target area'[3] or target zone'[83]. In this guidance we use these terms interchangeably.

[H3] 6.3.3 Risk

The assessment of risk from falling parts of trees considers the likelihood of tree failure and the character and severity of its consequences. As discussed in section 4, risk is defined as the likelihood (probability or chance) of an adverse event occurring during a stated period of time and of someone or something of value being adversely affected in a stipulated way by a specific hazard. Although all trees are potentially hazardous, the risk of reasonably foreseeable harm at any given time is relative to the number and type of targets (e.g. people, cars, horses etc) within the falling impact range of the tree and the size of the parts that are likely to fail. When considering risks from trees, the target area can be characterised according to the nature of occupancy (e.g. pedestrians or vehicles). This is typically 'zoned' according to the level of usage (see Occupancy and Zoning below). If it is not reasonably foreseeable that targets will be present within the falling distance of the tree, there will be no reasonably foreseeable risk of harm in the event of tree collapse. This is more likely to be the case in rural and remote areas and less likely in urban tree populations. Large trees may present a higher level of risk than small trees in a high-use zone but may represent a low or even negligible risk (regardless of defects) if they are growing in an area that is rarely used or that is inaccessible.

[H3] 6.3.4 Defect

The term 'defect' can be misleading, given that structural deformities in trees (i.e. variations from a perceived norm) can be highly variable as can their significance with respect to risk. In many cases, deformities may indicate an adaptive and even strengthening response and further assessment may be required to understand the nature of a perceived defect and whether it represents a significant hazard. In terms of tree safety, a defect principally relates to a condition or feature of a tree that might predispose the tree to structural failure. Deformities that might be perceived as defects do not necessarily imply a weakness that requires intervention. So-called deformities can be a normal response to internal hollowing or decay, compensating for loss of wood strength and providing a mechanical advantage that enables a tree to adapt to wind and gravity, forces which might otherwise result in breakage. Signs that might indicate a structural (although not necessarily hazardous) defect include, heavy dead parts, splitting, weak or malformed branch attachments or forks, bark and wood fractures, soil cracks, root plate lifting, advanced decay, certain fungal fruit bodies, large old wounds and severe root damage. Combinations of defects can elevate their importance. Disease and declining health associated with water-logging, extreme drought and soil compaction may in turn cause hidden defects that contribute to the impairment of structural strength and stability.

[H3] 6.3.5 Obvious defect

An obvious defect is a feature of a tree that can be easily seen and recognised as a hazard. Such defects could signify an impairment that may deteriorate over a long period of time or in rare cases indicate imminent structural failure. The courts and specialist literature often apply the term 'obvious' to tree defects that are apparent to a reasonable and prudent duty holder, and are likely to be recognised as such by most non-specialists. While obvious defects may include external indications of potential structural failure, they take many forms, not all of which are hazards that pose a risk of significant harm. So when considering the nature of a defect it is important to consider the immediate context and the measure of likelihood that harm might arise from tree failure.

An example of an obvious defect that poses a serious risk of harm is a large tree over a busy road with a clearly failing substantial branch or root plate. The person conducting the safety inspection is

looking for obvious defects that pose a serious risk of harm, particularly those that represent a real and present danger. The duty holder is not expected to guarantee that any particular tree is safe but, when concerned and uncertain, should seek appropriate specialist advice. Obvious defects frequently confer material habitat and wildlife benefits, even sometimes harbouring rare species (Section 3). Good management practice will take into account the conservation value of such defects.

[H2] 6.4 Framework for managing trees for public safety

A framework for decision making provides a sensible foundation for judicious care of trees, taking both positive values and potential adverse impacts into balanced consideration. Tree-risk management is an important part of this. A clear framework contributes to reasonable and proportionate decision making. There is no single universally adopted tree-risk management system. This is not surprising given the diverse considerations to be taken into account - such as the setting (including occupancy and zoning), and inspection and assessment (including risks and benefits). A framework for tree-risk decisions should be based on local priorities taking account of the objectives for managing the particular tree/s and the target area. The initial observations will inform the nature, priorities and rigour of the inspection procedure. Depending on the context and scale of the tree asset, the framework may or may not be explicitly documented; however, record keeping and formal review may serve an important role in management and proof of practice.

[H3] 6.4.1 Context in which trees grow

Tree-risk assessment is essential to achieve tree management for reasonable safety. Good management practice seeks to align the objectives of tree safety with other objectives considered important for trees in the context of their local setting, and social, landscape and environmental values. Such considerations along with the allocation of available resources, are integral to making sensible management decisions that provide for reasonable public safety without unnecessary loss of valuable and important trees (Figure 1.2). Understanding the context in which the trees grow and contribute to their setting is necessary if management is to discharge not only the safety duty but also avoid unnecessary tree loss or undue harm to the wider environment.

[H3] 6.4.2 Occupancy

Occupancy, in relation to tree safety, refers to targets and describes the level of use by people and/or the presence of valuable property within the target areas of trees (see Harm 6.3.2 and Risk 6.3.3). If there is no foreseeable occupancy within the target area then there is low risk of harm from trees. An understanding of occupancy does not require tree expertise but, importantly, typically relies on local knowledge of the site. Such knowledge might also include an appreciation of tree size and how many people or structures could be affected at various locations. As circumstances change over time it may be necessary to revisit and review the trees and the levels of occupancy. Judgement and knowledge of the site are required to use the level of occupancy as a determinant of risk assessment.

[H3] 6.4.3 Zoning

Zoning is a means of defining areas of land around trees according to levels of occupancy. It is useful for prioritising the allocation of resources to where risks are likely to be highest (i.e. areas of high occupancy). In many circumstances, two zones, high and low use, may be considered sufficient.[6] Zoning is particularly useful where a new risk management regime is being proactively implemented following a long period of little or no management input. Typically high-use zones are frequented by many people every day, such as busy roads, railways or other well-used routes, car parks or areas where people regularly congregate, or places where property may be affected. At some sites, landowners and managers may deem it appropriate to designate more than two zones, ranging from intensely used areas, to areas with intermediate levels of use, to areas where occupation is so low that visiting and checking trees (see 6.4.7.1) is deemed unnecessary. Areas in high-use zones where trees are considered liable to storm breakage may be identified for closer attention following high winds. It is important that whatever zoning system is adopted it is applied consistently. While multiple zones may be adopted for certain sites, the more zones that are included then the greater the complexity of the tree risk management system.

[H2] 6.5 Inspecting and assessing trees for safety

Despite the fact that most trees present an extremely low safety risk, specific trees may present a high risk and a significant objective of tree survey and inspection is to discover those cases. Assessing trees for safety involves looking at trees and drawing conclusions as to whether they represent some form of danger to their surroundings. In modern arboriculture there are various approaches to inspection and assessment. There is no universally accepted prescription for meeting reasonable duty of care that covers all eventualities. Tree safety inspection and assessment procedures will vary according to the situation, site circumstances and local priorities. The importance placed on trees by owners and duty holders tends to influence the levels of investment in their inspection and management.

[H3] 6.5.1 Informal and formal procedures

Tree safety inspection and assessment operates at levels that can be broadly classed as informal or formal.

[H4] 6.5.1.1 Informal procedures
Informal procedures are a normal part of tree safety management, principally involving non-scheduled visual ('informal') observation of trees, typically made while undertaking other activities. Informal observation relies on common sense, for example incidentally noticing an obvious sign of a major defect likely to lead to structural failure, which could result in serious consequences. In the national context, as a frequent and commonplace activity without undue reliance on resources, informal observation makes an important contribution to tree safety. As such, it is an important aspect of reasonable and balanced risk management and may be considered integral to everyday risk control, including on sites where formal proactive procedures are also adopted.

Informal procedures are often undertaken by non-specialists such as the tree owner (duty holder) or members of staff who are responsible for managing or maintaining property. Non-specialists who undertake informal procedures generally will observe trees alongside their other daily tasks, looking

out for any obvious deterioration in tree health or condition that might indicate a noteworthy structural weakness or requirement for a more formal inspection. At sites where trees pose low levels of risk, informal procedures will often be sufficient.

Choosing to manage tree safety by informal observation is not a reason to do nothing. Reports of safety problems arising from informal observations need to be followed up; this may result in no further action being required, or could lead to a formal inspection and remedial measures. To ensure that informal observations are appropriately acted upon, it can be helpful for the duty holder to have in place a system for recording reported observations and reports of hazards.

[H4] 6.5.1.2 Formal procedures

Formal procedures are carried out at various levels of inspection (see 6.5.2 below) and are generally planned, specified and proactive. They are generally performed by someone with a sound working knowledge of trees. The context will determine the appropriate level of proficiency required. For example with regard to highway authority inspections, personnel should be trained in safety assessment of roadside trees (for further information see Resource page). Formal procedures generally start with a visual check which may, in some cases, lead on to further inspection and/or detailed investigations. In a formal procedure, the inspector visits the tree with the specific purpose of performing an assessment that is not incidental to other activities. The spectrum of formal inspections includes tree inventories, as well as health and decline and safety condition appraisals. Formal procedures may employ drive-by and walk-over methods or may involve detailed inspections including aerial, root and soil investigations and the use of specialist diagnostic tools – the type and extent of investigation being informed by initial observations and assessment of condition.

[H3] 6.5.2 Formal inspection and assessment methods

[H4] 6.5.2.1 Visual inspection and checks

Tree inspection is a generic term used in tree safety assessment. Inspections may vary in the time taken and detail required and this will be determined by a range of factors including levels of use and value of trees. Assessment types include walk-over and drive-by and may involve non-detailed cursory visual checks or closer, more detailed investigation.

Visual checking should be conducted by someone with enough experience to discover obvious defects and to make a reasonable judgement as to whether such defects pose a significant risk to people and property. If the visual check reveals no cause for concern, then no intervention is needed, and the next check is scheduled. If the check raises concerns and indicates that intervention is needed, the duty holder should take the appropriate action(s).

It is important to recognise that it should not always be necessary to view every part of every tree and that the level of detail at which the tree will be inspected is a judgement to be made by the inspector based on their confidence in their initial observations.

[H4] 6.5.2.2 Visual checks

Visual checks involve brief, cursory tree observations that take account of health and stability features and rapid changes in condition, noting variations from generally held acceptable norms. Uncertainty and deviation that give sufficient cause for concern will generally prompt closer or more expert inspection. As visual checks are typically brief in comparison with closer inspection, the number of trees covered will be far greater and, as such, visual checking is an important aspect of cost-effective safety management, particularly where populations of trees are involved.

A visual check requires first a general view of the tree and its surroundings, and this will inform the extent to which the tree is inspected. A population of trees of varying stages of maturity adjacent to a country road might first be inspected from the road, looking for features indicating hazards or ill health. Observation may lead to further inspection, taking a closer view and, in specific circumstances, identifying trees that might require 360 degrees inspection. Finding a feature of concern where there is a significant degree of uncertainty will likely lead to a more detailed inspection.

The HSE SIM suggests that the method of making checks in tree risk assessment contributes to reasonable tree safety management and that 'for trees in a frequently visited zone, a system for periodic, proactive checks is appropriate…[involving] a quick visual check for obvious signs that a tree is likely to be unstable and be carried out by a person with a working knowledge of trees and their defects, but who need not be an arboriculture specialist'.[6]

A 'quick visual check' is considered a reasonable starting point in tree safety assessment for duty holders. Although not necessarily undertaken by a tree expert, such a system needs to ensure that specialist advice is called upon when the results of checks raise concerns that are beyond the experience and understanding of those undertaking the checks.

Ground level visual checks provide a useful, cost-effective means of determining when an urgent response may be required when there are clear and present signs of instability. This is an important way of identifying the need for high priority remedial action or further detailed assessment. It is generally possible to identify the most serious tree problems from visual observations made at ground level.

[H4] 6.5.2.3 Walk-over assessment

Walk-over assessments primarily involve checking trees and are undertaken on foot (see also 6.4.7.1). It is an effective means of inspecting trees over a wide area (or along a considerable length of road) from accessible viewpoints to identify if there is a need for further investigation or safety management. The time devoted to each tree, when undertaking checks, is brief, taking minutes (or even seconds) rather than hours. The procedure, based on visual tree assessment, involves viewing a tree in the context of its overall condition and its setting. The initial check may identify issues calling for a closer visual check of the base, trunk, and crown. This may involve tapping and probing tree features that can be reached from ground level. A judgement has to be made as to the likely importance of additional information that might be gained. If we consider the resources involved in inspecting trees for reasonable safety, whether one is dealing with tens, or tens of thousands of trees, will give a perspective on the nature of the judgements involved and will influence what constitutes a reasonable cost-effective strategy.

[H4] 6.5.2.4 Drive-by assessment

Drive-by assessment is commonly referred to as 'drive-bys'. These are carried out from a slow-moving vehicle to check trees alongside roads. They are often undertaken by highway inspectors competent in observing trees, and can help to identify individual, or groups of, trees which require more detailed inspection and can be supplemented by walk-over assessment. Others involved in drive-bys might include owners, tree specialists and land workers familiar with the site. Drive-bys may be undertaken reactively such as after storms or form part of planned proactive inspection procedures. In many circumstances, particularly in rural areas, drive-bys are the principal method of undertaking high volume, large-population roadside tree-risk assessment due to capacity and cost-benefits involved. Alongside walk-overs, drive-bys generally form part of a reasonable strategy to manage roadside tree risks. They are widely used in assessing conditions such as roadside ash dieback through observing and recording crown symptoms. Where there is no roadside footway, drive-bys are the main initial method of assessment for a great many highway trees.

The drive-by inspection method involves a driver accompanied by an observer who checks trees within falling distance of the highway for defects or other features that are likely to present an obvious danger and that may prompt further investigation or require direct intervention. Drive-bys can help to determine where walk-over assessments are necessary. One of the disadvantages of drive-bys is that only defects visible from the vehicle can be noted, and serious defects which cannot be seen may be missed. Exclusive reliance on drive-by inspections along busy routes and in urban areas is unlikely to be a sufficient strategy.

[H4] 6.5.2.5 Detailed inspection

Detailed inspections usually arise from concerns raised by informal observations or formal checks or inspections and typically initially entail a close visual tree assessment by a competent specialist at ground level. A detailed inspection usually starts by focusing on the exterior of the tree for any signs which might indicate serious ill health and/or likelihood of serious structural condition. In special cases, detailed inspection may involve inspecting soil and root condition, aerial inspections of the upper trunk and crown or other procedures to evaluate the nature of suspected decay and defects, and may also require the use of specialist diagnostic tools. Despite the fact that most trees present an extremely low safety risk, specific trees may present a high risk and a significant objective of tree inspection is to discover those cases. Fortunately, in the great majority of instances, a reliable management decision can be made from a simple visual check. Detailed inspections are time-consuming and relatively expensive, and it is rare that they are warranted for all trees in a given area, unless specific concerns have been highlighted, as to do so would normally be unreasonable and disproportionate to the benefit gained in risk reduction. In general, they are reserved for individual trees of concern, including high-value trees with special heritage, amenity or habitat qualities that provoke high safety concern in well-used zones.

Where the duty holder or other non-specialist carrying out a tree inspection identifies a specific concern with a tree or groups of trees, a more detailed inspection may be required by a competent tree specialist. Depending on the context and circumstances, the duty holder will make judgements on the risks posed, the work required to manage those risks, and, when deciding on management, will take into account the importance placed on the tree/s. The detailed inspection is a more highly specialised assessment than the tree check, and will clarify what intervention (if any) is recommended. It should be noted that some types of work could involve making changes to a tree's environment rather than to the tree itself. Duty holders will need to consider this advice in order to

make judgements about priorities and manage the tree-related risks as low as reasonably practicable.

[H4] 6.5.2.6 Tree inventory recording

Tree inventories involve systematic tree inspection and recording details of selected individual trees, without necessarily focusing on tree safety issues. Inventories of tree populations are compiled for different objectives, such as risk management, health condition, tree benefit assessments, tree population studies and asset management. When conducted for safety reasons, they provide a basis for scheduling and prioritising remedial work, including details of inspections, and also for monitoring condition and management history. While initially relatively expensive per tree, tree inventory systems are auditable and can be cost-effective over time. Many tree populations are recorded on bespoke databases using handheld devices with global positioning systems (GPSs) for recording and mapping all trees and/or groups of trees within the falling distance of roads and other frequently used public areas. Nowadays most local authorities and corporate landowners use tree inventories in support of broad tree policies and strategic tree management. Computerised tree inventories may be adopted as a standard method, not only for tree risk assessment and management, but also for calculating and modelling the ecosystem service benefits which trees provide. Tree inventories can also provide a full history in the event of insurance claims and may be used to inform a response to Freedom of Information requests

[H4] 6.5.2.7 Negative recording

Negative recording (also sometimes referred to as 'negative reporting') describes the inspection procedure for recording only those trees with hazards identified to be of safety concern, typically following walk-over and drive-by assessments. When considering tree safety, keeping records of every individual tree inspected within a tree population is seldom necessary and is generally not reasonably practicable, being disproportionate in terms of effort compared with the reduction in risks this would provide. Negative recording procedure involves looking at the trees at an appropriate level of detail (given their size, general condition and location). If there are trees that have potential to present significantly elevated risks, a closer look is taken. Details of these trees at this stage would be recorded including inspection dates, name of inspector and the identity of those sections of the tree population under assessment, together with recommendations and priorities for remedial work, and those trees that warrant further investigation.

[H3] 6.5.3 Who can carry out tree safety assessments?

Those who carry out tree risk assessments need to be mindful of their limitations when considering foreseeability, how this is relevant to management decisions, the timing of future inspections and contractual arrangements.

[H4] 6.5.3.1 Who can carry out informal procedures

Informal procedures may be carried out by people who are sufficiently familiar with the trees in their locality to notice changes in their condition and those with a working knowledge of trees and their defects[6]. In both cases the informal observer should be capable of making common-sense

judgements about the trees and their condition. Typically, this need not be a tree specialist, but may be an individual closely associated with a property, such as the landowner, gardener, another employee or agent who understands the way the property is used (e.g. areas most and least frequented). Members of the public can also make an important contribution to informal observations. In the rare circumstance where a tree is found with obvious defects, e.g. extensive basal decay or showing signs of uprooting, and is in a well-frequented area, this should be reported and acted upon, if necessary by engaging a tree specialist.

[H4] 6.5.3.2 Who can carry out formal procedures

Formal checks and inspections require general tree knowledge and an ability to recognise normal and abnormal appearance and growth for the species and locality, although specific qualifications are not necessarily required. Those carrying out checks and inspections should be able to assess approximate tree height and falling distance from the tree to the area of use and know when a detailed inspection is required. They must also be able to recognise visible signs of serious ill health and significant structural problems, such as substantial fractured branches or a rocking root plate which, were it to cause tree failure, could result in serious harm. Detailed inspections are formal procedures that involve investigations by an appropriate, competent expert with relevant experience. Specialists involved in conducting detailed tree investigations should be able to demonstrate a reasonable basis for categorising risks according to priority and also identify cost-effective ways of managing tree-related risks. The level of proficiency required will be determined by the circumstances of the trees, their number, age, size and condition, the site and levels of use.

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Competence and training:

Those commissioning formal procedures should satisfy themselves as to the suitability of the inspector's competence and experience and the adequacy of their insurance. Examples of competence levels are given in the scenarios (section 7) with respect to different types of land holding and circumstance. Training courses, available for non-specialists and specialists, that are endorsed by arboricultural and forestry professional bodies, have been designed to develop competence in identifying tree-related risks and understanding the basis for managing these risks in a reasonably practicable way. Courses also include comprehensive tree inspection guidance for tree specialists. Professional bodies providing accreditation schemes for professional arboricultural advice and training information are listed in the 'Contacts and sources of information' section.
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[H2] 6.6 Tree risk assessment

[H3] 6.6.1 Risk acceptability, prioritising treatment and inspection frequency

When inspecting trees for public safety, the inspection primarily looks for external features indicating mechanical (structural) defects that pose a reasonably foreseeable and significant risk to the public,

particularly concentrating on those risks that are considered imminent. Tree safety inspection will not normally identify tree risks that fall outside these categories.

[H4] 6.6.1.1 The framework for assessing categories of tree risk

Individual trees may pose an unacceptable level of risk and the purpose of the common-sense approach is to discover those trees and manage them in a reasonable and cost-effective way. In order for 'reasonably foreseeable' to be meaningful there needs to be a timescale, albeit one that may be imprecise, where the level of obvious danger is not imminent. The greater the imminence of obvious danger, the greater the confidence we may have in determining the level of priority for management. Tree size, condition and location (zoning) inform the risk assessment process, and how we make decisions on reasonable foreseeability, which in turn help determine future reinspection intervals.

[H4] 6.6.1.2 Imminent risk to public safety

An imminent risk of serious harm is one of such immediacy and likely consequence that urgent action is required. Such unacceptable tree risks are rare and, while remediation will require immediate and sometimes costly action, they are not normally managed according to cost–benefit criteria. In most cases, unacceptable risks are likely to be of such imminence that they are clearly observable in the course of informal observation or formal inspection. Imminent risks posed by trees may be so obvious that they can be readily identified by non-specialists and specialists alike (see Competence and training above). Tree risks that must be dealt with immediately will generally involve felling, branch removal or site management. For example, where a large tree with a lifting root plate or actively separating heavy branch is found within falling distance of a busy road, this may involve stopping or diverting traffic and carrying out remedial work as soon as is safe and practical.

[H4] 6.6.1.3 Non-imminent risk posed by trees

Risk of non-imminent, serious harm can normally be managed by means of a planned response, taking into account the nature and level of public use and the level of risk. The level of imminence and severity of risk of harm will determine the priority and character of remedial treatment required to manage the risk and may involve direct intervention or further competent assessment.

[H4] 6.6.1.4 Risks not requiring a response in the near future

Where trees are identified as posing an acceptable level of risk of harm, there is no specific requirement for additional safety management. Existing informal observation and/or formal inspection procedures should be sufficient, subject to periodic review.

[H4] 6.6.1.5 Special trees

Informal and formal procedures may identify trees posing a risk of serious harm. Special trees that owners want to retain for heritage, habitat or visual amenity (such as those that are ancient or veteran), but which may present a material risk, will likely require specialist detailed inspection and management to avoid loss of the material benefits they provide.

[H4] 6.6.1.6 Frequency of assessment

Informal observations of trees contribute to public safety and therefore are important for deciding when action is needed or when more formal assessment is appropriate. In areas of very low occupancy or where there is no surrounding high-value property, formal assessment is unlikely to be required, circumstances that from time to time may need to be reviewed. Informal observation is not normally specifically scheduled.

With regard to formal inspection, guidance relating to assessment frequency varies greatly. There are no uniformly accepted frequency intervals that are considered appropriate to all situations. The decision on the level of frequency will be based on the judgement of the tree owner, agent or adviser, taking into account the site circumstances and good practice. This will include considering zoning based on frequency of public access and tree condition to inform the level of risk and management priorities. Examples of scenarios (section 7) are provided to assist with making such decisions with different types of land holding and circumstance.

When circumstances change dramatically around a tree, such as when new public areas, paths, roads or housing are installed near trees, the impact on zoning needs to be assessed. Hazardous defects generally take many years to develop, but in exceptional circumstances the structural condition of a tree may weaken abnormally for example, following a storm or when accelerated due to disease or root damage. Different tree species deteriorate at different rates and vary in their propensity to break and shed branches. The frequency of, and the intervals between, inspections should be reviewed according to site circumstances taking changes into account, for instance when the levels of surrounding public use increase or decrease. Extreme weather events, although their severity and timing are not normally foreseeable, may become more frequent in the UK with climate change. Depending on the severity of the event, it may be prudent to prioritise post-event rapid checks and to monitor trees in high occupancy zones. The specific circumstances will dictate the need and type of post-event inspection, for example conducting drive-bys or walk-overs in pre-determined areas such as alongside busy roads and railways, and where large trees are close to children's play areas, seeking out those that pose an unacceptable risk.

[H4] 6.6.1.7 Seasonal timing of checks
There are no specific rules about the best time of year to check trees. For deciduous trees, after autumn leaf fall the lack of foliage within the crown sometimes makes it easier to observe structural defects. On the other hand, checking trees when they are in full leaf has the advantage of more easily seeing and assessing foliar condition and crown health. Crown foliar decline can be temporary or may indicate more serious ill health and/or deteriorating root condition. Each time of year has advantages and disadvantages. Those assessing trees need to take into account the influence of the seasons on the visibility of tree features, symptoms of health and decline and indicators of structural condition.

[H2] 6.7 Practical management

[H3] 6.7.1 Decisions for owners and duty holders

Owners and duty holders are usually familiar with their properties, and their local knowledge means that they are typically best placed to assess the levels of occupancy at various locations, which will in turn determine if a visit to check trees is necessary. There is no need to engage a tree advisor to do this when this relates to the use of the land and not to any technical tree matters. In urban forest

management, where large populations of people enjoy close proximity to trees, and where risks need to be identified and managed, sensible pruning and crown management and, in some cases, felling, will normally resolve risk control issues. In general, duty holders who employ their own specialist advisors, such as local authorities who employ tree officers, and landowners (or tree officers) who may commission advice from a tree specialist, should consider that advice but they are not obliged to act upon it. Duty holders' decisions on how to respond to advice will be informed by matters such as their management priorities, attitude to risk, the resources available and the importance of the trees. Options may include pruning, whole or part tree removal or conservation measures. The input of the tree advisor normally ceases with the delivery of their advice; how that advice is acted upon resides with the duty holder. For information on how to choose professional advisors and tree work contractors, please see 'Contacts and sources of useful information' <mark>(page XX).</mark>

[H3] 6.7.2 Reducing risk of damage to trees by managing access

On larger sites with public access, management options are guided by general policy or overall aims appropriate to the site circumstances. These options are frequently defined in a documented strategy. In general, choosing which risk control measures to use while conserving a tree involves assessing the costs and benefits. In some instances, options to reduce risks from trees may include tree works, while in other cases remediation without incurring significant costs from tree management may include controlling site access and/or use within the falling distance of trees, as practiced in managed parks, parklands and arboreta.

For sites where special events such as festivals or funfairs greatly increase the number of people within the falling distance of trees, an additional check of the trees should be conducted prior to the event to identify obvious defects or safety concerns which might warrant closer inspection of particular trees and any necessary intervention.

Restricting access may be a prudent risk control option, one which not only potentially reduces risk but is also of benefit to the tree. Reducing footfall and vehicles not only contributes to risk control but also reduces detrimental soil compaction. This is particularly important in wet conditions. Although the effects of root damage can be slow to develop, they increase the risk of tree decline and of structural failure in the long term. The duty holder will need to be aware of this when considering risk control measures.

The ways to reduce risks by site management for special sites, trees and events include deterring access through:

- Signage and information to communicate to visitors which areas they are allowed in and which they are not.
- Fencing or bunting to encourage people not to access areas that are not for visitor access.
- Deterring vehicle access and parking beneath trees
- Locating facilities such as play equipment, seats, picnic tables, barbecues, information boards, commemorative plaques, hides, fishing platforms, horse jumps and feeding centres where you want people to be.
- Rerouting paths and tracks
- Placing assembly points beyond the falling range of trees

- Redesigning mown paths in areas of long grass to influence behaviour to reduce occupancy

    Planting brambles and thorny shrubs
    Leaving grass unmown beneath the tree
    Temporary exclusion (e.g. in adverse weather conditions)

- Installing temporary fencing or permanent exclusion at certain sites (to manage the target area from the risk of falling limbs while also reducing adverse effects of trampling and compaction)

[H3] 6.7.3 Managing trees for habitat and amenity value

When trees with high value present significantly elevated risks and all the available options for managing the area within the falling distance of the tree have been exhausted, or where public exclusion from the area is neither desirable nor practical, then remedial tree work may be necessary. If a tree has obvious habitat or amenity value, consideration should be given to undertaking the minimum work necessary to control significant risks. Management options to optimise habitat and amenity value should take into account the opinions of local stakeholders. Where biodiversity and habitat have a high value, a range of treatment options may be appropriate to optimise habitat retention in balance with adequate safety. With high-value trees, felling will be a last resort after taking into consideration all other options. Even when felling is specified, it may be possible to remove or truncate a tree's crown and retain the upright, dead or heavily reduced stem for habitat value. Felled trees and trunks may also be left on the ground to provide important deadwood habitat. In some instances, one option might be to reduce the risks from structural failure through veteranisation methods, combining a reduction in weight while promoting and accelerating deadwood habitat.[84] Such management will benefit from the specialist knowledge and expertise of practitioners experienced in this field (see Contacts and useful sources of information).

[H3] 6.7.4 Reducing risks by providing information and interpretation

Providing information to the public can also play an important part in managing risks. Explanation and interpretation of the risks and chosen management options are also helpful in increasing public understanding of the issues. This can include the use of information board signs and notices at points of entry, in car parks and within the site. Social media can play a useful role in public information, including advising when sites are restricted or closed in severe weather.

[H3] 6.7.5 Record-keeping

While individual trees commonly shed branches and even uproot, accidents resulting in personal injury are rare. It is not a legal requirement to keep written records of tree risk management, but maintaining an audit trail can greatly assist in demonstrating responsible management. Records, including maps, provide the basis for safety management reviews and monitoring helps to ensure that arrangements are being implemented and, in the event of an accident, these can contribute to establishing proof of reasonable tree management[6]. It is not necessary to record every tree inspected or every tree on the site; however, records of trees presenting a serious risk and requiring treatment are useful, as are details of the remedial work which took place. When inspections are carried out, records can demonstrate that the landowner or manager has met a key component of their duty of care. Digitised databases are useful for storing details of inspections and work, defects and photographs across a full range of tree stocks. In the event of an incident, documents and other

records such as photographs may provide supporting evidence that reasonable care has been taken.[85]

[H3] 6.7.6 Insurance

Even if all the advice and guidance provided in this document were followed, a residual risk from trees would still remain. Storms and other unpredictable events can result in tree failures leading to harm. Insurance may provide for such eventualities. Landowners are advised to have insurance sufficient for their circumstances and to ensure that anyone who advises them, or carries out work on trees, is also reasonably insured.

# [H1]SECTION 7 – HOW THIS GUIDANCE CAN BE APPLIED

This section outlines a decision-making framework for those responsible for trees in the form of two flowcharts with explanatory notes, supported by nine scenarios indicating how tree safety can be managed in a reasonable and proportionate way. Figures 7.1 and 7.2 should be read in conjunction with the principles of balancing benefit and risk (see section 1, Figure 1.2).

[H2] 7.1 DECISION-MAKING FOR DUTY HOLDERS WITHOUT HSWA RESPONSIBILITIES (e.g. homeowner/occupier)

[H3] 7.1.1 Duty under civil law

Homeowners with responsibility for trees have a duty under the civil law, Occupiers Liability Acts (OLAs) and under the law of negligence, to take reasonable care to avoid causing a reasonably foreseeable risk of harm (see section 5). Figure 7.1 outlines a decision-making framework for managing tree risk. In practical terms, the homeowner needs to check for obvious structural defects in trees that could cause harm were they to fail (see section 6). If confident in their ability to identify obvious defects, the homeowner/occupier may carry out the checks. If unsure and concerned, advice from a competent tree specialist should be sought. Based on the outcome of the tree assessment, the homeowner will need to make a reasonable and prudent judgement on how best to manage the trees, taking into consideration the level of their knowledge, the assessed risk and the value placed on the tree along with other constraints (see also Figure 1.2).

Figure 7.1: Homeowner/occupier framework for tree risk assessment and management
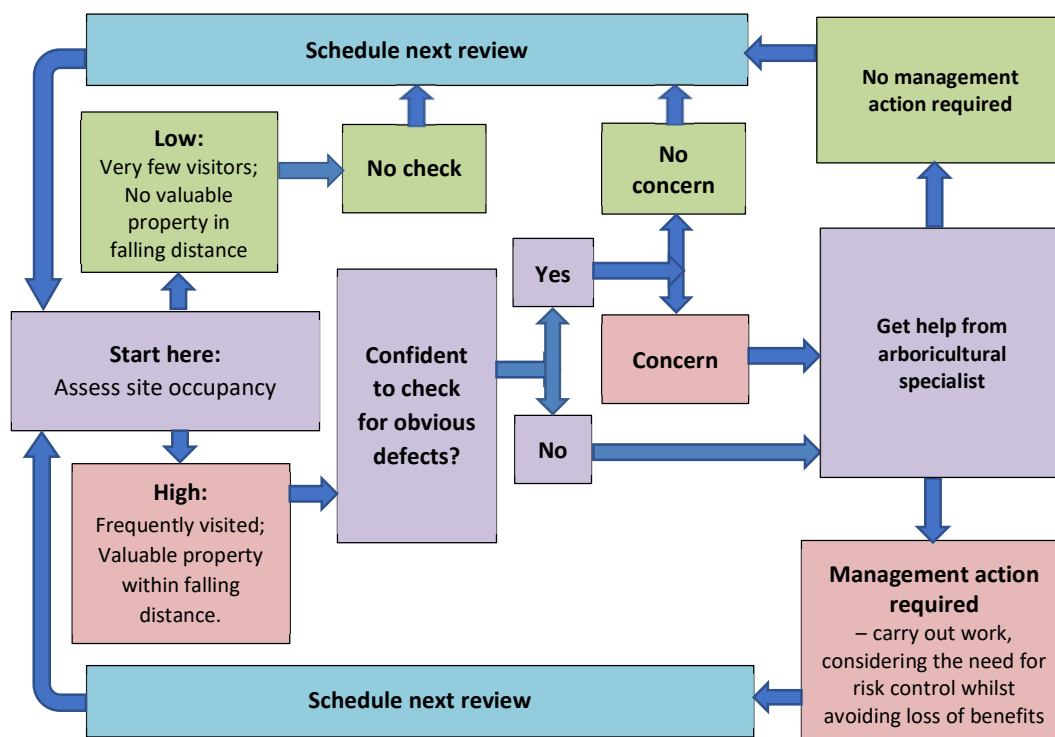
3] 7.1.2 Duty under HSWA

If you are a duty holder with obligations under HSWA (either as an employer or a self-employed person), you have a responsibility to take reasonable care to avoid acts or omissions that cause a reasonably foreseeable risk of harm and to manage risks as low as reasonably practicable (sections 4 and 5). The duty holder is likely to have knowledge of the level of occupancy of the land. There is no automatic requirement for a tree expert to assess whether it is necessary to check the trees. If the occupancy is so low (section 6, Zonation) that it is deemed unnecessary to assess the trees then all that is needed is that a future review be scheduled. Where there is a higher level of occupancy within the falling distance of trees, then a formal process for checking should be in place. In practical terms, the process of assessing the risk and reacting to the findings can be shared between the duty holder and the person delegated to inspect trees (Figure 7.2). However, it is necessary for the duty holder to ensure that the instructions given to the inspector are clear and sufficient to satisfy the duty holder's responsibility under the HSWA, and to take reasonable steps to check that such instructions are carried out.

Figure 7.2: Duty holder decision-making framework under HSWA
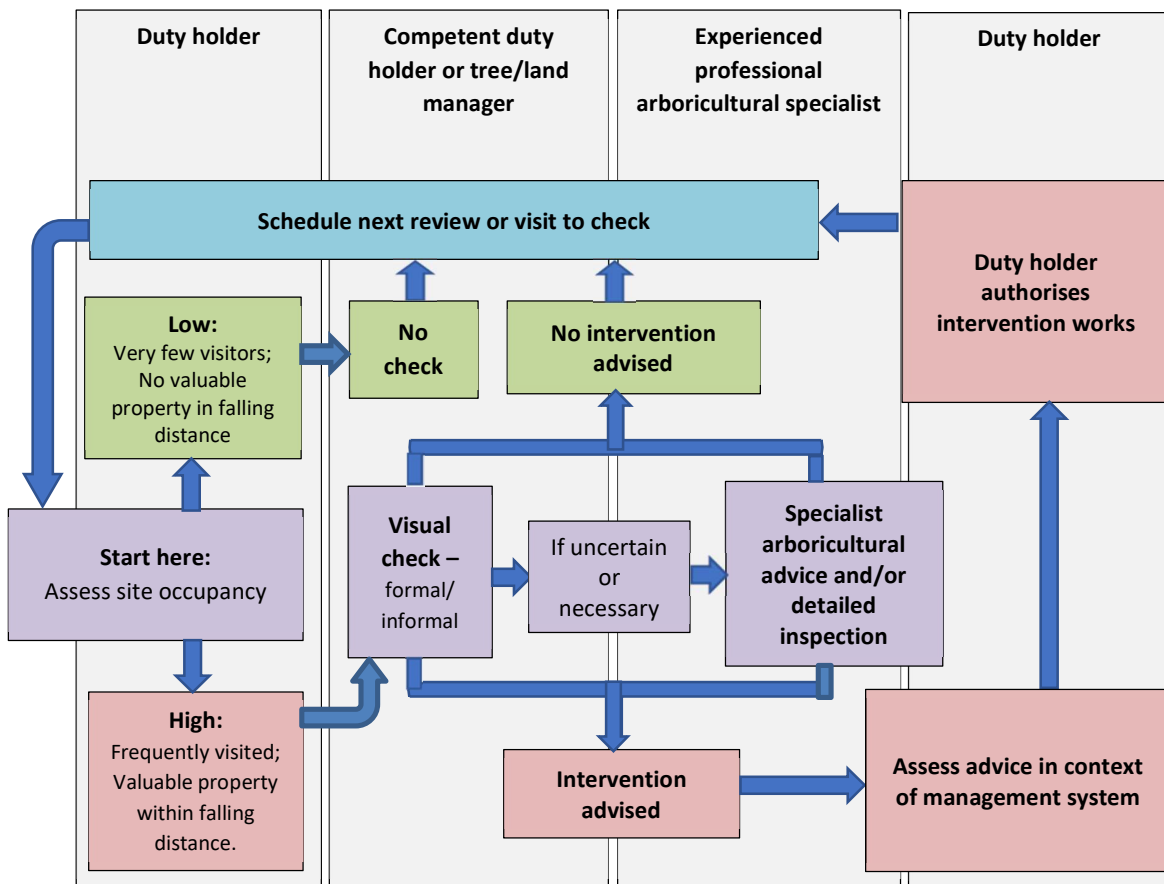
[H2] 7.2 Common scenarios

The following nine scenarios are indicative examples to assist duty holders, who should look for the closest scenario to their circumstances:

1. Householder

2. Business – restricted or limited public access

3. Business – open to the public

4. Local authority – district or borough council

5. Local authority – county council

6. Local authority – city council

7. Large private estate with public access

8. Large open space open to the general public

9. Small site with mature trees growing next to the railway

< OPEN BOX>

These scenarios are not intended as recommendations but to provide examples of reasonable, balanced tree risk management strategies based on balancing the benefits and the risks when making decisions. The strategies are considered to be reasonable in the particular circumstances described. However, each situation will be unique and the examples of reasonable decisions illustrated in these scenarios, such as management structures, personnel and frequency of inspections are not intended to be prescriptive for a particular type of duty holder. All those responsible for trees must assess their own situation.

<CLOSE BOX>

[H2] 7.3 Scenario 1: Householder

General description	
Scenario 1 is a detached home and garden, which has several trees and shrubs, some are on the boundary. Two trees in the front garden overhang the council-owned pavement and a quiet, residential road.	
Ownership/control of management	
Responsibility	As the owner of the land, the owners have responsibility and a duty of care.
Arboricultural competence	The owners are keen gardeners and although they have no specific tree knowledge, they have some experience, having looked at, thought about and cared for trees over a number of years.
Holding	
Land area	0.2 ha
Number of trees	Seven, including one mature walnut and two large apple trees.
Access	
Private access: there is no public right of way over the land. Two trees overhang the public road.	

The benefits of trees	
The owners enjoy their garden and the trees in it. As well as providing colour, shade and ornamental interest, the trees provide some privacy from the road and neighbouring properties. The owners take pleasure in harvesting the fruit and nuts and also appreciate the wildlife they attract. They understand the contribution that their trees make to the wider environment, in terms of the 'pleasant leafy neighbourhood' and how this increases the value of their home.	
Natural living organisms	
The owners know that if the two trees overhanging the road were to fall or lose a limb, passers-by and road users could be affected. The road is regularly used by local, residential traffic; occasionally people walk by on the pavement throughout the day. As far as safety is concerned, they classify these two trees as the most important in the garden and, although they do not consider these trees to be of concern, they recognise that they have an obligation to prevent them from impeding access along the footpath and road. The remaining trees are considered to be of low importance.	

strategy	
Management	The owners check their trees as part of their general care for the house and garden, paying particular attention to the trees on the boundary that could impact the road if they fail. They recognise that the benefits the trees provide to them and the wider community have to be balanced against any disbenefit or risk. If they detect anything unusual about them, such as an obvious defect that causes safety concern, they call a local tree surgeon, who can tell if any remedial work needs to be done. There is no regular frequency to this process.

Competence	As reasonable and prudent landowners responsible for trees, they are able to recognise and understand the significance of obvious visual defects and are able to carry out their own inspection that may result in needing to obtain further advice. They use a recommended tree surgeon they believe is capable of providing such advice and undertaking any work required.
Records	They do not keep any formal record of their *ad hoc* observations, but they do keep records of correspondence and invoices for any advice or work carried out.
evaluation	They do not normally worry about their trees but are occasionally concerned that in strong winds parts of a tree could fall. Within the range of costs they have for their property as a whole they consider their expenditure on the trees to strike a reasonable balance, maintaining them in good condition while meeting their duty of care to others. They believe that they have an informal but effective plan for the care of their trees that is affordable.

[H2] 7.4 Scenario 2: Business – restricted or limited public access

General description	
Scenario 2 relates to a mixed arable and livestock farm, with farmhouse and farm buildings, barns and yards. The land is made up of pasture and arable fields, some steep wooded ground, two small areas of managed woodland shelterbelts, plus many individual hedgerow trees, some of which are next to public paths and highways. The farm owner employs a farm manager and another permanent worker on the land, and subcontractors work at busy times.	
Ownership/control of management	
Responsibility	The owner of the farm has overall responsibility for managing its affairs. His farm manager reports to him and has day-to-day responsibility for organising the activities of staff and subcontractors. Part of the manager's job description is to care for the health and safety of employees and visitors but the owner recognises his ultimate responsibility.
Arboricultural competence	The farm owner and manager are experienced in a wide range of agricultural activities, with the manager holding a certificate of competence to use a chainsaw. Both he and the owner have a basic understanding of tree identification and can recognise most obvious defects and symptoms of tree features that might indicate structural weakness.
Holding	
Land area	90 ha
Number of trees	Approximately 7000
Access	
A minor B road runs across the land, which is also bordered for half a mile by a busy A road. The tree-lined access driveway from the main public road to the farm buildings is frequently used by the owner, his family and friends, the farm's employees and regular business visitors.	

Benefits of trees	
The owner takes his responsibility as a guardian of the countryside seriously. He recognises the many benefits of having trees on his land, including the sustainable supply of firewood for his household, *ad hoc* supply of timber for fencing and other minor construction works, as well as shelter for livestock and reduction of wind and water erosion. The trees along the busy main road reduce the amount of noise from traffic, and those along the driveway provide an attractive, shaded approach to his home. He is also aware that the trees enhance the capital value of his farm.	
Natural living organisms	
The owner has lived on the farm all his life and has witnessed the growth and decay of trees here and elsewhere. One of the veteran oaks in the pasture is completely hollow. He has seen mature trees suffering storm-damaged, broken branches and has observed the subsequent regrowth without the need for any public intervention. He has also managed the situation after one of the avenue trees had fallen across the drive during a stormy night.	
strategy	

Management	All farm staff are instructed to look out for any signs of tree problems anywhere on the farm, and report to the manager. He has made it clear he wants to know immediately of any serious, obvious problems such as a tree that appears unstable. In the past this has highlighted a tree with its root plate lifting and another near the road with a large branch that was badly split. The manager arranged for the first to be felled and the second to have the branch cut back. The manager undertakes the first formal inspection of the trees alongside the two roads. He finds three trees that he has serious concerns about but which he would like to keep, as they are large mature trees that provide a visual screening and reduce noise and pollution to the farmhouse. He arranges for a qualified arboriculturist to have a look at them to advise as to what, if any, work is required to manage the risk of failure. Having completed this initial inspection and arranged for the required remedial work to be carried out, unless there is a change in circumstances, the farm manager has arranged that the trees in these areas will be subject to the same informal inspection regime as the other trees on the farm, and has planned further formal inspection of the roadside trees for three years' time.
Competence	The farm staff's general working knowledge is considered adequate for identifying any areas of significant concern. However, if the manager is uncertain about how best to deal with any of the trees on the property, he calls in a local tree specialist.
Records	The results of the manager's formal inspection of the roadside areas are kept in a file in the farm office along with the results of the arboriculturist's survey and a note of the remedial work carried out. As part of the informal survey regime, the manager keeps a note of any trees reported to him by the public or other farm staff and records his response to those reports in the file in the farm office.
evaluation	These records are considered important in that, in the unusual circumstance where he might have to show a reasonable system exists, he can demonstrate 'the conduct to be expected from a reasonable and prudent landowner'.

[H2] 7.5 Scenario 3: Business – open to the public

<table>
<tr><td colspan="2">**General description**</td></tr>
<tr><td colspan="2">Scenario 3 relates to the Grange Hotel, a large Georgian building set back from a busy main road in well-manicured grounds with many mature and specimen trees. The hotel has 30 bedrooms and two function rooms, plus a popular restaurant and bar. Residents and other visitors are encouraged to enjoy the walkways and lawns in the gardens. The driveway from the road leads past the hotel main entrance to a large, tree-lined car park at the rear.

Similar considerations could apply to a wide range of situations where the visiting public make up the core element of the business. This could include holiday camps, sports and leisure complexes or shopping centres, and places of worship.</td></tr>
<tr><td colspan="2">**Ownership/control of management**</td></tr>
<tr><td>Responsibility</td><td>The hotel owner, a businesswoman, has overall responsibility for managing the hotel's affairs. The business employs five full-time hotel staff, including a deputy manager, two duty managers and chef plus additional part-time kitchen, waitress and service staff. There is also a full-time head gardener and his part-time assistant. The owner relies on the head gardener's advice in respect of any work needed to the trees but recognises that she carries ultimate legal responsibility. Due to the nature of the business, the emphasis on this duty of care is appreciated and actively discharged by the owner towards her employees, guests and the general public.</td></tr>
<tr><td>Arboricultural competence</td><td>The owner is not knowledgeable in arboricultural matters. She would be regarded as a lay person. However, as a reasonable and prudent landowner responsible for trees, the owner employs staff able to recognise and understand the significance of obvious defects in trees and be able to carry out a visual check that may result in obtaining further advice. The head gardener cares very much about the trees and all the horticultural works for which he has responsibility. Although he has no formal arboricultural qualifications, he has considerable experience of trees and their problems.</td></tr>
<tr><td colspan="2">**Holding**</td></tr>
<tr><td>Land area</td><td>5 ha</td></tr>
<tr><td>Number of trees</td><td>Approximately 700</td></tr>
<tr><td colspan="2">**Access**</td></tr>
<tr><td colspan="2">The public has full access to all the grounds. At the front of the hotel, there are about 30 mature trees alongside the main road, a busy thoroughfare with both vehicular and pedestrian traffic. There is regular traffic on the driveway and in the car park.</td></tr>
<tr><td colspan="2">**Benefits of trees**</td></tr>
<tr><td colspan="2">The hotel owner is an astute businesswoman and is well aware that fine trees and well-kept gardens add considerably to the enjoyment of visitors and the appeal of the establishment and therefore the success of her business. Customers frequently make compliments about the fine and in some cases rare, tree species, highlighted by the immaculately tended lawns and flower beds. She understands that these</td></tr>
</table>

benefits and value are balanced against the risk-reduction costs associated with maintaining the trees in good condition.

Natural living organisms	
	The head gardener spends a considerable amount of time in the garden, so he soon notices if a tree has changed in appearance or has some other problem that might suggest that it could be unsafe. He also observes them through the seasons in different stages of growth and dormancy.
strategy	
Management	The owner and head gardener have agreed that a formal, five-yearly inspection regime should cover all the trees on the property, with a three-yearly inspection of trees alongside the road. In the course of his other duties, the head gardener keeps a general eye on the trees and notices any significant change to their condition. The owner is satisfied that the head gardener is sufficiently knowledgeable about the grounds, their use and the trees to identify obviously hazardous changes in trees, such as broken, hanging branches or partially uprooted trees following a storm. The head gardener's initial check of all of the trees revealed six that caused him some concern and one in particular that he identified as potentially dangerous. He discusses these trees with the hotel owner and she engages an arboricultural contractor to inspect any trees that the head gardener is concerned about. The contractor provides a written report on these trees, detailing any remedial work required, prioritised according to his view of the level of concern for public safety. Between them, the hotel owner and the head gardener decide to undertake the recommended work using a professionally accredited contractor. This report and invoices for the work are filed in the head gardener's office.
Competence	The head gardener has no formal qualifications but his experience and regular presence on site mean he is more than capable of identifying immediate hazards. Employing a fully competent contractor (see Contacts and useful sources of information) for those trees where the head gardener is not sure of his diagnosis, gives the hotel owner confidence that a reasonable maintenance system is in place from the perspectives of both tree health and public safety.
Records	The written survey is updated as necessary and kept on record along with invoices and correspondence records of any work carried out. The head gardener also keeps a note of his observations and comments in a diary as and when they arise as part of his normal record-keeping in relation to the care of the gardens.
Evaluation	While recommended works should be carried out within a specified timescale, sometimes for economic and other practical reasons all work may not be completed exactly when scheduled. Trees with higher priority recommended works take precedence over trees with lower priority recommended works. The hotel owner considers her management strategy and practice to provide a reasonable balance between the costs of risk control and benefits gained from risk reduction. This management strategy also maintains large trees with other values and benefits, despite some being old with holes in branches and hollow trunks, features which she understands are important for wildlife.

[H2] 7.6 Scenario 4: Local authority – district or borough council

General description	
Scenario 4 relates to a borough authority that is a mixture of urban and rural areas. The council serves 148,000 people who are mainly concentrated in one large town at the centre of the borough. However, more than 60% of its land area is rural, divided among 23 parish councils containing numerous villages. The borough council employs two tree officers responsible for the sustainable and safe management of its trees, including management of oak processionary moth (OPM) in partnership with the Forestry Commission; different approaches to OPM management are being trialled to balance the public health risk, biodiversity impacts and finite budgets. A third tree officer is employed by Planning Services solely for dealing with tree-related planning matters.	
Ownership/control of management	
Responsibility	The borough council has direct responsibility for trees on all council-owned land, unless leased out to third parties on fully repairing and insuring leases. The council is responsible for:
	• 53 countryside sites, many of which are traversed by or adjacent to busy roads
	• 67 parks and other publicly accessible sites
	• 6000 trees on council housing land, including within the curtilages of individual council-owned properties
	• 11 closed churchyards
	• 13 allotment sites
	• Two large cemeteries
	• A large crematorium site with mature landscaping and hundreds of trees of remembrance
	• Multiple plots licensed to third parties as garden or grazing land
	• Numerous other small council owned parcels of land with trees on
	The tree team provides a surveying, advisory, conservation management and contract management service, working in partnership with seven local arboricultural contractors.
Arboricultural competence	Both tree officers responsible for tree risk management hold arboricultural qualifications to a minimum of Regulated Qualifications Framework (RVQ) Level 4, with one holding both Level 5 and Level 7 qualifications and veteran tree management qualifications. They occasionally seek additional expertise and capacity from other independent arboricultural, ecological and soil management consultants.
Holding	
Land area	1514 ha
Number of trees	Approximately 137,000

Access

The vast majority of the borough council's land is accessible, with much designated as public open space. Countryside sites total 800 ha, including 283 ha of registered common land and 380 ha of accessible woodland. The land is traversed by a busy local road network, and by a network of approximately 35 km of footpaths, bridleways and byways and by a river navigation. Much of the estate is in frequent use by the public.

Benefits of trees

The borough council practices a tree-management regime according to its limited resources while recognising the wide and many benefits that trees provide. The council seeks to manage its diverse tree stock in a sustainable and safe manner, investing in tree risk management, but also in planting and establishment and promoting long-term tree health and longevity. This is something many residents notice and appreciate. The council has a tree strategy and a tree risk management policy in place and sets out its general approach to the management of its trees on the council's website.

Natural living organisms

The tree stock varies considerably in age and species, from newly planted and self-sown saplings to significant populations of ancient and veteran trees, some of which are older than 1500 years. The council appreciates the importance of a wide age profile among its trees. It recognises that weather, development, construction, pollution and other factors subject trees to stresses and strains, physical and physiological damage, both above- and below-ground. The authority understands that despite these rigours, most trees respond, adapt and survive, by reactive growth and retrenchment, layering and natural regeneration. Many ash trees in high occupancy areas are increasingly showing symptoms of ash dieback and the council actively monitors the health and condition of these trees. Part of the skill in managing the stock is to recognise all these variables, carefully balancing the benefits of the trees with the risks posed by them.

strategy

Management	The authority's finite resources are allocated to ensure it reasonably meets its duty of care by demonstrating a defendable, proactive tree-management regime. The economic climate has affected the council in the last decade and resources have had to be carefully considered and prioritised. Funds saved by taking an informed, proportionate approach to risk management, using a risk of harm assessment method as a guide, leaves some funds available for investment in planting and establishment, and maintaining mature tree, woodland and soil health. The council understands this underpins their trees' capacity to respond and adapt to changes in their environment and their structural condition.
	Land is categorised according to either level of occupancy, frequency and speed of vehicles, or by financial value of infrastructure or property, and rated high, medium or low target. The tree officers carry out walkover surveys of high target areas every two years and medium target areas every four years; low target areas are managed reactively.
	The council recognises the particularly high value of large mature or veteran trees and its policy is to conserve all such trees for as long as they can be safely retained. Some high value trees adjacent to busy highways or other high-use targets have risks of harm that are assessed to be within the tolerable region. However, where these could conceivably deteriorate to be within the unacceptable region if probability of failure increased further, they are singled out for annual inspection. All such located ash trees showing symptoms of ash dieback are also subject to annual inspection.

	Trees on housing land are inventoried and individual trees deemed to require proactive management have return inspections scheduled for between one and five years, depending on target and size and condition of tree. The council recognises that due to their location these trees have the most potential for conflict with people. In this context the tree inventory is an effective management tool to reduce the burden of enquiries and requests for non-essential tree inspections, while also ensuring all trees that require it are under an appropriate level of proactive management.
	The council recognises that OPM, which is spreading rapidly through the borough, poses an immune-system health risk to people living near to infested oak trees. To mitigate the future risk of pressure to fell such trees, the council has identified and surveys all such trees each year for OPM nests and endeavours to remove all the nests found. Extra funds are currently being made available for this strategy because the council recognises the value of its extensive oak tree and woodland habitat to local people and nature. On other publicly accessible sites where OPM is likely to be present, people are alerted to this with clear signage and if nests low down on trees are reported to the council near public rights of way or other thoroughfares they will be removed.
Competence	The two tree officers carry out the proactive survey work and respond to enquiries from the public concerning essential tree management. Enquiries about specified, non-essential tree 'issues' that the council does not manage are referred by customer service representatives to information on the council's website. OPM surveying is carried out by an independent ecologist.
Records	The tree officers use a fit-for-purpose geographic information system (GIS)-based computer management system to inspect and audit its tree stock, capturing data electronically on site.
Evaluation	Surveys have shown that the residents value trees and their open spaces. The council is also committed to fulfilling its duty of care, ensuring its residents, visitors and staff live, work and play in a reasonably safe environment.
	Despite being challenged by reduced public funds, the borough council has demonstrated its commitment by allocating resources to its specialist staff, the development of a tree strategy, ongoing programmed inspection regime and software management system.

[H2] 7.7 Scenario 5: Local authority - county council

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General description

Scenario 5 relates to a county council with a significant urban or peri-metropolitan component. The county council provides services to approximately one million residents. One half of the county is heavily developed and includes a large portion of the overall population in large and medium-sized market towns. The other half is predominantly rural and sparsely populated, with most of the land managed for agriculture. The county council is responsible for trees on its own land and for ensuring the safety of the public highway and can intervene if trees on adjacent private land are identified to pose a threat. Within the county, trees on district, borough, town and parish council land are the responsibility of the respective councils and are managed according to their policies; a joined-up approach is sought where appropriate and regular meetings of district and borough council tree officers are held to share experiences and best practice. The county council employs one arboricultural manager to oversee management of its (predominantly urban) highway trees, one estates officer to manage trees and woodlands across its rural estate, and a countryside management team to manage a prominent woodland nature reserve, the rights of way network and to provide land management advice to staff and landowners, including support to address risks associated with pests, diseases and other factors affecting tree health.

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Ownership/control of management

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<tr><td>

Responsibility

</td><td>

The county council is responsible for managing trees:

- On 5000 km of highway land in 10 district areas (delivered in seven districts through agreements by district councils)
- On 3200 km of rights of way in 10 district areas
- On 4500 ha of rural estate land, much of which has public access
- On a variety of other council-owned property assets
- In 400 schools

The arboricultural manager oversees contract management for the survey and maintenance of trees on highway land that is delivered by seven district council tree officers through agency agreements and by a dedicated highways contractor. The estates officer oversees tree survey and maintenance of the county council's rural woodlands and agricultural land, which is outsourced to an approved contractor. The countryside management team manage a prominent woodland nature reserve in-house and outsources surveys of the rights of way network to an approved contractor.

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Arboricultural competence

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The arboricultural manager has arboricultural qualifications at Level 5 of the Regulated Qualifications Framework (RQF), plus a professional tree inspector qualification, and 30 years' experience. The estates officer has attended tree inspection training and has 14 years' experience of woodland management. The countryside management team comprises access and land management specialists who have attended tree inspection training.

</td></tr>
<tr><td colspan="2">

Holding

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<tr><td>

Land area

</td><td>6,460 ha</td></tr>
<tr><td>

Number of trees

</td><td>Approximately 240,000 mapped trees and 400 ha of woodland</td></tr>
<tr><td colspan="2">

Access

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Much of the county council's land is accessible, with a 5000 km highway network, 3200 km of footpaths, bridleways and byways, 400 ha of accessible woodland and council buildings that are accessible to residents and staff. Much of the estate is in frequent use by the public.

Benefits of trees

The county council places great value on its trees and woodlands and the contribution they make to local services, improved air quality, flood risk mitigation, carbon storage, forage and habitat for biodiversity, landscape and place. Residents are encouraged to visit and enjoy woodlands and green spaces. The county council acknowledges the local importance of individual trees for the benefits they provide to people and nature, particularly veteran trees which require careful management to enhance their longevity while maintaining acceptable levels of risk. Where possible, the county council adopts management approaches that mitigate the risks from individual trees without diminishing the benefits provided by the overall treescape.

Natural living organisms

The county council recognises that a tree's benefits and the management it requires will fluctuate throughout its lifespan. Consequently, management that promotes the health, longevity and resilience of the wider treescape as a collective, and which takes the various tree populations into account, is an effective strategy for ensuring the continued provision of countywide tree-related benefits. To make best use of tree budgets and optimise tree benefits, where practicable the county council adopts proactive resource management of its trees and woodlands through traditional and conservation forestry principles and sustainable urban forestry, which include endeavouring to diversify the age and species profile of its tree asset, improving local habitats and promoting biodiversity. In recognition of the increasing pressures upon tree health posed by pests, diseases and a changing climate, the county council added tree health to its corporate risk register and instructed the development of a county-wide Tree Resilience Strategy in partnership with other local stakeholders. The county council has significant incidence of ash dieback and some instances of acute oak decline. It has developed an ash dieback strategy to plan for and manage levels of intervention as the disease has spread widely through the county. Investigating for signs of ash dieback is part of the scheduled survey regime, which also includes a drive-by survey of the highway network to identify signs of dieback in roadside ash on both highway and adjacent private land across the county and record this for targeted action. The county council communicates actively with neighbouring authorities with ash-dieback to control risks appropriately while avoiding unnecessary loss of ash-dependant habitat. The county council monitors national guidance and initiatives in relation to tree pests and diseases and their impacts on their tree populations. Increased focus on biosecurity and treescape resilience is being incorporated into woodland restoration and new woodland planting initiatives.

strategy

Management	The county council's tree management varies across its estate, reflecting its diverse land holdings, and zoning supports survey and management decisions. Zoning is dictated by land type, levels of use and proximity to population centres. Risk zones are categorised using either a 'high/medium/low' or 'high/low' classification system. The predominantly urban highway tree asset is zoned according to a high/low risk classification while the county council's rural trees and woodlands are zoned as 'high/medium /low' classification, to account for the wider range of management contexts. The frequency of surveys is planned accordingly with all trees in high and medium risk zones proactively receiving formal walk-over assessments on a set schedule. Individual trees identified as posing a greater risk are inspected more frequently. A more reactive and informal approach is taken to trees in low risk zones. Managing risk from trees on the county council's rural land holdings is often achieved through the adoption of forestry principles, which incorporate the felling of potentially dangerous trees into routine forestry operations. Due to the county council's desire to retain individual trees in urban settings to maintain the local benefits they

	provide, managing risk from highway trees is often achieved through arboricultural techniques that mitigate risk while leaving the tree *in situ*. The arboricultural manager has begun to introduce sustainable urban forestry principles to both diversify tree species and age distribution, and to safeguard existing valuable tree assets for the long-term resilience of the tree population.
Competence	Proactive surveys of the highway network tree stock are outsourced to seven district councils and a dedicated highways contractor. Proactive surveys of the rural estate and rights of way network are outsourced to approved contractors (see Contacts and useful sources of information). Proactive surveys of the woodland nature reserve managed by the countryside management team are conducted in-house. All surveyors are adequately trained and qualified.
Records	Trees on the county council's highway and rural estate land are recorded on separate purpose-built tree management systems that allow trees to be plotted on-site, using GIS-based software. Those trees that pose a material risk are plotted for future inspection and management. Both systems are planned to be integrated into one consolidated GIS-database system.
Evaluation	The county council's finite resources are allocated to ensure it reasonably meets its duty of care by demonstrating a practicable and defensible approach to tree management. This involves prioritising resources, so that higher risk zones and individual trees that present a sufficient risk to warrant a higher level of assessment receive an appropriate level of inspection. Where possible, the county council follows sustainable principles for both forestry and urban forestry in seeking to incorporate treescape management that balances survey and maintenance costs with the need to retain and enhance the benefits that its treescapes provide.

[H2] 7.8 Scenario 6: Local authority – city council

General description	
Scenario 6 relates to metropolitan authorities, including London boroughs, which contain a large conurbation. This example council is responsible for managing land in the city centre, the outlying suburbs and some rural land in the green belt. The overall population is around 300,000. The city council employs one arboricultural manager and four tree officers. They proactively manage all street and park trees and respond to more than 2000 public queries each year. Two separate council officers in the planning department deal with tree preservation orders and development issues.	

Ownership/control of management	
Responsibility	The local authority has responsibility for all municipal property and services within the city boundary, including trees. This includes: • Highways: 25,000 street trees • Parks: 120 different open spaces covering 845 ha and one municipal golf course • Housing: 8000 trees on council estates and individual gardens • Schools: 102 schools • One cemetery and seven closed churchyards The council contracts out tree work to approved companies and the manager and his team manage a budget of more than £600,000 for all tree management and maintenance requirements, including planting. The city is built on shrinkable clay soil and the tree officers spend a substantial amount of time dealing with subsidence issues.
Arboricultural competence	The manager and his team manage the city council's tree stock in relation to amenity, public, political and environmental interests, building-damage risks and public safety. The manager is a chartered arboriculturist and the team is qualified from RQF Level 4 to Level 6 with 3–30 years' experience of managing trees. Details of all the public trees are held on a specialised database, as the authority's insurance service requires evidence of management in the event of either personal injury or subsidence claims.

Holding	
Land area	8600 ha
Number of trees	Approximately 300,000

Access	
The city attracts many visitors who, together with residents, enjoy the public spaces. Many of the parks are Victorian in design and many city trees date from that time. In the suburbs, there is an ageing tree stock of ornamental species, many with recognised defects.	

Benefits of trees	
The city is proud of its parks and the public interest in street trees is well documented. The council has a published tree strategy outlining its approach to its different responsibilities. One aim is to increase street tree cover by 2% each year for 10 years. Funding is in place to achieve this target, although this is under review. Because its tree strategy aims to proactively manage and maintain a healthy, sustainable tree population for the public's benefit, the council considers that its tree risk management policy is reasonable and cost-effective and that it is compatible with all its other tree-related policy objectives.	

Natural living organisms	

Under the arboricultural manager's influence, staff throughout the city council's departments have become increasingly aware of the role that tree stock plays in their overall environmental policy. This has led to the increased retention of dead wood for habitat benefit, both in living and dead trees and in managing tree safety issues in more innovative and responsible ways.

strategy	
Management	Due to the risk of subsidence in the area, street trees are managed on a three-year cycle and regularly inspected. This includes noting trees found to be in a poor condition. Schools and parks are also inspected every three years. The areas described above are managed proactively throughout the year, balancing the benefits the trees provide with the need for proportionate risk control. The tree officers record all tree inspections and any emergency work carried out. If they remove a street tree, they assess the location for replanting opportunities to keep in line with the council's stated strategic increase in its tree stock.
Competence	The tree officers carry out the main survey work. They look after all areas of public land in the city, with each officer responsible for a specific area, although they work together to carry out surveys of parks and schools for both safeguarding and support.
Records	The tree officers keep records using the software system designed for the purpose.
Evaluation	The council is committed to following its published tree strategy, which the council cabinet accepted as policy. Tree safety is only one element of managing trees. The manager and his team are aware of the importance of having a proactive system. In recent years, a change in the way they manage trees in less formal parkland has seen an increase in monoliths and standing dead timber. This has led to an increase in biodiversity and also saved money. The tree officers' knowledge of the district and the tree stock has helped save numerous trees under threat from subsidence claims and vociferous residents. The tree strategy explains unambiguously the council's intentions with respect to managing trees in the city. While these systems are in place, there are still over 100 incidents of tree or branch failure a year in the city, although these are mostly either small ornamental trees which were all planted at the same time and that are coming to the end of their lives, or trees which have been damaged by vehicles.

[H2] 7.9 Scenario 7: Large private estate with public access

General description
Scenario 7 could relate to a wide range of large landholdings where public access is the norm. This could include country estates, amenity woodlands, waterways and heritage land. In this instance, we have used a private estate open to and widely visited by the public. The estate has been in the family for generations. The estate is predominantly arable but with some grassland and 600 ha of woodland. There is a historic house, ornamental gardens, plus parkland and woods which contain many important veteran trees. Approximately 2000 ha are farmed in hand with the remainder tenanted; all the woodland and all the trees are retained and managed by the estate. The main house and its garden are open to the public throughout the year. Three car parks serve the main house, ornamental gardens, restaurant and the farm shop. During the summer, several events take place in the grounds including a craft fair, a caravan rally, a carnival, a jazz festival and a balloon fiesta. For the past three years, a television gardening programme has followed the seasonal cycle in the ornamental grounds through the eyes of the head gardener. The park and some of the woodland is open seasonally some of the year. The estate employs a general manager who has overall responsibility for implementing policy and strategic and operational decisions. Departmental heads are responsible for the house, the estate, the gardens, visitor facilities and catering. The estate's general manager is responsible for day-to-day tree safety. The estate also employs two gardeners, a farm manager, three members of farm staff, a head gamekeeper, two underkeepers and a woodman. An external forestry agent is employed to assist with management of the woods. The estate is divided by several public roads, notably a busy A road which runs through it from north to south.

Ownership/control of management	
Responsibility	The estate owner has overall responsibility for managing its affairs. The department heads report to him and they have day-to-day responsibility for managing their respective responsibilities. The strategic responsibility for the safety of all trees on the estate is held by the estate's general manager. As a reasonable and prudent landowner responsible for trees, the owner employs experienced staff who are able to recognise and understand the significance of obvious defects in trees, in the context of their location. They are able to carry out a visual check that may result in obtaining further advice.
Arboricultural competence	The farm manager is experienced in a wide range of agricultural activities and the woodman, one of the gamekeepers and the two gardeners have certificates to use a chainsaw. The woodman and the head gardener can identify the most common trees and can recognise the obvious signs that a tree may be hazardous. The external forestry agent advises on most tree-related issues and decides if tree safety work is required; if he feels the issue is beyond his level of competence then he will recommend a suitably qualified arboriculturist (see Contacts and sources of information).

Holding	
Land area	5000 ha
Number of trees	Approximately 450,000

Access
The estate is divided by several public roads, notably the busy A road. The estate is criss-crossed by footpaths, some of which run alongside or through the woodland. The house and garden are open all year round and the park and woodlands are open for part of the year. During the summer months, the park is used for public events.

Benefits of trees
The owner has known the estate all his life and has lived there for much of it; he values his trees and woodlands. The trees and woods are very important to him, they enhance the landscape where he lives and provide valuable habitat for game birds and wildlife. As such, he sees investment in their maintenance as a good use of funds. In the winter, he and his friends see shooting as an important leisure activity, but he also enjoys seeing the other wildlife during the rest of the year. Some of the veteran trees also give him a link with his family's heritage and presence in the area. Most of

the work that his trees and woodlands require costs him money and he is prepared to invest a reasonable amount in his trees.

Natural living organisms
Having lived on the estate for most of his life, the owner is well aware of how the trees and woods have changed over the years. He has experienced trees being felled and replanted, many of which are now of significant size. He observed that during the great storm of 1987, many younger trees blew over, while some of the older veteran trees stood firm despite losing branches. The scars and cavities resulting from this can still be seen on some of the larger trees. Recently, a mature beech lost a huge branch; fortunately, no one was underneath it at the time. These events help the owner to understand that trees are living things and that as they grow it is part of their nature to lose branches, develop cavities and eventually enter a long period of slow decline. He also recognises that trees can frequently recover from quite severe damage and live for many years with those features without being a danger to anyone.

Reasonable, balanced tree risk management	
Management	Until recently, the estate had no formal tree safety management plan, relying on staff and others to report problems then dealing with them as they arose. Although the owner was aware no one had been killed or injured by a falling tree or branch on the estate, two years ago he decided that it would be prudent to adopt a proactive approach.
	In a meeting with the estate's general manager, head gardener, farm manager and woodman, an estate map was used to identify the areas that they believed merited more formal inspection. For the first formal inspection they decided to include the A road, all the public roads, the garden, the visitors' car park and the park. They decided to continue with the existing informal system on the rest of the estate.
	The owner also wrote a letter to all staff informing them that he had asked the general manager to lead on the estate's tree safety plan and instructed them to report any trees that they were concerned about directly to him.
	The general manager and the woodman carried out the first formal tree checks. They checked the trees alongside the roads and in the park. This was mostly a drive-by visual check, stopping for a closer look at some of the bigger, older trees that were more likely to have problems, walking where the trees were closer together or where a wood grew alongside the road. The head gardener and the undergardener checked the trees in the garden and the car park.
	The roadside tree survey found three trees requiring attention and, as they were not considered to be important for landscape or environmental reasons, one was felled and the other two had limbs removed. No trees in the park needed attention. However, they decided some of the park's veteran trees needed protection, and that in future, event organisers would be instructed not to park or place marquees or other structures underneath or close to these trees.
	In the garden, in addition to the 'secret' hollow oak in a corner not used by the public, they found an old lime tree with a large cavity in it. The owner was very keen to keep the tree so, following discussion with the forestry agent, the general manager employed an arboriculturist to inspect it. The arboriculturist reported that the cavity was not affecting the tree's structural integrity and he recommended carrying out no work just now and undertaking another inspection in three years' time.
	Following the initial checks and remedial work, the owner decided that, unless there was a change in circumstances, the trees alongside the A road and the lime tree in the garden would be formally checked again in three years' time and those in the other areas in five years. Until that time, the trees in these areas would be subject to the same informal regime as the other trees on the estate.
Competence	Employees are able to recognise features that might signify a serious structural defect. When a greater level of expertise is required, the forestry agent recommends a suitable arboriculturist (see Contacts and sources of information).

Records	The results of the formal checks are kept in a file in the estate office along with the results of the arboriculturist's report and a note of any remedial work carried out. The general manager also keeps records of any trees reported to him and the action(s) that he took.
Evaluation	The estate owner believes that, in the unlikely event of an accident involving one of his trees, the system he has put in place is sufficient to demonstrate 'the conduct to be expected from a reasonable and prudent landowner'.

[H2] 7.10 Scenario 8: Large open space open to the general public

<table>
<tr><td colspan="2">General description</td></tr>
<tr><td colspan="2">Scenario 8 concerns a collection of urban open spaces including parks, grassland and 170 ha of secondary and ancient woodland where public access is largely unrestricted. Four areas are locked at night. There are 20 ponds, including three swimming ponds, areas of amenity sports fields, five cafes and four car parks. The parks and woods contain many important ancient/veteran trees and landscape trees that were planted during the 19th century. During the year, several large events take place on the site, including cross-country championships, park runs, art fairs, funfairs and a circus.</td></tr>
<tr><td colspan="2">Ownership/control of management</td></tr>
<tr><td>Responsibility</td><td>There are three separate sites that are managed by a single responsible ownership body. The Site Manager has overall responsibility for the running of the sites, implementing policy and strategic and operational decisions. Responsibility for the safety of all trees is held by the Arboricultural Manager, and is delegated to the Tree Officer. All tree-related issues are generally managed internally.</td></tr>
<tr><td>Arboricultural competence</td><td>The Arboricultural Manager, Tree Officer and Tree Team Leader are qualified in arboriculture and have different levels of experience. Some team members are qualified in veteran tree management qualifications (see Contacts and sources of useful information) and attend relevant conferences and events on arboriculture and ancient and veteran trees. A small in-house team of qualified and experienced arborists assists with various duties.</td></tr>
<tr><td colspan="2">Holding</td></tr>
<tr><td>Land area</td><td>Three sites totalling 300 ha</td></tr>
<tr><td>Number of trees</td><td>Over 25,000</td></tr>
<tr><td colspan="2">Access</td></tr>
<tr><td colspan="2">The main site is divided by busy A and B roads and a railway track runs along the southern-most boundary of the site. All three sites have busy roads and bus stops adjacent to one or more external boundaries. A variety of access tracks criss-cross the site, ranging from tarmacked vehicle tracks to informal desire paths. Other target areas include lockable play and education areas, car parks, sports areas and swimming ponds. The sites host public events throughout the year. The largest area is open all year round with 24-hour unrestricted access to most of the site. In accordance with the local Extreme Weather Protocol, some park areas are locked during poor weather.</td></tr>
<tr><td colspan="2">The benefits of trees</td></tr>
<tr><td colspan="2">The trees and woodlands form a significant part of the open space as an amenity, habitat and education tool. The importance of public access to semi-naturalised open space including trees and woodlands within an urban environment cannot be overstated. The specific retention and proactive management of deadwood on living and dead trees, alongside other conservation works, actively contributes to increased biodiversity on site and an enhanced visitor experience. Groups of students, tree professionals and members of the public are regularly taken on tours of the site to demonstrate the type of tree management undertaken and to share learning opportunities. To ensure that the tree management on the site is evolving, active international collaboration takes place with professionals from various relevant tree and conservation disciplines. The site also hosts short walks for international visitors and occasional interns.</td></tr>
<tr><td colspan="2">Natural living organisms</td></tr>
<tr><td colspan="2">The tree management team are aware that trees and woodlands are dynamic adapting organisms. They have experienced some of the cycles of planting, ageing, decline, decay and death that all organisms undergo and the value they provide to people and wildlife in all their life stages.

Long-term management has demonstrated that while all tree failures cannot reasonably be prevented, a balanced and proportional approach to tree risk management can provide an acceptably safe natural environment for the public to</td></tr>
</table>

learn and enjoy. In recent decades, the management of new pests and diseases, particularly Massaria, oak processionary moth (OPM) and ash dieback, has become increasingly important.	
Strategy	
Management	As part of a wider group under local authority control, the local tree policy is informed by the Open Spaces Department policy. The approach to tree management has evolved significantly over recent decades. Previous attitudes to the removal of any dead or dying trees and parts of trees have been replaced by a zoned, risk-based approach that is mindful of habitat retention and creation. When occasionally required, access to specialist decay detection equipment assists in taking an informed approach to risk management. The site has also developed a separate focused programme of veteran tree management. Risk sequence zones have been installed ensuring that areas are inspected proportionally to the level of usage. High and medium risk zone trees are inspected annually and lower risk areas are inspected every two or three years. A database logs the types of tree failure that occur. On average about 80 failures a year are recorded. As well as formal inspections, the team perform many unrecorded ad hoc checks throughout the year both while performing daily duties and after significant weather events. Rangers and park keepers also report failures and obviously defective trees. The tree safety system is audited annually by an independent tree safety consultant.
Competence	Survey work is undertaken by in-house qualified and experienced arborists with access to decay detection equipment when necessary.
Records	The dates of inspection are held on the database, scheduled according to risk sequence. Remedial tree work is prioritised and recorded on the software system. Records of minor works are delegated to a crew work list. The survey software system provides the framework for management of trees according to levels of risk and for maintaining records over time.
Evaluation	The site managers recognise that the threat trees pose to public safety is low. In the event of an accident involving one of the trees, the system in place is sufficient to demonstrate 'the conduct to be expected from a reasonable and prudent landowner'. The Open Spaces management is committed to following its tree safety policy but tree safety is only one element of managing trees. Long-term staff site knowledge of the tree stock and the condition of the trees allows a balanced approach to safety and habitat retention.

[H2] 7.11 Scenario 9: Small site with mature trees growing next to the railway

General description
There are some seven million properties, businesses and land holdings that border the railway in Wales, Scotland and England. Aerial survey data suggest that there is an average of one tree (taller than 3 m) per property. The property in scenario 9 is the headquarters of a local scout group with a 30 m long boundary adjacent to a busy commuter railway line, upon which passenger and freight trains travel at up to 160 km per hour. The boundary fence, at its closest point, is approximately 9 m from the nearest rail.
The boundary comprises a 1.8 m high chain-link fence with concrete posts, which is owned and maintained by the Railway Authority. Adjacent to the fence on the scout group landholding is a 'wild and woolly' hedge of mixed shrub species including hawthorn, hazel and elder. At irregular intervals along the boundary are five trees, including a semi mature Lombardy poplar that is 15 m tall with a large proportion of the tree canopy growing within the railway property.

Ownership / Control of Management	
Responsibility	The land was bequeathed to be used by the Scouts and so, as the owner of the land, the Scout Group committee have responsibility and a duty of care.
Arboricultural competence	The owners may have access to parents of members with specific arboricultural competence, but this would only be on an *ad hoc* basis and so the owners would be regarded as lay people.

Holding	
Land area	0.15 ha
No of trees	Hedgerow that also contains five individual trees

Access
The Scout group land is only accessible by those people authorised to access the headquarters with the entrances protected by locked gates when no activities are taking place. The majority of activity takes place on weekday evenings for up to three hours when about 30 Beavers, Cubs and Scouts, plus leaders, can be present. There are occasional private events where the headquarters are hired out. The open space to the rear of the headquarters is regularly used for varying activities and in all weathers.

The Benefits of Trees
In addition to the chain-link fence, the trees and the hedgerow provide a significant boundary and help to create an air of seclusion that is useful in outdoor scouting activities. Nature and the outdoors are a fundamental part of many aspects of scouting and the benefit of access to this small but invaluable resource is recognised by this group, especially when compared with neighbouring groups and those in more urban areas. The various species within the hedge provide an easily accessible source of material, not only for the nature-based activities such as identification, insect hotels and nature art, but perhaps more importantly for the children, as a source of fuel for their campfires.

Strategy	
Management	Risk assessments, required as part of Scouting activities, will look at the potential risk posed by the trees depending on the activities that are taking place. The laypeople involved in scouting would be able to notice dead limbs or other aspects of concern should activities be carried out beneath the trees (note that this is similar to the type of check that would be conducted if the scouts were carrying out activities or camping in the vicinity of any trees). These risk assessments will be reviewed during activities should, for example, the weather conditions deteriorate.

	The physical management of the trees and other vegetation is undertaken on an *ad hoc* basis by working parties of non-specialists and, other than when the risk assessments are being reviewed, the trees are not formally checked by the Scout group.

The railway boundary fence is inspected annually by the Railway Authority and the trees and vegetation on railway property are subjected to a check once every three years. The trees on the Scout group land are visible from the railway and railway personnel would be expected to report any concerns with the tall trees. |
| Competence | There is no formal arboricultural knowledge within the Scout group. |
| Records | There is no formal record-keeping other than the generic risk assessments covering the Scouting activities. The Railway Authority hold their own inspection records. |
| Evaluation | The current position and condition of the trees belonging to the scout group pose little current threat to the users of the scout facility. Managing trees next to railway lines can pose challenges and present a risk to the safe operation of the railway. To safeguard the future of the trees a combined approach to management will be required and consultation with the Railway Authority will assist in the planning and implementation of any required arboricultural activities. The Railway Authority will be able to advise on the communication requirements for planned, and unplanned or emergency, work and what should be included within a tree safety plan.

The preparation of tree safety plans should incorporate the advice received by the Railway Authority and incorporate a formal record of assessments made of the trees. If there were concerns about the safety of the trees, further arboricultural advice would be sought and the Railway Authority notified of outcomes and recommendations. (see Contacts and useful sources of information). As such, in the event of an accident involving one of the trees, the system put in place would be sufficient to demonstrate 'the conduct to be expected from a reasonable and prudent landowner'. Records of liaison with the Railway Authority to ensure that they specifically consider the trees during routine checks would provide further useful information, enabling trees to be retained and continuing to provide benefits to the scouts. |

[H1] REFERENCES

NOTE: 'References', Contacts' & 'Glossary' sections are omitted from the stakeholder consultation document.

[H1] CONTACTS AND USEFUL SOURCES OF INFORMATION

[H1] GLOSSARY

[Inside back cover]

[H1] National Tree Safety Group – position statement

The National Tree Safety Group (NTSG) was formed in 2007 in response to concerns over the unnecessary removal of trees. One of our aims is to develop a nationally recognised approach to tree risk management and to provide guidance that is reasonable and proportionate to the actual risks presented by trees. We believe that what is reasonable with respect to tree risk management should be based upon an evaluation of benefits and risk. This judgement can only be undertaken in a local context because trees provide different types of benefit across a wide range of circumstances.

One of the outcomes stipulated in our original terms of reference was to produce a set of basic principles for considering and managing tree safety in the public interest. Five key principles now underpin our work:

1. Trees provide a wide variety of benefits to society
2. Trees are living organisms and they naturally lose branches or fall
3. The risk to public safety is extremely low
4. Tree owners have a legal duty of care
5. Tree owners should take a balanced and proportionate approach to tree risk management.

Neither the law nor regulators require the NTSG or any other body to develop a single policy that states how safety should be managed in all circumstances. Management of the risk is the responsibility of those who own and manage the land upon which trees grow. The NTSG believes that tree owners, when considering what constitutes tree management that is reasonable in their particular circumstances, will benefit from the development of a coherent risk philosophy being adopted across the sector.

However, we believe that it is reasonable to expect sufficiently large organisations that own or manage trees to develop a formal policy (in line with good practice in other sectors), which should be based on a risk–benefit assessment of safety and other goals.

Our guidance is, given their social and environmental value and their importance to public health and well-being, wherever possible, amenity, heritage and veteran trees should not be felled. This policy, articulating the benefits of trees, should carry as much weight in protecting the policymaker against litigation following an incident as any reasonable risk management policy in a workplace setting.

The NTSG is an inclusive organisation with representatives from governmental and non-governmental agencies and professional and corporate bodies involved in the management of trees, and our membership is open to all stakeholders with responsibility for trees. You can find out more about us at **http://ntsgroup.org.uk**.

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