# Grounds & Tree Maintenance Policy
# AST-POL-23-02
October 2020

| 0. | DOCUMENT CONTROL |
|---|---|
| 0.1 | SUMMARY |
| | The purpose of this policy is to ensure that Torus provides an efficient and effective grounds and tree maintenance service which represents value for money and balances risk and with customer and neighbourhood needs. |

**0.2 DOCUMENT INFORMATION**

| Role | Name/Position | Date |
|---|---|---|
| Carl Talbot-Davies | Group Head Asset Compliance Manager | October 2020 |
| **Approved by** | Landlord Operations Committee | October 2020 |
| Document Reference | | |

**0.3 DOCUMENT STATUS HISTORY**

| Version | Date | Change owner | Reason for Update |
|---|---|---|---|
| 0.1 | 15th May 2020 | Margaret Goddard | Post amalgamation review and single policy document |
| 1.0 | 27th May 2020 | Margaret Goddard | Following consultation on initial draft with various stakeholders in Torus and HMS |
| 2.0 | 20th July 2020 | Colin Knox | Update following consultation |
| | | | |

**0.4 DOCUMENT REVIEW DATE**

| | |
|---|---|
| **Review Due** | October 2022 |
| **Responsible Officer** | Colin Knox – Group Asset Compliance Manager |

**0.5 DISTRIBUTION**

| Name / Department | Title |
|---|---|
| All Staff | Asset Management & Compliance Teams and HMS |
| All Staff | Housing, Neighbourhoods & Customer Service Teams, HMS |

**0.6 ASSOCIATED DOCUMENTS**

| | |
|---|---|
| **Ref**: AST-POL-23-02 | **Title**: Facilities Management Policy |
| **Ref:** | **Title:** |

Contents Page

## 1. Introduction

Torus is a well-established housing provider in the North West with stock predominantly located in Liverpool, St Helens and Warrington. Torus is one of the largest landlords in the North West, with a stock portfolio of circa. 37,500 homes, supporting around than 64,000 customers and their communities.

Torus is committed to ensuring neighbourhoods, estates, schemes and shared areas are attractive and safe places to live. Torus want customers to be proud of their neighbourhoods and will strive to balance the requirements of health and safety regulations and legislation, with maximising the opportunities for customers to enjoy grounds and external communal spaces.

Torus will ensure, as part of its commitment to fire safety and risk management, that all external communal areas are inspected on a regular basis.

Torus will work closely with Local Authorities across our heartlands, other registered providers, private landlords and other responsible agencies to ensure that neighbourhoods are well managed.

Torus is regulated by the Regulator of Social Housing and acknowledges and accepts its responsibilities under the primary legislation applicable to this policy: namely the Landlord and Tenant Act 1985, the Housing Act 2004 and HSE legislation applicable to the services being delivered under the Grounds and Tree Maintenance Policy.

## 2. Scope of Policy

The purpose of this policy is to ensure the effective maintenance of grounds and trees managed by Torus. This applies to all properties within Torus neighbourhoods and estates, across all Torus heartlands including leaseholders who live in mixed tenure schemes. The policy also provides guidance and instructions for all Torus employees and contractors, whilst undertaking associated contract work. This is with the aim of satisfying the service obligations and legal duties imposed on Torus.

Activities in relation to grounds and tree maintenance will conform to the requirements of the following key areas of legislation:

- The Health and Safety at Work Act (1974)
- The Health and Safety at Work Regulations (1999)
- Occupiers Liability Act (1957 and 1984)
- The Countryside and Wildlife Act (1981)
- Highways Act (1985)
- Local Government (Miscellaneous Provisions Act)
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Work at Height Regulations 2005 (WAHR)

Maintenance programmes and activities will be completed to the best horticultural practice; the creation and maintenance of visually pleasing horticultural features and the maintenance of rigorous standards of discipline, cleanliness and tidiness.

Torus is committed, so far as is reasonably practical, to ensure compliance with statutory requirements and to protect the safety of tenants, residents, employees and others who might use be adversely affected by its actions and / or omissions.

Torus is committed to the continual improvement of service delivery and performance across the business and will encourage business partners, stakeholders and members of the wider community to actively support this objective.

## 3. Statement of Intent

Torus has set a target of 100% compliance on all associated grounds and tree maintenance services. It is assumed there will be no difficulties accessing external and communal spaces.

Torus is responsible for the risk management and maintenance of trees and external communal areas and open spaces. A planned maintenance programme will be prepared each year and will be regularly monitored and updated to reflect efficient and effective performance as required.

- Torus will ensure that all external communal areas are managed effectively and kept free from obstructions or hazards to protect the health and safety of residents and other users of our buildings
- Torus will remove the risk of items causing an obstruction to access or exit routes in the event of an emergency
- Torus will maintain the appearance of our neighbourhoods by effectively dealing with litter, abandoned vehicles, graffiti, discarded furniture or anything that would cause a negative environmental impact
- Torus will carry out estate inspections to encourage Customers and partners to participate
- Torus will ensure Customers are confident that their area is being well managed.
- Torus will work to preserve and enhance the landscape, amenity and wildlife value of the Torus tree stock. All tree work will be in accordance with best Arboricultural industry practice and all relevant legislation
- Torus will undertake a programme surveys and inspections to all tree stock a minimum of every 5 years
- Torus will use the nationally recognised (THREATS) tree risk assessment model to categorise and prioritise any remedial work identified during surveys and inspections
- Torus will ensure all detailed tree surveys to open spaces and condition reports are undertaken by a suitably qualified Arboriculturalist
- Torus will ensure that visual inspections are carried out by suitably trained individuals and that any concerns or issues observed are referred to suitably qualified Arboriculturalist for more detailed survey
- Torus will ensure only suitable competent and trained individuals undertake the work activities. All tree work will be undertaken by NPTC qualified persons working to BS 3998 and the relevant AFAG guidelines
- Torus will ensure that any tree felling, thinning, crown reduction, pruning and planting is undertaken to find a harmonious balance between tree health and residents' wishes. The service has a responsibility to work to the highest arboricultural standards even if this is against the wishes of the residents
- Torus will recycle as much tree waste as possible onto shrub beds
- Torus will hold accurate maintenance records and dates

- Torus will ensure there is a robust process in place to investigate and manage all RIDDORs issued about all working practices delivered under the ground and tree maintenance services

## 4. Grounds Maintenance Services

Torus will carry out regular block inspections to ensure external communal areas are well maintained and free from hazards. Where issues are caused on land not owned or managed by Torus and this directly impacts on Torus Customers, Torus will take a pro-active role to resolve these issues by working with Customers and other agencies.

### 4.1 Schedule of activity

Torus will implement a performance schedule system which will cover all locations for the delivery of grounds maintenance by the appointed service provider.

Services will include all aspects of grounds maintenance from leaf collection/disposal, shrub & lawn management etc. Torus will maintain communal grounds including regularly cutting grassed areas at scheduled intervals and keeping flower and shrub beds neat and tidy. Communal grounds include shared grassed areas, shrubs and flower beds.

The frequency of services will be influenced by the season and reflected accordingly in the scope of works comprising the maintenance programme. Grounds maintenance annual programme will normally comprise the following activities / frequencies each month or period:

| TASK | WINTER | | | SPRING / SUMMER | | | | | | WINTER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| **Grass Cutting** | | | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| **Leaf Clearance** | | | | | | | | | | 1 | | |
| **Grass Edging** | 1 | | | | | | | | | | | |
| **Litter Clearance** | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| **Herbicide Application** | | 1 | | | | | 1 | | | | | |
| **Hedge Maintenance** | | 1 | | | | | 1 | | | | 1 | |
| **Shrub Border Maintenance** | | 1 | | | | | 1 | | | | 1 | |

Additional works will be undertaken to address unforeseen aspects of work as and when required, with such being a scheduled item for financial management purpose.

Torus will periodically review the performance of the ground's maintenance service.

### 4.2 Communal external areas

Communal areas, even those immediately adjacent to a tenant's property, are not an extension of an individual's home. As such tenants should not use these areas for their personal effects.

Torus have a duty to ensure all tenants can escape our communal areas in an emergency. This means items which may cause a trip hazard, anything combustible or anything that could shatter must not be stored in our shared areas, even if they are outside a tenant's front door.

Torus will remove and immediately dispose of items left in communal areas should they be deemed a hazard, a high fire risk or are obstructing or blocking access and routes. The cost of removal will be billed to the responsible owner.

In addition, Torus will consider enforcement action will be taken under the terms of the tenancy or lease agreement.

### 4.3 Fly tipping

Fly tipping is a criminal offence. Where there are repeat incidents of fly tipping Torus shall work with the Local Authority partners in each of our heartlands to pursue prosecution.

Under the Environmental Protection Act 1990, the Local Authority has a duty to ensure that any land in their direct control, to which the public has access or any public highway, is kept clear of litter and refuse.

Where local authority land is adjacent to Torus schemes, Torus will use 'walkabouts' to monitor the cleanliness of the land and report any concerns directly to the Local Authority.

Torus reserve the right to remove and immediately dispose of items left in any communal areas should they be deemed a hazard, a high fire risk or are obstructing or blocking access and routes.

### 4.4 Landscaping

Shared garden or landscape facility for Customers will be maintained and kept tidy. This will be in line with the service contract agreed between our Customers and the grounds maintenance contractor.

Torus will ensure all open grassed areas we own are cut regularly during the growing season.

Torus will review all contractors' performance at least annually regarding the ground's maintenance service performance.

### 4.5 Car parking

All vehicles parking within on Torus car parks must have current valid road tax and be roadworthy. Unless there are designated parking places allocated to an individual tenancy, parking is on a first come first served approach.

Torus may seek to appoint a reputable company to operate a parking scheme, to ensure the effective management of parking spaces.

The parking of caravans or motor homes on Torus land is not allowed.

### 4.6 Untaxed or abandoned vehicles

Torus will work in partnership with Local Authorities in our heartlands to remove untaxed or abandoned vehicles from Torus land.

### 4.7 Graffiti

Torus recognise that graffiti can have a detrimental effect on the appearance of an estate or neighbourhood. Offensive graffiti will be removed within 24 hours of us receiving the report. All other graffiti will be removed in 14 working days.

### 4.8 Play Areas

Where Torus own play areas, steps will be taken to ensure that they are clean, safe and well managed and Torus shall undertake regular inspections to ensure no items are present that can harm a child such as broken glass or syringes.

### 4.9 Private Gardens

Where a private garden is identified as being neglected, Torus will write to the tenant reminding them of their obligation and ask them to clear / tidy their garden.

On occasions, where there is concern of vermin, Torus may 'cut back' to size or dispose of rubbish to any overgrown gardens and recharge the cost to the occupant.

## 5. Tree Maintenance Services

To ensure Torus neighbourhoods, opens spaces and communal areas are well maintained and free from hazards Torus will carry out regular surveys and inspections. Where issues are caused by trees not owned or managed by Torus and this directly impacts on Torus Customers, Torus will take a pro-active role to resolve these issues by working with Customers and other agencies.

Trees are often considered fundamental to wellbeing and quality of life. They are integral to natural eco-systems and provide a wide range of benefits to people and communities. Tree maintenance services will ensure that risk management is a reasonable balance between these benefits and the low level of risk that trees present.

Torus will work to preserve and enhance the landscape, amenity and wildlife value of the tree stock.

### 5.1 Schedule of activity

Torus will undertake a pre-planned programme surveys and inspections to all tree stock a minimum of every 5 years in order to record, assess and prioritise any necessary remedial work. Within the pre-planned 5 year survey programme trees maybe surveyed annually or bi-annually if a structural or physiological defect is present that requires monitoring.

Each year a new annual pre-planned survey and inspection programme will be generated by the specialist service provider based on the previous year's surveys and findings i.e. a 'dynamic' annual programme that is based on risk and prioritisation. Condition reports will be centrally recorded for future maintenance works in a tree management database.

Torus will use the nationally recognised (THREATS) tree risk assessment model to categorise and prioritise any remedial work identified during surveys and inspections.

Surveys and inspection frequencies will be:

- All trees in the public realm, open spaces and communal areas trees within the ownership of Torus will be surveyed in detail by a suitably qualified arborist minimum every 5 years
- Trees in communal areas that are adjacent to blocks of flats will be visually inspected by suitable trained individuals for any obvious defects as part of the Block Inspection Programme a minimum of every 1 year
- Trees in tenants' gardens will be visually inspected by suitably trained individuals for any obvious defects as part of the Asset Management Stock Condition Survey programme a minimum of every 5 years
- Trees in tenant gardens will also be visually inspected by suitably trained individuals for any obvious defects when a property becomes void and before it is relet
- ensure that visual inspections are carried out by suitably trained individuals and that Any concerns or issues observed during visual inspections will be referred to a qualified Arboriculturalist for more detailed survey

### 5.2 Risk Assessment

Torus will use a consistent and nationally recognised model to evaluate, categorise and assess the risks identified during tree maintenance surveys and inspections.

The Tree Hazard: Risk Evaluation and Treatment System (THREATS - Forbes Laird Arboricultural Consultancy 2010) will be used. It is an accepted model to quantify the risk posed by trees identified as having structural defect and assists in determining the appropriate response to the level of identified risk (Appendix 2).

### 5.3 Inspection Requests

Torus will, upon request, inspect trees in individual gardens when contact is received from the tenant claiming that a tree is causing them cause for concern e.g. potential damage to property, potentially dangerous or hazardous.

A condition report will be generated by a suitably qualified arborist and any remedial work identified will be risk assessed and prioritised for completion. Torus will only undertake work to trees in individual gardens when there is a clear health and safety issue and remedial action is absolutely necessary.

The tree must meet the following criteria for any work to be arranged:

- Diseased, in serious decline or dead
- Dangerous (for example, storm or wind damaged)
- Causing damage, or likely to cause damage e.g. roots damaging pavements, etc.
- Causing an obstruction e.g. low branches over footpaths/roads

Torus will not respond to requests to prune or fell trees where there is no justifiable reason.

If a tree inspection is of an urgent nature i.e. the tree is immediately dangerous, damaged, windblown or causing damage, the request would be considered a high priority and would be responded to make safe within 4 hours and will aim to complete the job within 24 hours.

All other tree requests will be considered routine and depending on the issue would be inspected within maximum calendar 20 days.

The tree in the garden will be included in the pre-planned survey programme and re-inspected until the remedial work is completed, at which point it will then be removed from the pre-planned programme.

General care and maintenance of trees in tenants' gardens falls within the tenancy agreement concerning garden maintenance.

### 5.4 Tree Work Exemptions

Issues that are not considered to be a legal nuisance and therefore would not qualify for work to be carried out are as follows:

- Loss of light/reduced light to properties
- Effects on TV or mobile phone reception
- Obstruction of views
- Interference with private vegetation
- Honeydew (dripping sap)
- Bird Droppings
- Squirrels gaining access to properties from trees
- Leaf, fruit, or flower fall
- Smells generated by trees

### 5.5 Planting

Torus is committed to regenerating the tree stock on its estates. New planting will be designed to have a beneficial impact on the environment and is carried out in accordance with British Standards guidelines best practice for tree planting.

All planting will be carried out by NPTC qualified arborists and new trees will be maintained in accordance with best practice until they are established in the landscape

## 6. Roles and Responsibilities

### 6.1 The Board

Overall governance responsibility for ensuring the Policy is fully implemented to ensure full compliance with the required standards. As such the Board will formally approve this policy and review it every two years (or sooner if there is a change in regulation, legislation or approved codes of practice).

Board will receive regular updates on the implementation of the policy and performance along with notification of any non-compliance issue which is identified. This is so they have assurance that the policy is operating effectively in practice.

### 6.2 Chief Executive

Responsible for effective operation of this policy across Torus and will ensure that effective procedures are developed to implement the policy within Torus. The CE will also be responsible for ensuring adequate resources are made available to both develop and implement appropriate procedures and training, enabling responsibilities to be effectively delegated to key personnel as described in their statement of intent and key responsibilities.

### 6.3 Chief Operating Officer

Responsible for the effective operation of this policy across Torus and ensure that effective procedures are developed to implement the policy within the Torus. They will also ensure that adequate resources are made available to both develop and implement appropriate procedures, enabling responsibilities to be effectively delegated and that key personnel have received training.

### 6.4 Group Assets Director

Responsible for ensuring that this policy and the associated procedures are robust and effective and to regularly confirm that the persons currently in roles of responsibility can commit to the statements of intent. They will report to the Chief Operating Officer on all service delivery aspects of this policy relating to these properties. They will act as an interface with Executive and Operational Management Teams.

### 6.5 Group Head of Asset Compliance and Delivery

Responsible for the operational management and for day-to-day performance and budget management and to ensure suitable skills and resource is made available to deliver grounds and tree maintenance and management programmes. They will monitor the quality of services provided by contractors ensuring compliance with contract conditions.

### 6.6 Asset Compliance Management Team

Responsible for policy setting, procurement of competent contractors, quality analysis, assurance and compliance for grounds maintenance work carried out for Torus. They will hold appropriate competencies and monitor the performance and quality of services provided by contractors ensuring compliance with contract conditions for all work undertaken. They will provide day-to-day performance management and ensure suitable skills and resource is made available to deliver management and maintenance.

They will ensure systems and procedures are in place across all Torus work streams, and will develop effective management information systems, establish, monitor and review performance indicators for effective grounds and tree management. They will verify and ensure that all parties engaged in grounds and tree maintenance works are suitably qualified and competent.

### 6.7 Managing Director Housing

To support the effective delivery of grounds and tree maintenance programmes and ensure that end users, staff and tenants of Torus properties in supported housing and properties designated for older people adhere to the requirements of this policy.

Ensure that their managers and team(s) monitor the correct operation of grounds and tree maintenance services and report any issues as appropriate to Assets Management Team and/or appointed contractors and suppliers. To seek further advice from either the Assets Management Team or Safety Team where specific assistance is required.

### 6.8 Main Contractor

Responsible for ensuring and reporting on all relevant servicing and maintenance delivery aspects of this policy in relation to the works they are contracted to provide. They will ensure effective delivery of this policy through safe systems of work.

### 6.9 Heads of Service and Torus Managers

- Ensure they and their staff are aware of this policy and its content - then comply with it
- Responsible for ensuring the implementation and monitoring of this policy as appropriate throughout their directorates / service areas
- Responsible for ensuring the implementation and monitoring of any applicable recommendations arising from grounds and tree maintenance in their areas of responsibility
- Each of their teams is aware of any ground's and tree maintenance risks in the areas in which they operate

- Ensure training is provided for teams. Ensure attendance is monitored
- Ensure incidents and 'near misses' are reported as per Torus' agreed protocol and are fully investigated – initially by their managers but in conjunction with the Safety Team and/or Asset Management team as appropriate

## 7. Competent Persons and Arrangements

### 7.1 Qualifying Contractors and Operatives

This relates to the duties placed on Torus by the Landlord and Tenant Act 1985, section 3(1) Health and Safety at Work Act, etc 1974, and other associated legislation. Torus must ensure that its employees, or the appointed contractors it uses, are suitably qualified and have competencies in the categories of work they undertake. Prior to any work being carried out, the contractor must have procedures in place for suitable recruitment, induction and probationary periods, along with carrying out HSE checks for any outstanding enforcement notices (improvement or prohibition).

Torus will appoint a suitable 'main contractor' who will have appropriately trained and skilled staff to carry out various works activities covered by this policy. All of Torus's contractors and sub-contractors will have been financially vetted and will have signed up to Torus's policies and procedures or produced their own policies and procedures in respect of confidentiality, data protection, Health & Safety, Equality and Diversity and code of conduct and will be approved by Torus. Torus will work within the principles of partnering with all its contractors to explore innovative and best practice initiatives such as standardisation, value for money and joint procurement methods.

All tree maintenance work will be carried out by NPTC qualified arborists. All equipment will be suitable for the use for which it is intended and will inspected and maintained in accordance with current legislation.

All work will be carried out in compliance with relevant British Standards for grounds and tree maintenance activities.

### 7.2 Quality Control ('QC')

Torus will adopt a risk-based approach to QC with findings documented and action taken. This will be done by undertaking a combination of post-completed, work in progress and desktop/visual inspections, which will ensure work carried on behalf of Torus is carried out to industry standards. The results of these inspections will culminate in regular Quality Control Reports and shared with contractors at Quality Control meetings.

QC Inspections will be on a risk-based approach as above and include the following:

1. Asset Compliance Team quality control checks (post-completed, work in progress and desktop/visual audits) on a minimum of 1% of the work
2. Service provider (post-completed and work in progress) quality control checks on a minimum of 10% of the work and includes sub contracted work
3. Customer satisfaction surveys

## 8. Performance Reporting

Torus will control and monitor grounds and tree maintenance with performance reports and KPI's.

Performance information will as a minimum be produced and monitored at the Repairs & Maintenance Performance Meetings which are held monthly.

Performance may also be reported quarterly to the Landlord Operations Committee, who in turn provide feedback to the operational teams. The Committee will also be involved in the review and development of this policy.

Performance indicators will be monitored, reviewed and amended on a regular basis to ensure they are relevant and appropriate.

## 9. Issues of service failure and non-compliance

Torus will monitor service delivery and performance and ensure appropriate courses of corrective action are implemented to address any issues of service failure and non-compliance

Torus will ensure there is a robust process in place for the management of any follow-up works required following the completion of surveys and inspections. Torus will ensure that there is a robust process in place to collate and store any warning notices and all associated records of completed remedial works

## 10. Training and Awareness

This policy and the procedures that support it will be, where appropriate, subject to a range of training across Torus and will involve all relevant stakeholders. The training will be bespoke to the individual stakeholders and refresher training will be provided as appropriate.

## 11. Diversity & Inclusion

A key aim of the Torus approach to diversity and inclusion is to ensure that it is embedded in service delivery policies and procedures.

In recognition of this Torus aim to deliver services that are;

- relevant and fully accessible to all
- tailored to meet both the specific needs of the individual, including those with additional support needs, and the diverse needs of the wider community
- compliant with all aspects of Equality and Diversity legislation

## 12. Monitoring and Review

Torus Asset Compliance Team is responsible for reviewing this policy as a minimum on a biennial basis, or prior to this where legislative change or amended work practices are introduced, or to comply with best practice.

**Review date:** **October 2022**

**Prepared by:**

name: Carl Talbot-Davies

role: Group Head Asset Compliance & Delivery

signed:

date:

**Reviewed by:**

name: Dan Bradley

role: Group Assets Director

signed:

date:

## Appendix 1

### Performance Monitoring

Performance information will as a minimum be produced and monitored at an operational management level each month. Key performance indicators will be provided at Executive Management Team level on a monthly basis and to the Landlord Operations Committee on a quarterly basis.

Performance indicators will be monitored, reviewed and amended on a regular basis to ensure they are relevant and appropriate. Typically, they will consist of the following measures:

| |
|---|
| **Grounds maintenance -** % of pre-planned grounds maintenance activities completed against programme |
| **Trees -** % of pre-planned programme surveys and inspections completed within target date - Completed Vs due |
| **Trees -** % of identified remedial actions completed within target period - Completed Vs due |
| **All assets - RIDDORs** - total number of RIDDORs within the reporting period |

Where performance is non-compliant / below target, a narrative explanation will provide:

- Explanation of Current Performance
- Corrective Action to be Taken
- Impact of Actions and Timescales

## Appendix 2

### Tree Hazard: Risk Evaluation and Treatment System (THREATS)

**A method for identifying, recording & managing hazards from trees**

**GUIDANCE NOTE FOR USERS**

***To be read in conjunction with THREATS pro forma, included at the end of this document***

*June 2010*

*Forbes- Laird Arboricultural Consultancy*

## 1 Preamble

### 1.1 Development history

**1.1.1** Work started on THREATS in 1998, when the author was engaged on a consultancy basis as a part-time highway tree surveyor/manager. A need was identified early in this commission for a method of quantifying the risk posed by trees identified as having structural defects. It was considered that the method should have several characteristics:

- It had to mirror and be in sympathy with typical tree assessment processes
- It had to record and analyse tree defects in such a way that it could be used for large scale tree inspections without impeding data collection
- It had to offer consistency of approach, definition and outcome
- It had to stratify tree risk such that intervention could be programmed as to urgency, roughly according to: immediate, scheduled and deferred
- It had to be transparent and comprehensible to non-specialists

**1.1.2** The framework was laid down based on a two-page data collection pro forma which:

- Recorded the fact of inspection
- Listed any observed defects
- Assessed the three components of tree risk (defect, target and impact – after Matheny & Clark (1994)[1])
- Contained an algorithm that provided for a relatively subtle interaction between these three components
- Arrived at a conclusion which was in tune with what can be termed 'unassisted arboricultural decision making' (aka gut instinct)
- Established a defensible hierarchy of response that included delayed intervention and phased reinspection

**1.1.3** Since its inception, THREATS has enjoyed several iterative amendments, chiefly based on feedback both from peer review (conducted in 2002 under the auspices of the Arboricultural Association), and from users of the method (who have always been encouraged to offer suggestions for improvement).

**1.1.4** The framework and algorithm had not been altered in over ten years, when the author was commissioned to prepare an amended version of the method specifically for use by Network Rail Infrastructure Ltd, known as THREATS – NR. This exercise led to an extensive and intensive review of the method whereupon it was found for the railway application that one combination of factors produced an unsatisfactory result. This led to a boundary change which has been carried across into the standard method: the outcome being on a borderline the change was equally satisfactory.

**1.1.5** In 2007 an in-depth comparative field trial was undertaken to examine 15 tree risk assessment systems, one of which was THREATS. Despite the trial group of eight arborists not having been trained in the use of the method, THREATS fared well in the tests, being preferred to and producing more consistent results than several other well-known systems, including that known as QTRA, in the use of which three of the eight users had been trained.

**1.1.6** THREATS and the new THREATS – NR are effective, simple and quick to apply. THREATS has been rigorously examined in numerous scenarios for over ten years and has been found to be fit for purpose.

**1.2 Introduction**

**1.2.1** The THREATS method has been designed to offer all those who have responsibility for evaluating and managing trees a means of assessing them for risk in a consistent fashion. THREATS also assists the user in determining the appropriate response to the level of identified risk.

**1.2.2** THREATS can be applied in a number of ways, making it a versatile tool for tree managers:

a) In its full form, most suited for smaller numbers of trees, THREATS is a detailed record of inspection; it can also be used in a compressed form to evaluate risk as part of larger scale tree surveys (see part 3)
b) It provides a framework for defining a defensible, phased response to identified hazards, where the immediate rectification of all safety-critical defects identified during a tree survey is not always possible
c) It can be used to reassure an anxious party that a tree has been found on inspection to be reasonably undangerous, or to demonstrate to a complacent party that a tree is unsafe, and that intervention is required
d) It can be used as part of a desk study to prioritise tree inspections, by means of Target Zoning treed areas as type-diverse as large gardens, woodlands, country parks and even towns (see part 4)
e) It can be used to quantify tree risk by ward, district, railway region etc, and by this means the effectiveness of tree inspection and management regimes can be monitored (the total THREATS score for a given area should generally decline with time under effective management)
f) It can be used retrospective to a tree failure to assess foreseeability

**1.2.3** THREATS takes established methodology for considering potential hazards from trees and puts this into a user-friendly framework by cross-referencing the factors that, in combination, define the level of risk for any given tree defect. In order to achieve this, THREATS relies on craftsman-level arboricultural knowledge, in the form of familiarity with tree defects, together with an judgement-based assessment of the likelihood of any given defect actually failing for the tree being assessed. In this context, the species of tree and, where pathogens are present, host/agent combinations, are frequently important.

**1.2.4** THREATS deliberately relates back to the authoritative work by Lonsdale (1999)[2]. Any further clarification required as to the nature of tree defects and the likelihood of them failing should lead the enquirer directly to this book as a starting point.

**1.2.5** It is stressed that THREATS is not designed to provide 'The Answer' to the question of tree safety, and is not, therefore, a substitute for properly informed arboricultural judgement. Instead, it aims to offer a framework for systematically and consistently quantifying this judgement, allowing tree managers to arrive at their decisions through a logical, defensible and transparent process.

**1.2.6** When the method was being constructed, the interaction between the Hazard Rating Calculation (THREATS section 7) and the Appropriate Response (section 8) was mapped out into 120 possible outcomes (5 x 6 x 4 outcomes). These were grouped into seven 'Threat Categories' that reflected, in the author's opinion, a satisfactory range of responses to any given outcome. In order for any derived set of possibilities to result in the 'correct' response (i.e. a response that matched up with unassisted arboricultural decision making), a weighting score was attached to each option within the three factors. Ensuring that this algorithm worked was beyond the author's limited mathematical capabilities, and was delegated to his wife (who is quite literally a former rocket scientist). Said rocket scientist also reviewed and modeled outcomes for the THREATS – NR variant.

**1.3 Legal framework in the UK**

This is well-trodden ground, so only the briefest of summaries is offered here[3]:

**1.3.1** There is an obligation of reasonable safety owed by site owners both to visitors and to those adjacent to a site under the Occupiers' Liability Act 1957 (OLA 1957, i.e. the principle of Duty of Care) and 1984, such that an occupier may be held liable for losses (physical harm to life and/or property) arising from an accident to a third party, where the cause of the accident was both reasonably foreseeable and reasonably preventable, bearing in mind all the circumstances pertaining to the situation.

**1.3.2** These circumstances include specific consideration for children; under s2(3)(a) of the OLA 1957, 'an occupier must be prepared for children to be less careful than adults'. The case of Tomlinson v Congleton Borough Council ([2003] 1 A.C. 46; [2004] UKHL 47), the 'shallow pond case', expanded on this requirement by stressing the need to consider the inequivalence of danger relative also to people of reduced mobility.

**1.3.3** A considerable body of case law has established that, in order to be in a position to foresee and indeed to prevent harm arising from a tree failure, it is necessary to subject the tree or trees in question to 'regular inspection', with this inspection undertaken by someone competent both to identify any defects present and to interpret their significance for public safety.

**1.3.4** Regular inspection is a notoriously vague concept, with intervals applied ranging from every six months to five years. The author considers that the former is unworkable and the latter potentially ineffective. The definition that this author proposes is that:

> '*A tree should be inspected at a regularity that is appropriate to its condition, within its context, with a maximum interval between systematic expert inspections of five years within Risk Zones 1-4*'[4] (Please refer to Table 2 at page 12)

For this definition to work in practice, and indeed for the occupier to discharge his Duty of Care at all, a baseline knowledge of the tree stock for any given site is essential.

## 2 Notes on applying THREATS

### 2.1 Completing PART I, the tree inspection record

**2.1.1** Survey details
This section serves as the record of complaint where a problem tree is reported to the tree manager, and/or a record of inspection, is a mix of desk-based and fieldwork.
The 'surveyor details' box should be initialed on completion of the survey, as prompted, as well as having the surveyor's name and position recorded in full.
The 'origin…' box fixes the time of the incoming complaint, though it can also identify a more routine survey, such as "storm damage inspection".
The 'survey date & time' box effectively pegs the response time to the log of complaint; this should prompt the tree manager to consider carefully how urgent the complaint sounds…
The 'weather conditions' box notes the weather both at the time of the log of complaint, e.g. "strengthening wind", as well as when the tree is inspected.
'Other notes' should cover any other information provided by the complainant, such as "reports ground moving at base of tree"…

**2.1.2** Description of tree
'Owner…' & 'tree no…' are self-explanatory
'Location' could be "outside No.21 Acacia Avenue", a GPS waypoint reference (see section 3), a highway chainage and so on.
'Species' & 'age class' are self-explanatory.
'Size category' refers to the stem size bandings listed in section 6 of THREATS under 'Agents' (see 2.2.3).

**2.1.3** Description of failure indicators
The prompt in brackets tells the user how to deal with a tree that has more than one indicator: all indicators should be recorded, but the one that should be scored in Part II of THREATS is that which gives greatest concern. The list of failure indicators is taken from Lonsdale (ibid.). Whilst it is hoped that the THREATS list is exhaustive, as with all the best pro forma there is an 'other' box provided.

It is important that every visible indicator is recorded. However, the indictor that requires the most urgent attention is the one that should be scored (first) in Part II (though of course any other defects that might be present should be considered for remediation at the same time).

The nature of the hazard from each indicator is explained very briefly, to assist the user in his/her assessment of their significance. Identified indicators should be flagged in the tick-boxes provided. Field use of THREATS suggests that it is helpful to record the precise nature of the indicator(s) identified and also, at this stage, to suggest what target might be vulnerable should the indicator(s) fail, hence the notation space provided.

This section completes the written tree inspection record and could, if required, stand alone.

**2.2 PART II: The Risk Evaluation Sum**

The Note is of critical importance: the given examples are just that and **must not** be treated as a substitute for good judgement based upon sound arboricultural knowledge.

**2.2.1** Failure Score

The prompt directs the user to consider known data on relative vulnerability of tree species to failure from observed defects, as well as the possibility of seasonal pre-disposing factors.

Examples of the former would include the differing persistence of dead wood on pedunculate oak (*Quercus robur* L.) and common ash (*Fraxinus excelsior* L.), and examples of the latter would include humidity during the high photosynthetic period (as an agent involved in summer branch drop), and autumnal gales (storm damage, windthrow, etc).

Thus a horse chestnut (*Aesculus hippocastanum* L.) with a heavily end-loaded limb surveyed in December might require a different entry in the 'Likelihood of failure' range than would the same tree if inspected in May.

Also important at this stage is a consideration of failure criteria, such as *t:r* ratio[5]. Where the tree's condition relative to failure criteria has yet to be established, the assessor should err on the side of caution (though overreaction to uncertainty should be avoided).

When considering 'Likelihood of failure', it is important to bear in mind two (almost) conflicting issues:

- Defects that might appear at risk of impending collapse often remain sound for years
- As well as the protection of life and property, another purpose of the survey is frequently to protect owner liability: the user should not take unnecessary chances – an identified defect that threatens a target is a 'foreseeable danger'

The numerical weighting of the score for each failure category gives an indication as to the approach required. The user should reserve 'Imminent/Immediate' for only the most hair-raising of defects, as suggested in the examples given.

The failure category 'Probable/Soon' might seem to cover many tree defects, though actually it should be reserved for clearly identified problems where failure in the near term is a reliable prognosis. This is where the oak/ash deadwood example is useful: on pedunculate oak it is not usually 'probable' that dead wood will detach 'soon', this process generally takes years and frequently occurs by piecemeal crumbling from the branch tip, with bark and sapwood disintegration to leave a robust desiccated heartwood spar. Ash trees, of course, shed their dead wood much more readily, and thus it *is* 'probable' that dead wood recorded on ash will detach 'soon'.

The failure category 'Likely, foreseeable' is the one that field use suggests most often applies to tree defects, and it is designed to reflect a guesstimated failure timeline in the two- to three-year range, and possibly a little more.

'Potentially with time' covers emergent defects that are likely to become hazards only slowly. A good example of this is given as 'robust dead wood', where we are thinking of pedunculate oak again.

'None apparent' is a category that becomes increasingly used the more trees one surveys with THREATS…

The important issues to consider are:

- How far advanced towards failure is the defective part? (Returning to our dead oak branch, it may indeed take many years to shed, but this tree inspection may be taking place years towards the end of that period)
- What is the known failure pattern of trees of survey species, and when and how do they or their constituent parts actually fail, and where does the identified defect fit into these questions?
- How does the defect relate to established failure criteria? If this is not known and cannot be established by visual inspection alone, then a suitable 'Control Measure' selection (see 2.3.1) might be 'Further investigation'

Again, sound arboricultural judgement is essential in making the appropriate selection, and in avoiding either complacency or over-reaction. However, where there is genuine uncertainty, the selection should be made one category higher (though not from score 8 to score 50).

**2.2.2** Target Score

There are three prompts here:

- The first is a reminder that, for example, the now well-known dead oak branch is unlikely to hit a target far outside its vertical drop zone (though a realistic possibility of ricochet off other branches should not be ignored)
- The second prompt is designed to highlight cases where people are at elevated risk: those 'trapped' in cars or unsighted whilst driving, the relative naivety of children to danger, whereby a higher Duty of Care pertains to them[6], and those whose physical or mental functions are impaired, with a consequent decline in their ability to be aware of or to react to/evade imminent danger. THREATS addresses this by upgrading any given target value by one level if, for example, unsupervised children are likely to be the human component of the target. A little common sense is necessary here: children ubiquitously traveling in cars, for example, would not warrant a rise in the target value of a road
- The third prompt directs users to the railway-specific variant THREATS – NR where the target is an active railway line

Targets are divided into two groups: Static and Target Occupancy. This is designed to help the user to identify the appropriate Target Score and has been field tested quite exhaustively.

- The 'Static target examples' presuppose a cross-reference between the monetary value of the structure and the presence of people. This would not always be the case, so these examples should be used with some caution: a park bench is a low-cost item, but it may be that the one under consideration is frequently occupied by old ladies feeding squirrels
- The 'Target Occupancy examples' are included to guide the user through the park bench dilemma: the bench is properly scored as a low-cost item, rating a '7', but the old ladies would probably rate '20' (or perhaps '25' if very persistent), being 'frequent use' and 'constant traffic- pedestrian' respectively. With this example of course, the Control Measure, if required, would probably be the relocation of the bench

**2.2.3** Impact Score

The prompt is designed to help the user focus on the actuality of the impact potential of any given defect, once failed. For example, an unstable tree adjacent to a busy highway is obviously not hazardous if it leans heavily over the adjoining field. The same tree would be assessed differently if it inclined the other way.

The list of 'Agents' has been re-worked several times but ultimately, in the author's view, remains somewhat unsatisfactory: tree size class, limb size and weight and likely momentum are deceptively complex issues. As such, this list represents the best iteration to date and the author would welcome any suggestions for improvement.

For this reason, the examples listed under 'Degree of harm' should be used as a good guide as to the appropriate Score. In simple terms, these can be thought of as killed, disabled, injured, hurt where people are concerned. However, care is needed to avoid over-reacting to the possibility of fluke injuries. In this connection, the user should remember that Duty of Care is discharged by mitigating 'reasonably foreseeable' dangers.

The agent to be scored will be either a whole tree or a part of the crown (single branches included), so the surveyor should consider either the stem size millimeter range (estimated at 1.5m above ground level), or the approximate weight of the vulnerable section, or revert to the examples.

It is essential that the agent of damage is considered with particular care: whole tree failure might be the assessed risk, but the impact score should relate only to how hard the target might be struck. For example a 25m tree toppling onto a target 20m away is likely to strike it only with relatively minor branches: the impact score should probably be 4 rather than 10.

The impact score is necessarily weighted to give low importance to a 'recoverable injury': the point being that a balance should be struck between the retention of desirable trees with public safety. Whilst the thought of a collapsing tree inuring or killing someone should give the surveyor pause, the possibility of a minor injury ought not to lead to mistimed intervention. Apart from anything else, in large, district-wide surveys, not all hazard trees identified can be remediated simultaneously.

**2.2.4** Risk Evaluation Sum

This is the heart of the THREATS method: by mirroring the established decision making process employed by arboriculturists, the method takes the three scores from sections 4-6 to transform the surveyor's arboricultural judgement concerning the relative safety of a tree into a number, capable of further manipulation.

## 2.3 Implementing Control Measures: PART III of THREATS

**2.3.1** Appropriate Response

Very simply, the number derived above is compared with the 'Score range' column to arrive at a Threat Category: this is the ultimate goal of THREATS, and provides the user with a quantified assessment of the risk.

The 'Threat Categories' are both numbered and described, so one might refer equally to a Category 3 tree, or to the same tree posing a 'Slight' threat. The word description is designed to give the user a convenient means of defining the risk to a non-specialist. Users report that this is a very helpful feature.

The 'Action Required' is deliberately prescriptive: too often unsafe trees are not afforded the intervention priority necessary to discharge Duty of Care. The balance between intervention and deferred action through reinspection shifts from the lower end of the scale where it restrains over-reaction, to the higher end where it requires a decisive response.

Occasionally, typically when first using THREATS, the user discovers on cross-referencing the Hazard Rating with the Threat Category, that an 'Action Required' seems at odds with his/her expectation. Repeated field-testing has suggested that this is due to an incorrect category assignment in Part II and not a flaw in the algorithm itself. Accordingly, if the derived outcome fails to match professional judgement, it is necessary to recheck the assigned categories to see whether one has been incorrectly attributed. In any event, if disagreement persists the author always recommends following professional judgement (though currently there are no instances of serious disagreement reported from practiced users).

At the lower end of the scale where, of course, by far the majority of trees are found, THREATS guides the user towards a more routine approach to Control Measures. However, THREATS stresses the need to reinspect a defective tree following circumstances that might cause its condition to deteriorate, including the passage of time. The obvious example of this is high wind speeds, and THREATS suggests what response should be appropriate following winds of different velocities, listed according to the Beaufort Scale (see Table 1).

**Table 1: Beaufort Scale, Specification on Land[7]**

| Beaufort Force | Description | Specification on land | Speed | | |
|---|---|---|---|---|---|
| | | | Knots | km/h | mph |
| 0 | Calm | Smoke rises vertically | Less than 1 | Less than 1 | Less than 1 |
| 1 | Very Light | Direction of wind shown by smoke drift but not by wind vanes | 1 - 3 | 1 - 5 | 1 - 3 |
| 2 | Light breeze | Wind felt on face, leaves rustle, ordinary wind vane moved by wind | 4 - 6 | 6 - 11 | 4 - 7 |
| 3 | Gentle breeze | Leaves and small twigs in constant motion, wind extends white flag | 7 - 10 | 12 - 19 | 8 - 12 |
| 4 | Moderate breeze | Wind raises dust and loose paper, small branches move | 11 - 16 | 20 -29 | 13 - 18 |
| 5 | Fresh breeze | Small trees in leaf start to sway, crested wavelets on inland waters | 17 - 21 | 30 39 | 19 - 24 |
| 6 | Strong breeze | Large branches in motion, whistling in telegraph wires, umbrellas used with difficulty | 22 - 27 | 40 - 50 | 25 - 31 |
| 7 | Near gale | Whole trees in motion, inconvenient to walk against wind | 28 - 33 | 51 - 61 | 32 - 38 |
| 8 | Gale | Twigs break from trees, difficult to walk | 34 - 40 | 62 - 74 | 39 - 46 |
| 9 | Strong gale | Slight structural damage occurs, chimney pots and slates removed, branches break from trees | 41 - 47 | 75 - 87 | 47 - 54 |
| 10 | Storm | Trees uprooted, considerable structural damage occurs | 48 - 55 | 88 - 101 | 55 - 63 |
| 11 | Violent storm | Widespread damage | 56 - 63 | 102 - 117 | 64 - 73 |
| 12 | Hurricane | Widespread damage | >64 | >119 | >74 |

The Beaufort Scale was originally developed for the Royal Navy in 1805 (by one captain Francis Beaufort) and was adapted for use by 'land-based observers' in 1906. As can be seen from the descriptions in Table 1, the land version frequently relies on the behaviour of trees under wind action (instead of on waves), such that, at higher wind speeds, the observations define failure thresholds.

The UK Meteorological Office uses the land version of the Beaufort Scale in issuing severe weather warnings to predict the likely level of damage from forecasted high winds. Thus the Beaufort Scale can be used to identify a measure of foreseeability of tree failure.

Concerning reinspection and possible future work to a tree, it is important to realise that the first time a tree is assessed using THREATS is not necessarily the last: in other words, a defect can and potentially should be re-evaluated at each successive regular inspection. By this means, the deferring of intervention, as opposed to reinspection, can be rolled on such that a defect may never, in fact, reach the state where intervention is required during the life of the tree. This recognizes the fact that trees exist on a very different timescale to people: what might appear a defect with, for example, a three-year critical time, in reality might never require remediation. By using THREATS, the surveyor is given a framework that justifies doing nothing.

In this way, hazard tree mitigation can be systematised towards proactive intervention based on necessity, rather than either the 'fire brigade tactics' of reactive response, or the frequently wasteful policy of cyclic pruning regardless of need.

Finally, the reinspection interval for Category 1 is reduced from five to three years where a) there is child-specific access and b) the target score is 20 or higher. This further precaution towards children reflects the view that it is not safe to leave trees with identified defects uninspected for over three years where children are present in significant numbers.

**2.3.2** Outline of Work Required

The prompt is designed to make the user consider the suitability of non-arboricultural solutions: can the target score of the old ladies' park bench be reduced, preferably to zero, by relocating it? The suggestions for remedial measures are not in any way intended to cover all the options, but merely to offer a few possibilities. In fact, no formal attempt has been made to tie this section into the method as a whole, as individual tree problems demand tailored solutions. Notation space is provided so that the surveyor can enter a more detailed description of the necessary work.

However, the practiced user will soon develop a correlation between the nature of the defect and the work required. Indeed, someone ticking the 'Tree removal' box having scored only an end-loaded limb should look again! The main intention of this section is to show how the level of tree work should be graded, with wholesale removal clearly identified as the measure of last resort.

It may be that more than one defect was originally identified: where this is the case, it may be advisable to score other defects using THREATS, as a guide to whether it is appropriate to prescribe additional treatments while the contractors are on site.

## 3 THREATS used in Large-scale Tree Surveys

**3.1** Up to now, we have examined THREATS as a stand-alone method for assessing individual trees, and it is obvious that the use of the full pro forma for a tree survey covering numerous specimens would be cumbersome. However, THREATS was designed from the outset for use in large-scale tree safety surveys; in fact, practiced users find that employing the method actually reduces time required per tree. Most proprietary tree management software has THREATS as a selectable option.

**3.2** 'Action required' and the 'Priority' for this would, in any case, be standard columns in any tree safety survey (albeit perhaps under different headings). The advantage of using THREATS in this context is that outcomes in the method provide a guide as to the appropriate entries in the columns that deal with recommended treatments and priority. For these reasons, the author and other THREATS users have found large tree surveys to be the most useful application of THREATS to date. In fact, practiced users find that the method actually speeds up the decision-making process and takes if anything less time than surveying without it.

**3.3** Finally, local authorities using THREATS for district-wide safety surveys can benchmark the effectiveness of their tree risk management regime by comparing total accrued every five years (the recommended interval for baseline inspections). This is a helpful tool when approaching considerations of Best Value & performance evaluation.

## 4 THREATS as Part of a Desk Study: Target Zoning & Tree Inspection Priorities

Even where the existing level of knowledge of the tree stock's condition is low (and likewise, perhaps, the resources for its inspection), THREATS can assist in the prioritizing of tree inspections, and can do so in two ways:

### 4.1 By considering the Target Score

The tree manager can evaluate his area of responsibility in the context of varied target value. At the larger scale this will be a fairly blunt tool, but even so a useful one. By referring to the target examples, and producing one's own list tailored to the locality, it is possible to arrive at a prioritised schedule of areas for inspection.

### 4.2 By considering the Impact Score

Cross-referencing known size of any trees present with their locations can further prioritise the inspections: clearly the damage potential from young *Sorbus* is much lower than from mature *Platanus*, and even in areas where baseline knowledge of the stock is low managers usually have *some* idea of the nature of the population.

### 4.3 Example

Based on these factors, a THREATS-prioritised list for a locality could look something like this:

a) Various mature trees adjacent to playground
b) Raywood ash avenue along dual carriageway
c) Lapsed pollards in pedestrian precinct
d) Mixed age/species planting in hospital grounds
e) Several mature horse chestnuts in public parks f)
30-40 year old trees at lower school
g) Mature pines lining roads in Victorian residential district
h) Trees flanking cycle-way through park
i) Area of woodland designated as a Public Open Space

See Table 2 for an example Risk matrix for target zoning.

**Table 2 Example matrix for risk zoning and tree inspection**

| Risk Zone | Land use (examples) | Frequency of access | Tree attributes (wh known) | Level of inspection | Frequency of inspection |
|---|---|---|---|---|---|
| 1 | Major road or busy junction where cars static under tree(s)<br>School buildings or immediate environs and school main access / busy playgrounds<br>Urban centre<br>Hospital buildings / main access | Constant to very frequent access /occupancy including frequent access by unsupervised or partially supervised children | Maturing or mature trees | Arboricultural | Annual<br>(consider basic inspection after severe weather conditions) |
| | | | Young trees or mature trees regularly managed as pollards | Basic | Quinquennial for young trees, triennial for mature trees managed as pollards |
| 2 | Busy road / footway pavement or road junction / bus stop with peak times traffic where cars or pedestrians static under trees<br>School grounds or less well-used playgrounds<br>Frequently used buildings including college buildings | Very frequent to frequent access / occupancy including regular access by unsupervised or partially supervised children or by people with reduced mobility and other impairments that elevate risk | Maturing or mature trees | Arboricultural | Biennial or annual as driven by tree condition<br>(consider basic inspection after severe weather conditions) |
| | | | Young trees or mature trees regularly managed as pollards | Basic | Quinquennial |
| 3 | Peak times traffic (pedestrian or vehicular) including main access to colleges, or buildings with regular use | Some access throughout the day but busy during peak times, or sporadic use / access by unsupervised or partially supervised children or by people with reduced mobility and other impairments that elevate risk | Maturing or mature trees, especially if large | Basic or refer for arboricultural inspection if required | Triennial or more frequent as driven by tree condition |
| | | | Young trees or mature trees regularly managed as pollards | Basic | Quinquennial |
| 4 | Occasional traffic or use including most rural roads and regularly used woodland paths | Sporadic access only | Mature or large trees | Person with good working knowledge of trees, or refer for basic / arboricultural inspection if required | Regular though casual observation |
| 5 | Infrequently used rights of way including minor woodland paths | Access is rare | Mature or large trees | Landowner / occupier should be familiar with tree stock, seeking advice where required | Occasional casual observation |
| 6 | No formal public access including private land with no rights of way / permitted paths | Access is not foreseeable | No applicable | None likely to be required | None likely to be required |

## 5 Concluding remarks

**5.1** THREATS has been designed as a way of utilizing existing arboricultural knowledge, not replacing it. Essentially, therefore, the method is a codification of a tool that tree managers use every day: professional judgement.

**5.2** THREATS is a consistent, logical and transparent way of standardizing the assessment of tree risk, and of describing that risk to non-specialists. It will also assist the tree manager in justifying works budgets and in phasing tree work.

**5.3** THREATS restrains over-reaction to some hazards, whilst demanding rapid intervention for others. As such, it can highlight a dangerously slow response, hopefully in time to implement necessary control measures.

**5.4** In THREATS – NR, Britain's rail infrastructure operator has a unique and bespoke system to assist in controlling risk from lineside trees, as well as those on third party land capable of falling on the railway.

**5.5** Tree owners and managers are reminded that the most important letter in THREATS is the 'S' for '**System**': having a system in place is essential to enable Duty of Care to be discharged.

*Note*

*Whilst competent arboriculturists are welcome to try THREATS for themselves, the author and Forbes-Laird Arboricultural Consultancy Ltd wish to stress that they accept no responsibility whatsoever for any consequences arising, whether directly or indirectly, from management decisions arrived at using the method, in the absence of training in its application by the author and continuing professional development by the user.*

*References*


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# TREE HAZARD: RISK EVALUATION AND TREATMENT SYSTEM - THREATS

**PART I: TREE INSPECTION RECORD**

**1] Survey details**

| | | | |
|---|---|---|---|
| **Surveyor details (initial on completion)** | | | |
| **Origin, date and time of inspection request** | | **Survey date & time** | |
| **Weather conditions** | **At log** | **At site** | |
| **Other notes** | | | |

**2] Description of tree**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Owner if known** | | | | | | |
| **Tree no. if applicable** | | **Location** | | | | |
| **Species** | | **Age class (circle)** | Y MA EM M OM V | **Size category (circle)** | S M L VL | |
| **Other notes** | | | | | | |

**3] Description of failure indicators (Circle Item no. to identify defect scored in Part II; always score most hazardous defect)**

| Item | Indicators | 3 | Hazards | List defect and target details |
|---|---|---|---|---|
| 1 | Altered exposure | | Tree vulnerable to windthrow/storm damage due to e.g. loss of companion | |
| 2 | Unstable root plate | | Tree at imminent risk of toppling | |
| 3 | Root damage | | Tree topples. Compare damage with failure criteria: $R:R_w$. Also consider health loss | |
| 4 | Root decay (fungi) | | Tree vulnerable to windthrow/toppling, possibly without further warning (see 3) | |
| 5 | Stem/limb decay (fungi) | | Stem/limb fracture causing crown elements to collapse (consider type of decay) | |
| 6 | Inadequate stem taper | | Failure risk due to e.g. excessive crown raising or D/h deficiency | |
| 7 | Target cankers | | Possible weakening/failure of affected area, especially if located on stem 'hot spot' | |
| 8 | Exudates | | Indication of (internal) disorder; if from lower stem, Honey Fungus infection? | |
| 9 | Stem hollow, decayed, cracked inc. shear cracks | | Stem fracture/buckling, causing crown to collapse. Consider *t:r* value | |
| 10 | Lapsed pollard | | Re-growth epicormic in origin & possibly weakly attached; possible decay at knuckles | |
| 11 | Overweight, subsiding, or lion-tailed limbs | | Limb failure due to an excess of mass over strength or to end-loading | |
| 12 | Bark congestion | | Fibre buckling of leaning/subsiding area indicating possible forthcoming collapse | |
| 13 | Reactive growth | | Member fails if repair (reactive growth) unsuccessful in stabilising defect | |
| 14 | Inclusive bark | | Fork fails causing leader/limb to fall | |
| 15 | Fractured limbs; storm damage | | Broken limbs/hanging breaks could fall; crown destabilised: further failures likely | |
| 16 | Bark necrosis | | Cambium death causing xylem dys-function: affected area dies, decays & fails | |
| 17 | Dieback; poor foliage | | Dead areas become unsafe. Various biotic and abiotic causes; roots damaged? | |
| 18 | Dead wood | | Branches fall | |
| 19 | Prolific ivy | | Possible obscuration of defects and excessive winter sail area | |
| 20 | Other/None (specify) | | | |

**PART II: RISK EVALUATION SUM** *NB: Examples given in sections 4-6 & 9 are neither prescriptive nor exclusive*

### 4] Failure Score

Consider identified defects in relation to species/clone history, established failure criteria & time of year

| Score | ☐ | Likelihood of failure | Example indicators |
|---|---|---|---|
| 50 | | Imminent/Immediate | Uprooting; Extreme root loss; Collapsing structure (i.e. primary failure has already occurred) |
| 8 | | Probable/Soon | Altered exposure; Primary decay fungus; Severe inclusive bark/root loss; Fragile dead wood |
| 2 | | Likely, foreseeable | Lapsed pollard; Overweight/subsiding limbs; Poor stem taper; Dieback |
| .8 | | Potentially with time | Early development of inclusive bark; Robust dead wood |
| 0 | | None apparent | No significant defects observed |

### 5] Target Score

Consider impact radius of identified defect against potential targets. Consider forward visibility available to drivers (Poor Forward Visibility / Good Forward Visibility) & whether vehicles are likely to be stationary, e.g. at junctions. If targets liable to include unsupervised children &/or the elderly or infirm, upgrade target value by one category. **For railway targets use THREATS NR**

| Score | ☐ | Value | Static target examples | Target occupancy examples |
|---|---|---|---|---|
| 40 | | Very high | Building 24 hour use | Constant vehicular traffic/busy playground |
| 25 | | High | Building 12 hour use, ≥11Kv power lines | Frequent vehicular traffic/constant pedestrian use |
| 20 | | Medium | Building/structure occasional use, <11Kv lines | Peak times traffic/intermittent use, PFV, e.g. commuter run |
| 15 | | Low | Garage, Summer house, Listed wall | Occasional traffic/sporadic use, GFV e.g. quiet rural road |
| 7 | | Very low | Unlisted wall, paving, garden features | Infrequently used access/public right of way/bridleway |
| 0 | | None | Grass | Hardly ever used, e.g. remote path |

### 6] Impact Score

Consider height of fall/momentum & whether e.g. lower branches would impede agent's descent

| Score | ☐ | Degree of harm and consequences (examples) | Agent: trees, mm, or branches, kg (NB size/weight for guidance only) | | |
|---|---|---|---|---|---|
| 10 | | Severe structural damage, vehicles crushed – passenger fatalities very probable | VL | > 750mm | > 500kg |
| 6 | | Moderate structural/ severe vehicle damage – fatal/disabling injuries likely | L | 350-750mm | 50-500kg |
| 4 | | Minor damage/probable disabling/hospitalising injury to pedestrians | M | 100-350mm | 10-50kg |
| 1 | | Fragile objects destroyed, superficial/recoverable injury to pedestrians | S | < 100mm | < 10kg |

### 7] Risk Evaluation Sum:

FAILURE SCORE_____X TARGET SCORE_____X IMPACT SCORE_____=

**PART III: IMPLEMENTATION OF CONTROL MEASURES**

### 8] Appropriate Response

The use below of the word 'within' should not be taken to mean that delay is necessarily acceptable

| Score range | ☐ | Threat Category | Recommended action & Completion deadline | Code |
|---|---|---|---|---|
| 4000+ | | 7- Extreme | Evacuate/prevent access to impact site, emergency call-out of contractors | E |
| 2001-3999 | | 6- Serious | Close site if practical; arrange for work to be completed within 7 days | 7D |
| 1000-2000 | | 5- Significant | Arrange for work to be completed within four weeks maximum | 4W |
| 330-999 | | 4- Moderate | Remediate within 13 weeks, reinspect after SWE meantime (inc. gales to Force 7+) | 13W |
| 160-329 | | 3- Slight | Reinspect annually /after storms (Force 10+), expect to schedule work within 2 yrs | A |
| 50-159 | | 2- Minimal | Reinspect within 3 yrs if public access, schedule work as required | 3Y |
| 0-49 | | 1- Insignificant | Reinspect within 5 yrs if general public access or 3 yrs if child-specific access & TS ≥20 | 3/5Y |

### 9] Outline of Work Required

Consider amenity and conservation values of tree when selecting control measure

| Control measure | ☐ | Examples | Notes / Work specification |
|---|---|---|---|
| Target management | | Target value / vulnerability reduced by exclusion, diversion or relocation: e.g. anti-social planting / fence off & warn; re-route paths; relocate benches | |
| Further investigation | | Decay mapping to establish significance of defect: set results against failure criteria | |
| Install support | | Non-invasive brace to support vulnerable member / dividing union | |
| Localised pruning | | Reduce weight loading on vulnerable limb (including shortening dead branches to retain habitat) | |
| Limb removal | | Prune out dead/damaged/vulnerable growth | |
| General pruning | | Reduce crown by specified amount | |
| Crown removal | | Leave stem as a standing carcass (consider habitat-piling cord wood, preferably in dappled light) | |
| Tree removal | | Takedown and fell to ground level (consider habitat piling & also stump-grinding as a disease reduction measure) | |