

E V Cargo

Quedgeley Depot

Unit H Quedgeley Trading Estate

Bristol Road

Hardwicke

Gloucester

GL2 4PA



Ref # DGOP240103



Date of Report 16th January 2024

Report reviewed and approved by



Tree Condition and PiCUS Sonic Tomograph Report – Site Address Quedgeley Depot, GL2 4PA –
Ref# DGOP240103 – Date of survey 15/0/2024 – Consultant [REDACTED]

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1. Client instruction

I have been instructed, via email, by [REDACTED] of EV Cargo (referred to as the 'client' from here on) to conduct a PiCUS Sonic Tomograph on 2 oak trees within the boundaries of Unit H, Quedgeley Trading Estate, Bristol Road, Hardwicke, Gloucester, GL2 4PA. No boundary maps have been provided by the client, tree locations have been provided by [REDACTED] of John O'Conner Ltd.

1.1. Background data and client information provided

I am not aware of a previous formal survey of the site, further investigation of the base with a PiCUS Sonic Tomograph was recommended following a site visit by [REDACTED] after concerns about the tree's safety were brought to him.

I have not received or been made aware of a tree policy for this site.

1.2. Scope of survey and report

The scope of this report is as follows: -

- Conduct a PiCUS Sonic Tomograph as per the recommendations in previous survey.
- A schedule of the relevant trees to include basic data, tree location and a condition assessment.
- A tree risk assessment based on current targets, defects and the likelihood of failure or damage to structures.
- A schedule of any subsequent work that may be required.
- A schedule of any subsequent inspections based on locations and targets.
- Provide recommendations for remedial work and a suggested timescale for those works.

1.3. Technical References

This arboricultural report is based on the following primary technical references:

- British Standards Institution (2010) BS:3998 Recommendations for tree work.
- Lonsdale, D. 1999 Principles of Tree Hazard Assessment and Management.
- Mattheck, C and Breloer, H. The Body Language of Trees.
- Strouts, R.G. and Winter, T.G 1994. Diagnosis of Ill-Health in Trees.
- Weber, K. and Mattheck, C. The Manual of Wood Decay in Trees.
- The National Tree Safety Group. 2011. Common Sense Risk Management of Trees.

2. Limitations of report

The following limitations apply to the survey and report.

2.1. Survey

The inspection was conducted from ground level using a Visual Tree Assessment (VTA – Mattheck et al) method, Sonic Tomography was conducted at 0.15m using a PiCUS 3 system. All visual observations and recommendations relate to the condition of the trees on the day of the survey.

Unusual weather conditions, changes in soil, soil level and changes to surroundings may result in a dramatic change in the trees health and a new survey would be appropriate in this event.

2.2. Trees as dynamic organisms and risk

Trees are dynamic structures that are constantly in motion through growth, decline and seasonal impacts.

Trees provide an inherent level of risk as they grow, become damaged and decline. No tree can be deemed as 100% safe or free from risk of failure.

Regular inspections can help identify potential problems before they become acute.

2.3. Duty of care and recommendations

'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' (NTSG, 2011).

Recommendations for remedial action have been proposed and are provided with the outputs from this survey.

Recommendations have been made to manage the risk from trees and defects, for sound arboricultural management of tree stock and where further investigation or assessment of tree condition is required to make a reasoned and proactive judgement.

Recommended timescales for completion of recommended works have been provided to allow the tree owner to manage their budget according to potential risk of failure or damage.

A recommendation is provided in respect of frequency and timing of future inspections.

2.4. Site factors and changes

Various site factors influence and change the trees condition over time. Changes in site usage and occupancy, ground conditions and construction/demolition etc as well as significant weather events have the potential to change the condition and level of risk of individual trees. Significant changes to site factors may require a new assessment of tree condition.

3. Site assessment

3.1. Site visit conditions

I conducted an unaccompanied site survey on Monday 15th January the weather was sunny and cold. All observations were taken from ground level using the VTA (Visual Tree Assessment) method of C. Mattheck et al.

3.2. Site description

The site consists of an industrial unit, lorry yard and associated car parking. The two mature oak trees are in small, grassed areas on the north eastern boundary of the site.

The soil type, as per the British Geological Survey, is shown to be Blue Lias Formation and Charmouth Mudstone Formation – mudstone.

I did not examine the soil or take samples for analysis.

3.3. Survey methodology

During the on-site survey 2 individual trees located within the boundaries of site has been inspected from ground level using the VTA method and with Sonic Tomography.

The following survey tools and aids have been used during the inspection: -

Sounding mallet, probe, clinometer/hypsometer, DBH tape, binoculars and the PiCUS 3 Sonic Tomograph.

This inspection considers the following: -

- A distance visual assessment of the tree considering the overall shape, form, foliage colour appropriate for the time of year and any other elements that do not appear normal for that species.
- Results of the Sonic Tomogram.
- Exposure to weather. This can be due to it being a solitary tree or the surrounding tree cover could have been removed exposing it to 'new wind forces' acting on the canopy.
- Prevailing ground conditions. For example: soil erosion, ponding, soil characteristics and their subsequent impact on the tree, presence / lack of vegetation.
- Any information as to the tree's history or history of the surrounding trees / landscape. For example: previously failed limbs, surrounding tree removal / failure, excavations, fruiting bodies seen.
- Knowledge of previous documented information of issues with a particular species. For example: tight union failure on Beech, poor compartmentalisation of Willow.
- The health and visual defects of the tree. For example: cavities, the trees 'body language', dieback, foliage irregularities, fungal brackets, and deadwood.

From the data captured through inspection, an assessment is made of the likelihood of any part or parts of each tree likely to fail in relation to the target/occupancy value within the tree's failure area.

Recommendations are then made to mitigate the likely failures and recommendations consider the balance of the likelihood of failure, the potential impacts of failure and the likely cost implications for undertaking remedial works.

Recommendations may include the following (not exhaustive) options: -

- Recommendations for further and more detailed assessment.
- Remedial pruning / limb removal.
- Whole tree removal.
- Removal of significant deadwood.
- Root investigation, de-compaction or soil improvement.
- Or no work may be needed.

3.4. Identification of trees on site

Trees have been provided with a unique reference number which can be found in the schedule of trees provided in the Appendix.

Trees have also been plotted on the accompanying tree location plan.

4. Site data

4.1. PiCUS Sonic Tomograph

The PiCUS® Sonic Tomograph unit can detect decay and cavities in standing trees non-invasively by tracking the speed of sound waves in the trunk, roots, and larger branches. The velocity of sound in wood depends on the modulus of elasticity (MOE) and the density of the wood itself. Damage and disease in trees can cause fractures, cavities, or rot, which reduces elasticity and density of the wood. Wood characteristics can vary, both between species and within a tree species itself. Such damage can be found by comparing individual sound velocities measured on a specific tree with tabulated standard values. The PiCUS® Sonic Tomograph uses relative sound velocities so that the system calibrates itself automatically at each measured cross-section.

The PiCUS® Sonic Tomograph consists of a set of sensors (PiCUS 3 offers 6 or 12), which are placed at strategic points on a tree trunk. Each sensor is connected to a pin or nail (0.8 - 2 mm in diameter), which is placed on the outer trunk with a pin hammer at an inspection point. By manually tapping the sensors with a small hammer, sound waves are induced, and their delays recorded. The time the sound wave travels between the sensors is used to calculate the apparent sound velocities.

Because each sensor on the tree records delays (times) of every impact at each point, a dense network of sound velocities is collected across all cross-sections. A full-coloured tomogram of the tree's cross-section can be made on site using a PC. This tomogram shows the presence of decay and cavities within the tree. It can also indicate the remaining wall thickness or opening angles of cavities.

There are three main colour groups to be considered:

1. Black/brown
2. Green
3. Violet/blue/white

The colours violet, blue, and white should be treated as a single class.

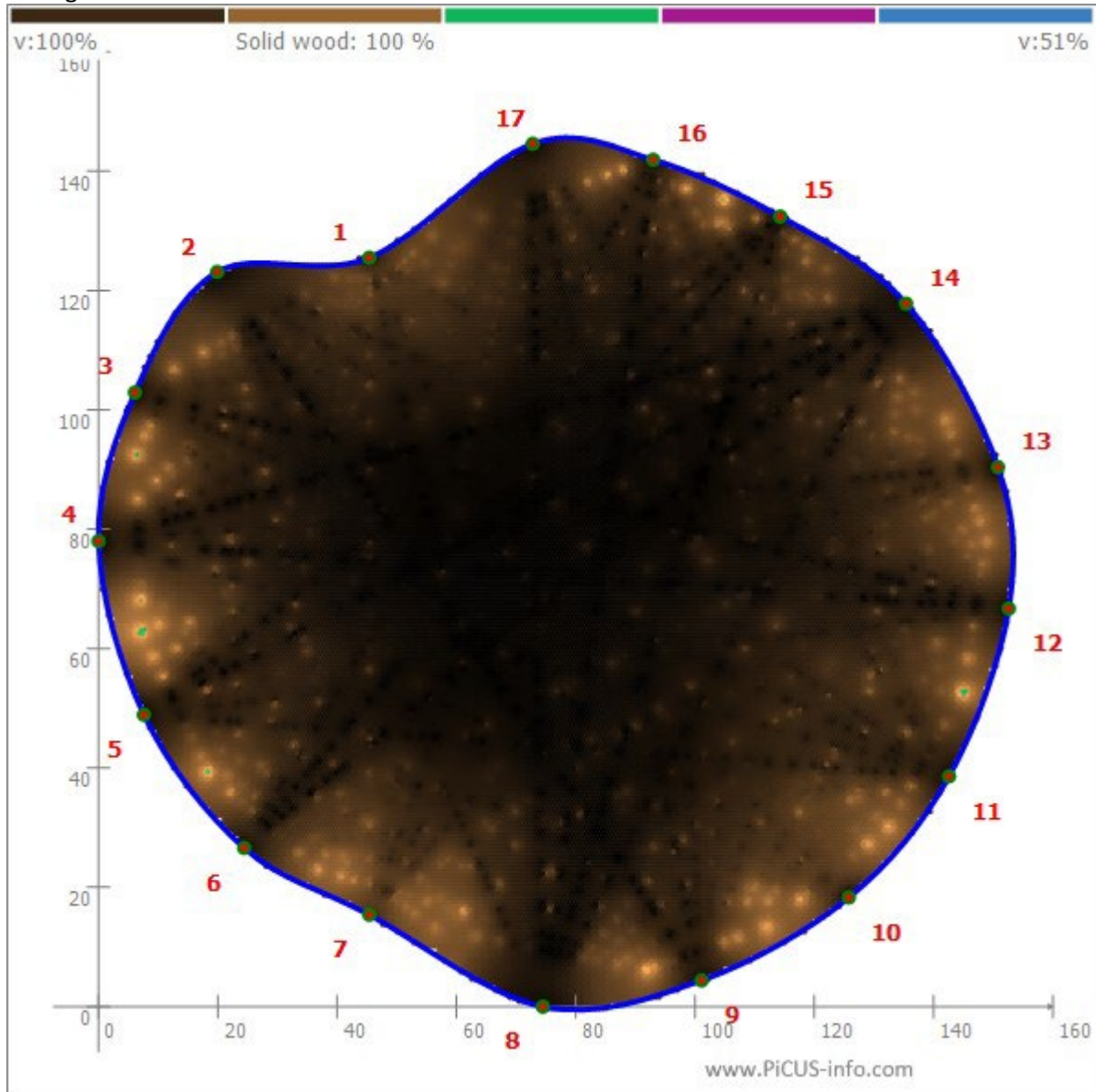
Areas of high velocity are represented in black or dark brown and indicate sound wood.

Areas of low velocity appear in violet, white or blue, and these are the areas that indicate problems. Those colours do not mean that there is a cavity, it just means that the acoustic waves travel slowest in that area. Green areas mark those sections which could not be classified as being either fast or slow, and these areas must be interpreted together with the overall damage.

A Sonic Tomograph was conducted on tree T001 at 0.2m and on T002 at 0.15m. Measuring point 1 was aligned with north on all Tomographs.

T001 at 0.2m

No indications of potential decay were observed during my visual assessment, no decay detected by tomogram.



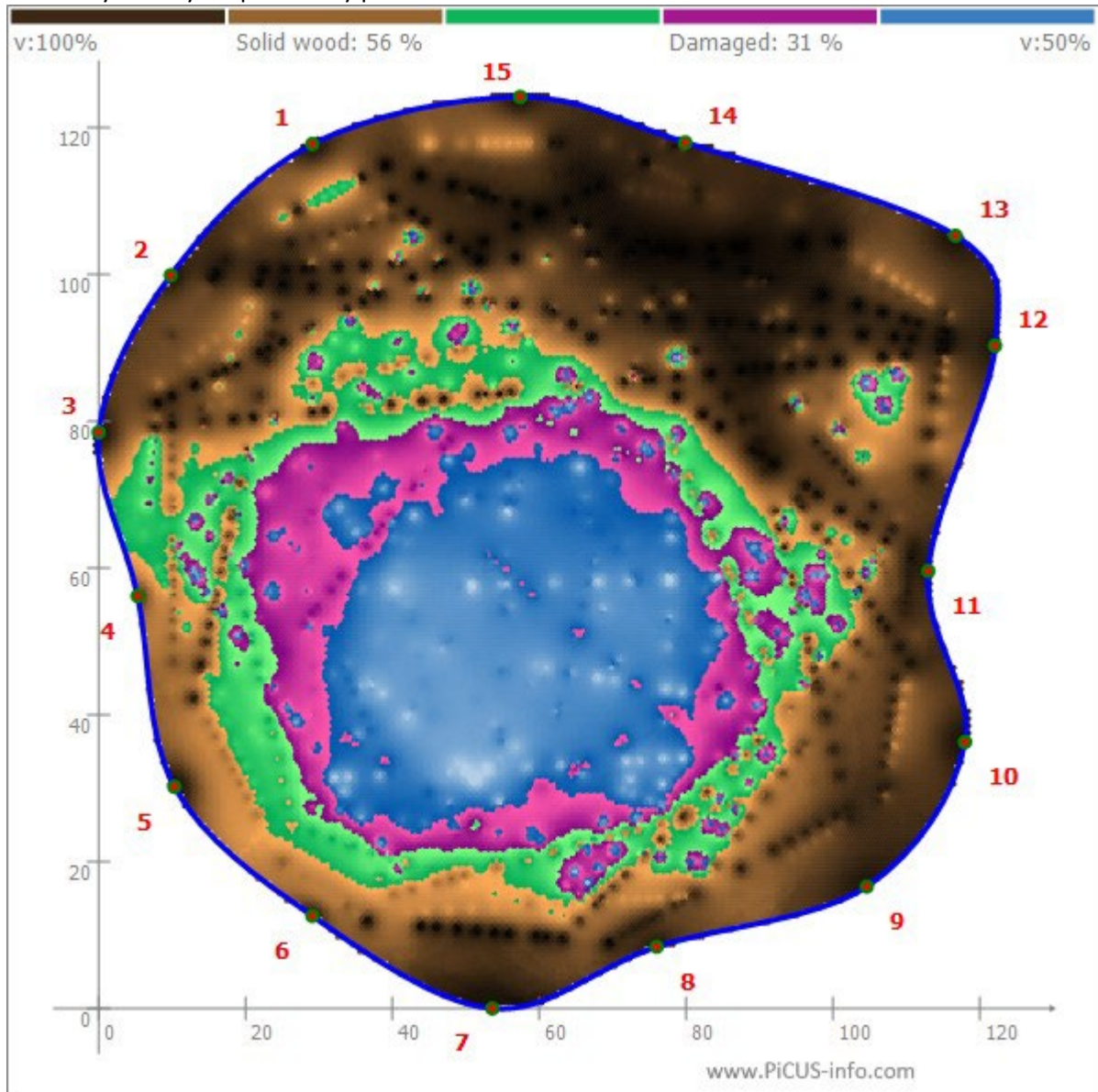
T001 at 0.2m



T002 at 0.15m

Ganoderma sp. fungal brackets were observed at measuring points 4, 11 and 14, and between measuring points 8 and 9. All fungal brackets were old and desiccated, as a result I was unable to confirm the species of Ganoderma affecting the tree.

The tomogram clearly shows a significant cavity in the centre of the base, with 31% damaged wood, the cavity is not yet open at any point around the base.



T002. at 0.15m



T002. Fungi at measuring point 4



T002. Fungi between measuring points 8 and 9



T002. Fungi at measuring point 11



T002. Fungi at measuring point 14



4.2. Recommended remedial actions

Although the tomogram for tree T002 clearly show a significant cavity, I do not believe this to be severe enough to warrant the removal of the tree. Recommendation have been made to reduce the crown to reduce the mechanical loading and windsail area, and for a follow up tomogram to track the progress of decay, in three years.

Tree Survey Recommendations

Client: EV Cargo
Site: EV Cargo Quedgeley Depot PiCUS

Timescale	No. Recommendations
1 Year	2
3 Years	1
No Action	1



Total 4

Ref.	Species	Survey Notes	Physiological Condition	Structural Condition	Measurements	Recommendation	Work Timescale
T001	Pedunculate oak (<i>Quercus robur</i>)	<ul style="list-style-type: none"> * Foliage - No comments * Crown - Crown density good Minor deadwood throughout crown * Branches - Major deadwood at 7m on southern aspect Split, failed & hanging limb at 10m on north western aspect * Stem - Ivy on stem, severed to allow access for Tomograph * Roots & base - No obvious defects 	Good	Fair	Height (m): 18 Crown Radius (m): 8 DBH (cm): 108 Life Stage: Mature	Remove major deadwood at 7m on southern aspect and split, failed & hanging limb at 10m on north western aspect	15-Jan-2025 (1 Year)

Ref.	Species	Survey Notes	Physiological Condition	Structural Condition	Measurements	Recommendation	Work Timescale
T002	Pedunculate oak (<i>Quercus robur</i>)	<ul style="list-style-type: none"> * Foliage - No comments * Crown - Crown density good Minor deadwood throughout crown * Branches - Major deadwood at 8m on north eastern aspect, 10m on southern aspect, 6m on northern aspect & 12m in top of crown on northern aspect * Stem - Ivy on stem, severed to allow access for Tomograph * Roots & base - Ganoderma sp. fungi on south eastern, southern and northern aspect. Old desiccated brackets unable to identify species of Ganoderma. Fungus: Ganoderma sp. 	Good	Fair	Height (m): 15 Crown Radius (m): 8 DBH (cm): 85 Life Stage: Mature	Crown reduce by up to 3m to reduce mechanical loading and windsail on defect.	15-Jan-2025 (1 Year)

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Ref.	Species	Survey Notes	Physiological Condition	Structural Condition	Measurements	Recommendation	Work Timescale
T002	Pedunculate oak (<i>Quercus robur</i>)	<ul style="list-style-type: none"> * Foliage - No comments * Crown - Crown density good Minor deadwood throughout crown * Branches - Major deadwood at 8m on north eastern aspect, 10m on southern aspect, 6m on northern aspect & 12m in top of crown on northern aspect * Stem - Ivy on stem, severed to allow access for Tomograph * Roots & base - Ganoderma sp. fungi on south eastern, southern and northern aspect. Old desiccated brackets unable to identify species of Ganoderma. Fungus: Ganoderma sp. 	Good	Fair	Height (m): 15 Crown Radius (m): 8 DBH (cm): 85 Life Stage: Mature	Long term recommendations Follow up investigation of internal decay with PICUS Sonic Tomograph to track the progress of decay and inform future management decisions.	15-Jan-2027 (3 Years)

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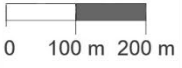


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4.3. Recommendations for completion of remedial action

- No direct contact has been made with the local authority to check for Conservation Areas or Tree Preservation orders. Before any work commences checks should be made with the local authority to make sure there is no statutory protection on these trees.
- All tree works should be conducted in accordance with BS:3998 2010 Recommendations for Tree Work. Tree work can be a hazardous profession, so it is imperative that all operatives have the relevant training and experience and that the company be able to supply records of said training, insurances, method statements, risk assessments, health and safety and environmental policies.
- All biosecurity measures should be in place during any works.
- All tree work operations are covered by the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000. This provides statutory protection to birds, bats and other animals that inhabit trees. All tree work operations are covered by these regulations and advice from an ecologist should be sought before undertaking any works that could constitute an offense.

4.4. Tree Location Plan

EV Cargo Unit H Quedgeley Trading Estate, Bristol Road, Hardwicke, Gloucester, GL2 4PA	Page size: A4 1 : 8,000 		
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EV Cargo
 Unit H Quedgeley
 Trading Estate, Bristol
 Road, Hardwicke,
 Gloucester, GL2 4PA

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5. Appendices

5.1 Appendix A Survey Key

- **Ref.** - Identifies the tree, group, hedgerow or woodland with a unique identification number.
T - Tree
G - Group of trees (used where a group of similar trees of similar condition is identified).
If identification tags are used, they are located at 1.5 meters above ground level on the trunk.
- **Species** - Common tree name, scientific tree name in brackets.
- **Life Stage** - The age of the tree
Newly Planted - Recent planting with tree stake and tie usually still present.
Young - First 10 years of growth.
Semi Mature - Less than 20% of life completed.
Early Mature - Less than 50% of life completed.
Mature - 50 - 80% of life completed.
Senescent - In the last 20% of life expectancy, crown retrenching and declining
Veteran - Tree that, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.
- **Vigour** - The physiological condition of the tree.
Good - very few minor defects.
Fair - signs of stress, impaired vigour, signs of disease the tree is currently managing to live with.
Poor - signs of significant disease and/or infections, lifespan greatly reduced.
Dead.
- **Structure** - The structural condition of the tree.
Good - no significant defects.
Fair - some defects, minor works may be required to correct.
Poor - Major defects, large limb decay, significant limb failure, major root damage, major work required up to and including removal.
- **Target Occupation** - An estimate of the volume of use, assessed on the day of the survey, relating to the potential for damage to persons or property if failure of the tree, or any part thereof were to occur.
- **Work Timescale** - A priority rating for management of work recommendations.

5.2 Appendix B Glossary

Absorptive Roots – The fine, fibrous roots at the periphery of the root plate.

Adaptive Growth - In tree biomechanics, the process whereby wood formation is influenced both in quantity and quality by the action of gravitational forces and mechanical stresses on the cambial zone.

Adventitious bud/root/shoot - bud/root/shoot that forms other than through primary development.

Aerobic Conditions - In which oxygen is freely available, or to biomechanical processes that depend on the presence of oxygen.

Anaerobic - A condition marked by the absence of oxygen; Generally, such areas are unsuitable for normal life and growth of plant tissues. These sites tend to be populated by bacteria capable of surviving low oxygen conditions often associated with Slime Flux.

Ancient Trees – Old trees that because of the age are liable to present specific outward sign, e.g., splits and cracks in the trunk, and crown retrenchment. Veteran trees may not necessarily be ancient but they still present, at least, some of the outward signs of ancient trees.

Annual Rings – A ring of growth added annually, that increases the girth of the tree.

Apical Dominance – Having a definite, distinct 'leader', i.e., the apical shoot has dominance over others.

Arborescent Plants – Referring to plants that attain tree-like proportions. They are not technically arboreal, as they do not share all the features of other woody plants and include palms and palm-like monocotyledonous plants such as cordylines.

Arboriculture - The culture and management of trees as groups and individuals primarily for amenity and other non-forestry purposes.

Arboricultural Method Statement - Methodology for the implementation of any aspect of development that is within the root protection area or has the potential to result in loss of or damage to a tree to be retained.

Arborist - A person possessing the technical competence through experience and related training to provide management of trees or other woody plants in a landscape setting. Generally involved with the development or management of trees for visual amenity or land management rather than the growth of trees for product or profit.

Arisings - any parts of a tree, including stem, roots, branches (brushwood), bark, other woody material and foliage, derived from the tree during tree work operations.

Axiom of Uniform Stress – The axiom of uniform stress maintains that all trees will always have, or will return to, a uniform stress all over their surface. Inconsistencies are rectified by wood being produced; the biological design of trees is determined by mechanical optimization.

Bark Sloughing – The natural process of losing bark carried out by healthy trees.

Bark Shedding – The shedding of large sheets of bark exposing the tissues beneath is a symptom of ill health.

Barrier Zone - A layer within an annual increment of wood which contains abnormal xylem cells, laid down by the cambium in response to wounding or another trauma.

Body Language in Trees - The outward display of growth responses and or deformation in response to mechanical stress.

Bole or Trunk - The main stem of a tree below its first major branch. **Bracket** - A type of fruiting body produced by various fungal species, plate like to hoof like in shape and often a one-sided attachment to the wood or bark.

Bottle Butt – The obvious swollen base of a tree created when a fungal attack has caused the main stem of the tree to become hollow and reaction wood is produced to stabilize the tree.

Bracing – A method of supporting a branch using an inflexible rod, flexible wire ropes, expanding belts or polypropylene hollow braid rope.

Branch Bark Ridge - A ridged area located at the union of a branch to a trunk or stem.

Branch Collar - Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigour or begins to die, the collar usually becomes more pronounced and completely encircles the branch.

Brown Rot - Form of decay where cellulose is degraded, while lignin is only modified.

Buttress Root - Roots that emerge from the base of the tree stem, normally large and well developed that rapidly reduce in diameter to create the Root Plate this offers structural support for the tree. Buttress roots divide rapidly forming the connection between the stem and the transport roots.

Cabling Bracing - Installing cables within the crown of a tree to prevent collapse.

Callus - Undifferentiated cells often formed at the edges of recent injuries. This tissue quickly becomes differentiated, forming cells of the type characteristic of that position on the tree (e.g., forming wood, bark, roots, etc.) see wound response tissue.

Cambium - A thin layer of actively growing and dividing cells, located between the xylem (sapwood) and bark of a plant, the part responsible for radial growth of a tree stem or branch.

Canopy - The topmost layer of twigs and foliage in a woodland, tree or group of trees.

Canker - A localized area of dead bark and cambium on a stem or branch, caused by fungal or bacterial organisms, characterized by wound wood development on the periphery. This may be annual or perennial.

Cavity - An open and exposed area of wood, where the bark is missing, and internal wood has been decayed and dissolved.

Chlorotic also Chlorosis - A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.

Clear fell - The process of felling large areas of trees to clear the whole area.

Clinometer - Device that measures vertical angles and provides direct height measurements of objects by triangulation.

Coalescence of Decay – Where two or more distinct areas of decay interconnect to form a much larger area of decay.

Co-dominant Stems/Trunk – Trunks or branches that arise from a common position and develop together. Co-dominant stems do not have overlapping tissues like a lateral branch and the main trunk, but merely abut one another, for this reason they do not have the structural strength of branch unions and they indicate a weakness which can be a potential hazard.

Compacted Soils - Soils in which the airspace (oxygen space) has been reduced or eliminated, reducing water infiltration and percolation, reducing root presence and inhibiting new root development.

Compartmentalization/CODIT – Compartmentalization Of Decay In Trees. The physiological process that creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms.

Competent person - Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the task being approached.

Compression Failure - Localized buckling of fibres and other longitudinal elements produced by compression of wood along the grain; compression failures sometimes develop in standing trees.

Compression Fork – A kind of narrow fork with included bark in which continued radial growth results in pressure which tends to push the limbs of the fork apart.

Compression Strength - The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees using special drilling devices.

Compression Wood - Abnormal wood formed on the lower side of branches and curved stems, with physical properties different from normal wood.

Conservation Area - In Great Britain, designated areas of architectural or historical interest, in which there are special procedures for planning applications. Additionally, tree works cannot generally be undertaken without prior notification (Currently 6 weeks) to the relevant local planning authority. See also Tree Preservation Orders.

Construction exclusion zone - Area based on the root protection area from which access is prohibited for the duration of a project.

Core Sample - A sample of wood extracted from a trunk or branch, using an increment borer tool. The resulting core can be analysed for characteristics of growth, wood strength, structure, decay, and for species identification.

Coppicing - Cutting trees close to ground level with the intention of encouraging regrowth of multiple shoots.

Coronet Cuts – A specialised cut in the shape of a crown, created after branch removal and used by environmental/ecological arborist, that attempts to emulate natural branch fractures. Used on trees to ‘Veteranize’ them.

Crotch - The union of two or more branches; the auxiliary zone between branches.

Crown - The upper canopy of a tree, including upper trunk, scaffold branches, secondary branches, stems and leaves.

Crown Clean – To remove dead, dying and diseased wood, stumps, crossing branches, epicormic shoots and climbing plants. An outdated term no longer in use.

Crown Lifting / Raising, Crown Lift - The removal of the lowest branches, usually to a given height. It allows more residual light and greater clearance underneath for vehicles etc.

Crown Reduction - Operation that results in an overall reduction in the height and/or spread of the crown of a tree by means of a general shortening of twigs and/or branches, whilst retaining the main framework of the crown.

Crown Thinning – The removal of a proportion of small, live branches from throughout the crown to achieve an even density of foliage around a well-spaced and balanced branch structure, usually 5- 25%, allowing more light through its canopy and reducing wind resistance.

DBH – Standard method of expressing the diameter of a trunk, measured at 1.5m.

Distribution Network Operator – Run the distribution of electricity from the national grid to homes and businesses. Responsible for the network of towers, transformers, poles, cables and meters that deliver power to homes and businesses.

Deadwood (noun) - Deadwood is often present within the crown or on the stems of trees. It may be an indication of ill health; however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).

Deadwood (verb) - The removal of dead branches from a tree's canopy, usually of a specified size (in diameter).

Decay - Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.

Decay Detection - The assessment of decay within a tree has been traditionally difficult, but recent advances have made it possible to achieve accurate representations of the internal section of a tree in both 2D and 3D, removing doubt over the condition of the tree and allowing accurate management decisions.

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.

Defoliation - The loss of plant foliage.

Dieback - Progressive death of buds, twigs and branch tissues, on individual limbs resulting in Deadwood, or throughout the canopy, extreme cases can result in Stag Heading.

Dripline - A projected line on the ground that corresponds to the spread of branches in the canopy, the farthest spread of branches.

Dysfunctional Tissue – Tissues that no longer function because of age and/or breakage by compression.

Eiffel tower – Decay of the centre section of the main stem at the base making the tree appear to be standing on stilts made of the buttresses.

Epicormic Shoots - Fast growing, weakly attached shoots/branches that often grow as a response to stress factors upon a tree or branch removal.

Exclusion Zone – Minimum safe distance that must be kept from powerlines to reduce the risk of electric shock. People, plant and equipment must stay out of the exclusion zone while an overhead powerline is live or energised.

Exit Hole – The hole that allows adult boring beetles, or gall wasps, to emerge.

Failure - In connection with tree hazards, a partial or total fracture within the wood tissue or loss of cohesion between roots and soil. (In total failure affected parts will snap or tear away completely, Partial failure there is a crack or deformation, which results in an altered distribution of mechanical stress.

Fastigiata – Upright clustered branches.

Fibre Buckling – A local transverse failure in compression of the outer wood of a stem. The resulting adaptive growth give rise to a characteristic ring like bulge around the stem.

Feeder Roots - Fine Fibrous water and nutrient absorbing roots located in the outer root system.

Flush-Cut - In trees and shrubs, a pruning cut close to the parent stem, which removes the branch bark ridge.

Foliage - The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.

Formative Pruning - The trimming of a tree to remove weaknesses and irregularities which may lead to problems. The formative pruning operation is aimed at reducing the potential for future weaknesses or problems within the tree's crown.

Gall - An abnormal, disorganized growth of plant tissues, caused by parasitic or infectious organisms such as insects, fungi, bacteria, or viruses.

General Prune – Remove all deadwood, crossing, diseased, reverted and weak branches. Remove basal and epicormic growth up to 5m on stem. Prune to clear phone lines by 1m. Prune to clear streetlight and allow beam to shine along path/road in both directions. Prune to clear building by 2 meters. Crown lift to 2.4 metres for pedestrians and 5.2 metres for vehicular access.

Girdling - In woody plants, any form of damage that destroys the bark and / or the Cambium all the way around the stem, branch, or root, normally resulting in death of the damaged section.

Girdling Root - In woody plants, a root that grows across the buttress, or across other roots, eventually causing constriction of the radial growth.

Growth Increment - The incremental growth added as new annual ring develops each season over existing wood. This is seen as (growth) rings in cross-sections of wood.

Hazard Beam - An upwardly curved branch in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).

Heartwood - Inner dysfunctional tissues that provide structural support to trunk.

Heave - In relation to shrinkable clay soils, expansion due to rewetting of a volume of soil previously subjected to the removal of water by plant / trees following felling or root severance. Also, in relation to root growth, the lifting of pavements and other structures by radial expansion. Also, in relation to tree stability, the lifting of one side of a wind rocked root plate.

Height/Diameter Ratio – The ratio of tree height to diameter at breast height, measured in metres. Open grown trees with a h/d ratio above 50 are considered critically slender, for Forest grown trees a h/d ratio of above 70 is considered critically slender. A typical h/d ratio is below 30.

Herbicide - A chemical compound that causes the death of a plant.

Hung-Up Branches – Branches left in the crown either lodged in amongst other branches or held in the crown by a few fibres.

Included Bark - Bark tissue lodged in the union between a branch and the parent stem, in the crotch of two branches, or between the bases of co-dominant stems, indicating potential weak attachment.

Increment Borer - A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments. Outdated and not commonly used now.

Knuckle - Swelling that forms at a pollard point, especially after repeated cutting.

Lapsed coppice/lapsed pollard - Tree that has been coppiced/pollarded but has not been maintained by cycles of cutting.

Leader - The primary terminal shoot or trunk of a tree.

Limb - A large lateral branch growing from the main trunk or from another larger branch.

Lion Tailing - Often the result of poor pruning practices; the main leader or branches are largely devoid of side branches; growth is restricted to the end of branches and is likely to suffer damage through end loading.

Maiden Tree - A tree with a natural, untouched, and unmanaged crown.

Monitoring - Due to the relative life span of trees in relation to our own, long-term monitoring provides a valuable insight to the health of trees, identifying decline and or stabilisation and or improvement.

Mulch - A material laid over the root system of a tree to help conserve moisture within the soil. Additionally, it may help control the development of weeds close to the tree.

Mycelium - A mass of growing filaments (hyphae) formed by fungi.

Mycorrhizae - The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.

Occluding Tissue - The general term of wood, cambium and bark that develop around the site of a wound on a woody plant.

Pathogen - A microorganism that causes diseases within another organism.

Phloem - The principle conductive tissue that the products of Photosynthesis are transported around the plant.

Photosynthesis - The process carbohydrate production, fuelled by the sun with chlorophyll as a catalyst, for use within the plant.

Pollard - Tree that has formed a crown consisting of numerous branches arising from the same height on a main stem or principal branches.

Pollard Head - The swollen section of branch / stem that forms behind the pollarding cut.

Pollarding - Cutting a tree to encourage formation of numerous branches arising from the same height on a main stem or principal branches. This process is initially carried out on trees that have not yet reached maturity. The form of the tree can then be maintained by cycles of cutting. This is not the same as topping. The pollard heads collectively, and the framework of a pollarded tree, are both known as the bolling. Repeated management is required cyclically to maintain the feature.

Propping - The use of metal or wooden supports to prop up a fallen or semi-prostrate trunk or low branch.

Prune or Pruning - Selective removal of woody plant parts of any size, using saws, Loppers, Secateurs, or other pruning tools.

Reaction Wood - Secondary tissues laid down in trees as a result of stress stimulus. In hardwoods, tension wood usually forms. In conifers, compression wood is usually found.

Reaction Zone - A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.

Re-grading - The raising or lowering of a soil profile from its original grade.

Remedial Pruning - The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.

Resistograph - Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.

Restoration Pruning – A phased reduction of the crown achieved by a 'little and often' policy to reduce the periphery of the crown and used as a management tool for veteran trees.

Retrenchment pruning - Form of crown reduction, intended to encourage development of the lower crown, which emulates the natural process whereby the crown of an ageing tree retains its overall biomechanical integrity by becoming smaller through the progressive shedding of small branches.

Rib - In tree body language, a long narrow, axial protuberance which often over lays a crack.

Ripewood - Older central wood of those tree species in which sapwood gradually ages without being converted to heartwood. Ripewood is usually not durable since it lacks both pre-formed defensive substances and an ability to react to wounding. It is not sharply delineated from the sapwood because the cells die gradually over many years.

Ring Barking - Artificial girdling of the stem, to result in the death of a tree. May be used in habitat creation where the retention of dead standing trees is required.

Rod Bracing/Bolting - Traditionally, this has relied upon the installation of steel rods or bolts through the stems or limbs, to reduce twisting or splitting of the wood.

Root Barriers - Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.

Root Collar - The basal area of the tree; transition zone from trunk to root. Also, sometimes called trunk flare.

Root Plate - The primary support area for the tree; an area of the root system close to the base that structurally anchors the tree to the soil.

Root Protection area (RPA) - Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.

Root Rot - Either a general term for decay within the wood of the lower stem / buttress roots, or a disease in which the fine roots are killed.

Root System - The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.

Root Zone - The area and volume of soil around the tree in which roots are expected. May extend to three or more times the branch spread of the tree, or several times the height of the tree.

Sail Area - That area of the tree subjected to wind load.

Sapwood - Xylem wood tissue, usually light in colour, representing the outer growth rings of the wood. Usually living, reactive wood tissue, in a healthy tree. See heartwood.

Scaffold Limbs / Scaffold Branches - The branches that form the main network framework of the crown of a tree.

Secondary Growth/Thickening – Tissues responsible for the increase in girth of stems and roots of trees.

Senescent - A decline in growth and vigour due to age or stress factors.

Shrub - A woody plant that branches at or close to the ground level and so does not have a single stem.

Slime Flux - Relating to a toxic condition from the spreading of bacteria or their products from a source of infection; characterized by malodorous gases, or salt deposits upon the bark. If these products enter the sap stream, localised vessel necrosis can result, usually associated with anaerobic conditions.

Soft Rot - A kind of wood decay, where fungi degrade cellulose within the cell wall, without causing overall degradation.

Soil Compaction - The compression of soil, causing a reduction of pore space and an increase in the density of the soil. Air is squeezed out and nutrients become locked. Tree roots cannot grow in compacted soil.

Sonic Decay Detection - Non-invasive method whereby sound waves are passed through the tree and the speed is measured. Slow speeds indicate decay and a tomography picture representing the inner stem is produced.

Stag Heading - In a tree, a state of dieback where dead branches protrude beyond the current living crown.

Stem - Principal above-ground structural component of a tree that supports the branches. This either extends throughout most of the height of the tree (primary stem) or is one of several such components (secondary stems) which divide from each other either near the ground or at a higher level. Trees comprising two or more stems arising from, or immediately above, ground level are commonly referred to as “twin-stemmed” or “multi-stemmed”. “Stem” is synonymous with “trunk” for single-stemmed trees, particularly those of a large diameter.

Stress - In plant physiology, conditions where one or more physiological functions are not working within normal parameters.

Stub - Broken or severed short remaining section of a branch extending beyond a crotch. Also known as a “snag” or “noggin”.

Stub Pruning – A pruning cut which, unlike target pruning, leaves a snag or stub. Acceptable in a woodland setting where the wildlife value of the whole area may be of more importance than the individual trees health. Considered unacceptable in most instances, particularly in urban and domestic settings.

Stump Grinding - The removal of a tree stump using a specialist grinding machine.

Subsidence - In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.

Sucker - Same as sprout.

Suppressed - Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.

Systemic - Affecting the whole plant or organism. A systemic compound is carried throughout the entire plant to all parts through the vascular system.

Tap Root – The principle root that develops from the seed which may or may not persist to later stages of development.

Target - Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.

Target Pruning - The pruning of a branch where the wound affects only branch material, often result in a target shaped wound.

Tension Wood - Reaction wood typically formed on the upper side of limbs or curved stems; characterized by lack of cell wall lignification (higher ratios of cellulose to lignin).

Tight Union / Tight Crotch Also, Narrow Crotch - A crotch with a narrow angle between branches, often having included bark.

Tomography (PiCUS) - The comparison of sound or stress waves through the tree allows the creation of a 2D or 3D representation of the internal structure of a stem or branch section and highlights areas of damage. Virtually non-injurious.

Topography - The configuration of surface features, including the vertical and horizontal relationships of the ground and other features.

Topping - Cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees and promotes decay and structural weakness within the crown.

Tree - A woody plant that typically has a single stem, at maturity has a height of a least 4 meters and a stem diameter at breast height of at least 75mm.

Tree Preservation Order - In Great Britain, an order made by the local planning authority, where consent must be gained before undertaking all but exempt works to a tree.

Tree protection plan - scale drawing, informed by descriptive text where necessary, based upon the finalized proposals, showing trees for retention, and illustrating the tree and landscape protection measures.

Trunk Flare - The basal area of the trunk that flares or widens and merges with the main roots. See root collar.

Veteranization - Controlled infliction of damage on a tree to achieve a specific habitat objective. This is undertaken to promote or emulate the development of some of the features of a veteran tree, especially the wildlife habitats and shelters that are provided by decaying wood and cavities. When undertaken, it is usually on young or early mature trees.

Veteran Tree - Tree that, by recognized criteria, shows features of biological, cultural, or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem.

Vigour - Active, healthy growth of plants: ability to respond to stress factors.

Visual Tree Assessment (VTA) - An assessment of the mechanical condition of trees based upon their 'body language'. Trees are dynamic and respond to faults / decay / environmental factors in various ways, these responses can be indicative of structural integrity.

Water pocket - Natural depression or crotch in a tree that holds water.

Wetwood - An infection caused by bacteria living inside the plant tissues. The bacteria ferment the plant fluids, resulting in death of nearby cells, and often causing exudations of fluid from the bark, often referred to as a Slime Flux.

White Rot - A kind of wood decay where fungi attack the lignin within the wood matrix.

Wind Loading - Forces placed upon tree canopy, branches, trunk, and roots of a tree under windy conditions.

Wind Snap – The failure of a tree where the stem snaps due to wind loading.

Wind Throw - The failure of a tree at the roots due to wind loading.

Witches Broom - A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.

Wood Secondary Xylem - The main structural support and water conducting tissue of trees and shrubs.

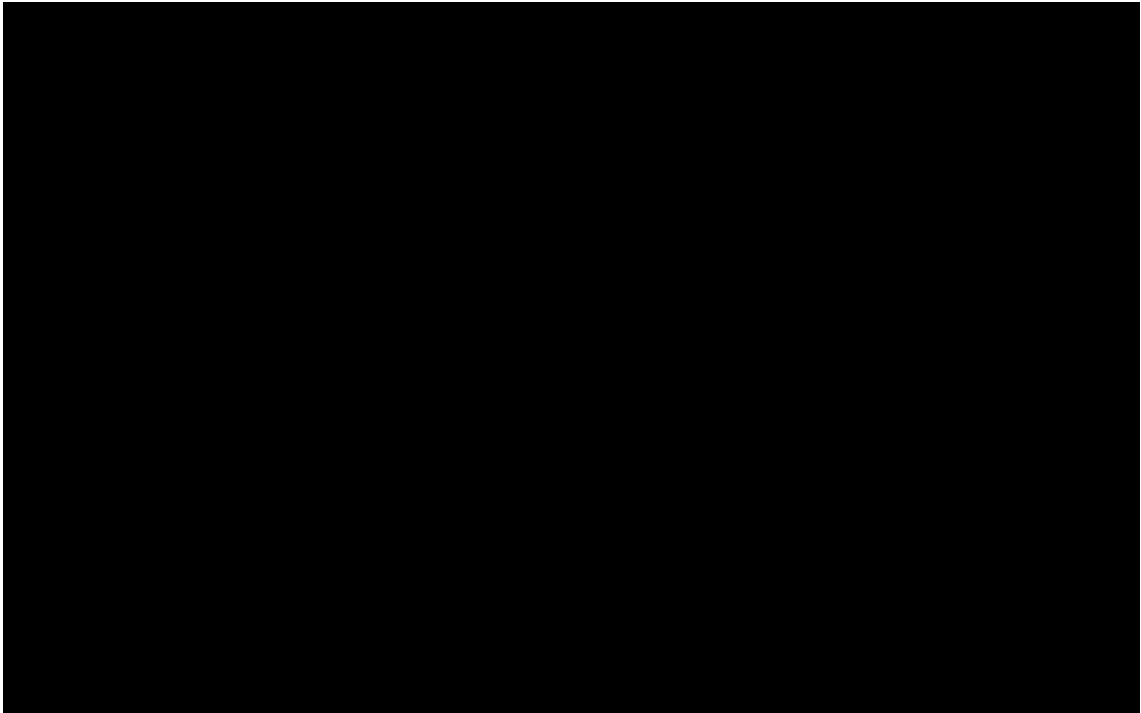
Wound Response Tissue Also Occluding Tissue - Wound Wood or Callus. Differentiated wood tissue that grows around the margins of a wound or injury.

Work area - Area designated for the safe execution of the specified work.

Wound Wood - Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound.

Xylem - Plant tissues with special function of translocation of water and dissolved nutrients.

5.3 Appendix D Surveyor qualifications and experience



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