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Tree Constraints Data

“BS5837 2012: Trees in Relation to Design, Demolition and Construction”

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Project:	St Mary the Virgin Church, Bury.

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1 Introduction

1.1 Instruction

1. Christians Environmental Limited have been instructed to inspect all trees within the site boundary and trees in adjacent land that may be affected at the site of St Mary the Virgin Church, Bury BL9 0AH. The aim of this inspection is to prepare the following information to accompany a planning submission for the site:
 - Schedule of the relevant trees, groups, and hedges to include basic data and a condition assessment.
 - Production of a Tree Constraints Plan showing tree stem, group and hedge positions, canopy spread, root protection area, reference number, species, and BS5837 retention category.
2. At the time of writing this report no trees at the site are subject to statutory protection, whether in the form of individual TPO's or a conservation area.

1.2 Tree Data Collection

1. All Trees on site which are adjacent to any proposed development areas or fall directly into these areas have been numbered and species identified. Each tree has also been inspected as described in British Standard 5837:2012; this includes information on height, diameter, crown spread, maturity, condition, and recommendations. Each tree is also classified as a category A, B, C or U (Summary in the Appendix). The collection of information also takes into consideration any low branches, structural or physiological conditional defects, and an estimated remaining contribution (lifespan) that the tree will offer at the site.

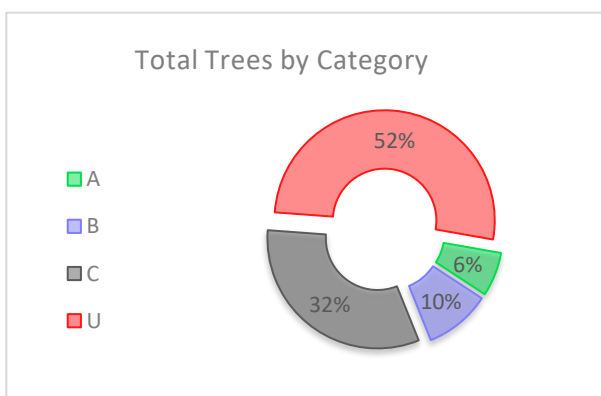


Chart 1: Individual trees by retention category as percentage.

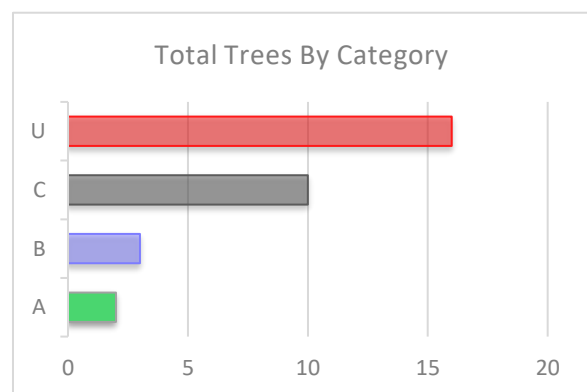


Chart 2: Individual trees by retention category by count.

1.3 Interpretation of Tree Data

1. Within section 5 of British Standard BS 5837:2012, it recommends that stem diameter is measured at an average breast height (1.5-meters), which is used to calculate the root protection area. This root protection area can be interpreted to identify any design constraints to the site. Once site design has taken place this data can be used to form the basis of any exclusion zone and position the appropriate protective barriers, fencing, and ground matting.

1.4 Ash Dieback

1. The site has a high proportion of ash trees which have all been assigned category U (hence the 52% cat U's) by default as they are expected to have an estimated remaining lifespan of <10 years. For more accuracy, it is recommended that a summertime inspection of all the ash trees is undertaken to assess the extent of potential ash dieback symptoms more thoroughly. From there, recommendations based on up-to-date findings can be issued which may be desired if and when further planning stages are required; compared with using the existing tree health observation data attached.

2 Appendices

APPENDIX A: TREE DATA TABLES

APPENDIX B: TREE CONSTRAINTS PLAN

APPENDIX C: GLOSSARY OF ARBORICULTURAL TERMS

Within this section is the tree and group survey data. Also included is a chart explaining how trees are classed when carrying out a *BS 5837:2012 Trees in Relation to Design demolition and Construction – Recommendation’s* report. Within the appendix is also a glossary of arboricultural terms. **N.b.** Where group survey data is discussed, measurement variables of height, crown clearance and canopy spread are discussed as an average.

Category A	Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)
Category B	Those trees of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)
Category C	Those trees of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested)
Category U	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management

KEY:

Tree Numbers/Tags	Individual tree = T + number Group of trees = G + number
Species	Common and or scientific names where appropriate
Height	Overall tree height
Crown Clearance	Distance between lowest point of canopy and ground level
Diameter at breast height	Measurement of tree stem
Canopy spread	Extents of tree branches taken in compass points
Age Class	(Y=Young) (SM= Semi Mature) (M=Mature) (OM=Over Mature) (V=Veteran)
Tree Condition	Comments on trees overall health etc...
Comments	Any further details that may be of importance
Management recs	List of urgent works or further investigation that may be needed
Life Expectancy (years)	How long the tree will offer a contribution
Category Rating	See opposite table

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
1	Fraxinus excelsior	11	3	1	38	3	2	3	2	M	Poor	Moderate	-Ash dieback symptoms -Deadwood -Poor physiological condition -Crown over seating and path	monitor decline via summertime inspection	<10	U	07/03/22
2	Fraxinus excelsior	14	3	1	47	5	6	5	4	M	Moderate	Moderate	-Ash dieback symptoms -Deadwood -Reduced physiological condition -Crown over seating and paths	monitor decline via summertime inspection	<10	U	07/03/22
3	Prunus avium	7	2	1	34	3	3	4	5	M	Moderate	Moderate	-Co dominant stem at 2m -Crown over seating -Stem lean -Unbalanced crown with minor suppression		11-20	C.2	07/03/22
4	Tilia cordata	9	2	1	23	2	3	2	2	SM	Good	Moderate	-Crown over seating -Stem lean -Minor deadwood -Minor stem epicormic		31-40	C.2	07/03/22
5	Betula pubescens	14	3	1	39	4	2	2	3	M	Good	Moderate	-Stem lean over parking -Minor crown suppression and deadwood		21-30	B.2	07/03/22

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
6	Acer pseudoplatanus	14	3	1	78	6	4	6	6	M	Good	Moderate	-Stem lean over parking -Minor crown suppression and deadwood -Root exposure with surface damages -Co dominant stem at 3.5-4m		31-40	A.2	07/03/22
7	Fraxinus excelsior	13	6	1	46	4	5	4	4	M	Poor	Moderate	-Crown over parking and cemetery areas. -Poor crown vigor -Deadwood -Moderate decline and dieback -Reduced physiological condition; declining	monitor decline via summertime inspection	<10	U	07/03/22
8	Prunus avium	5	2	3	40	4	3	2	3	M	Moderate	Moderate	-Crown over parking -Deadwood -Included base union -Suppressed growth -Old pruning wounds; epicormic shoots	monitor decline via summertime inspection	11-20	C.2	07/03/22
9	Prunus avium	6	3	3	44	5	3	4	5	M	Moderate	Moderate	-Crown over path and cemetery -Deadwood -Included base union -Suppressed growth -Old pruning wounds -Minor crown decline		11-20	C.2	07/03/22
10	Prunus avium	6	2	2	38	2	3	4	4	M	Moderate	Moderate	-Crown over path and cemetery -Deadwood -Included base union -Suppressed growth -Old pruning wounds -Minor crown decline -Unbalanced crown		11-20	C.2	07/03/22
11	Prunus avium	5	2	2	34	4	3	2	3	M	Moderate	Moderate	-Crown over path and cemetery -Deadwood -Included base union -Suppressed growth -Old pruning wounds -Minor crown decline -Unbalanced crown -Stem decay		<10	U	07/03/22

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
12	Prunus avium	5	3	2	35	4	3	2	3	M	Moderate	Moderate	-Crown over path and cemetery -Deadwood -Included base union -Suppressed growth -Minor crown decline -Unbalanced crown -Declining		<10	U	07/03/22
13	Prunus avium	5	2	3	38	5	3	2	4	M	Moderate	Moderate	-Crown over path and cemetery -Deadwood -Included base unions -Minor crown decline -Unbalanced crown towards parking -Declining		<10	U	07/03/22
14	Fraxinus excelsior	13	6	1	56	5	3	4	4	M	Poor	Moderate	-Crown over cemetery -Major decline -Deadwood -Storm damage -Co dominant stem at 3m -Ash dieback symptoms -Poor physiology -Suppressed	monitor decline via summertime inspection	<10	U	07/03/22
15	Fraxinus excelsior	13	5	1	54	4	3	5	3	M	Poor	Moderate	-Crown over cemetery -Major decline -Deadwood -Storm damage -Multi stem at 4m -Ash dieback symptoms -Poor physiology -Suppressed	monitor decline via summertime inspection	<10	U	07/03/22

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
16	Fraxinus excelsior	13	6	1	44	5	3	4	4	M	Poor	Moderate	-Crown over cemetery -Major decline -Deadwood -Storm damage -Co dominant stem at 4m -Ash dieback symptoms -Poor physiology -Suppressed	monitor decline via summertime inspection	<10	U	07/03/22
17	Fraxinus excelsior	5	2	2	27	3	3	2	3	SM	Poor	Moderate	-Crown over parking -Major decline -Deadwood -Storm damage -Co dominant at 1.3m -Ash dieback symptoms -Poor physiology -Suppressed -Poor situation	monitor decline via summertime inspection	<10	U	07/03/22
18	Fraxinus excelsior	13	6	1	66	7	7	5	8	M	Moderate	Moderate	-Crown over parking and seating -Deadwood -Storm damage -Co dominant at 2m -Ash dieback symptoms -Poor physiology -Suppressed -Root lifting concrete slabs	monitor decline via summertime inspection	<10	U	07/03/22
19	Acer pseudoplatanus	11	3	1	38	4	5	5	3	M	Good	Moderate	-Crown over seating and paths -Deadwood -Minor storm damage -Co dominant at 4m -Root exposure -Unbalanced -Stem lean		21-30	B.2	07/03/22

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
20	Acer pseudoplatanus	14	4	1	64	5	6	7	6	M	Good	Good	-Crown over road and paths -Deadwood -Minor storm damage -Co dominant at 3m -Root exposure -Old pruning wounds -Unbalanced -Stem lean		31-40	A.2	07/03/22
21	Fraxinus excelsior	9	3	1	39	5	4	6	6	M	Moderate	Moderate	-Crown over road and paths and main entrance -Deadwood -Minor storm damage -Root exposure -Unbalanced -Stem lean -Ash dieback symptoms -Suppressed growth		<10	U	07/03/22
22	Crataegus monogyna	7	2	1	33	3.3	3.8	3.3	3.8	M	Good	Good	-Crown over path and seating -Minor deadwood -Included unions -Canopy unions included.		40>	B.2	07/03/22
23	Fraxinus excelsior	15	2	1	70	6	5	7	9	M	Moderate	Moderate	-Co dominant stem at 3m -Major lean over road and paths -Storm damage -Deadwood -Unbalanced stems -Ash dieback potential -Suppressed -Declining crown		<10	U	07/03/22
24	Acer pseudoplatanus	13	4	1	45	5	5	5	4	M	Good	Poor	-Crown over gardens beyond wall -Major stem wound with decay; crown unbalanced away from path and road towards church -Minor deadwood and crown decline		11-20	C.2	07/03/22

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
25	Acer pseudoplatanus	9	3	2	29	1	4	5	4	SM	Moderate	Moderate	-Crown over gardens beyond wall -Crown unbalanced away from path and road to church -Co dominant at base -Epicormic growth -Crown decline -Suppressed		11-20	C.2	07/03/22
26	Rhododendron sp.	4	2	2	10	1	1	1	1	SM	Good	Moderate	-Co dominant shrub close to gate path entrance -Wire around stem and branch		11-20	C.2	07/03/22
27	Laburnum anagyroides	7	3	2	32	4	1	4	6	SM	Good	Moderate	-Major lean over wall and above parking and path -Stem base decay and swelling -Unbalanced -Minor deadwood -Companion acer stem close to tree	monitor base of stem for root decay and soil lifting	11-20	C.2	07/03/22
28	Acer pseudoplatanus	10	3	1	27	3	1	3	4	SM	Good	Moderate	-Crown over path and wall; parking alongside church -Minor deadwood -Crown suppression -Unbalanced canopy -Base epicormic		11-20	C.2	07/03/22
29	Fraxinus excelsior	12	4	1	30	3	2	5	4	OM	Poor	Moderate	-Crown over side of church path -Deadwood -Storm damage -Decline -Ash dieback potential -Suppressed -Co dominant stem at 3m	monitor decline via summertime inspection	<10	U	07/03/22
30	Fraxinus excelsior	13	8	1	62	5	5	5	5	M	Moderate	Moderate	-Crown over side of church path and road entrance -Deadwood -Storm damage -Decline -Ash dieback potential -Suppressed -Co dominant stem at 4m	monitor decline via summertime inspection	<10	U	07/03/22

TREE_NO	SPECIES	HEIGHT_M	CROWN_HT	NO_OF_STEM	DBH	CS_N	CS_E	CS_S	CS_W	AGE_CLASS	PHYS_COND	STRUC_COND	CONDITION	MANAGEMENT	REMAIN_CON	CATEGORY	DATE
31	Fraxinus excelsior	14	8	1	68	6.9	6.2	6.4	6.2	M	Moderate	Moderate	Crown over side of church path and parking entrance -Deadwood -Storm damage -Declining -Ash dieback potential -Suppressed -Co dominant stem at 5.5m	monitor decline via summertime inspection	<10	U	07/03/22

Abscission. The shedding of a leaf or other short-lived part of a woody plant, involving the formation of a corky layer across its base; in some tree species twigs can be shed in this way

Abiotic. Pertaining to non-living agents; e.g. environmental factors

Absorptive roots. Non-woody, short-lived roots, generally having a diameter of less than one millimetre, the primary function of which is uptake of water and nutrients

Adaptive growth. In tree biomechanics, the process whereby the rate of wood formation in the cambial zone, as well as wood quality, responds to gravity and other forces acting on the cambium. This helps to maintain a uniform distribution of mechanical stress

Adaptive roots. The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading

Adventitious shoots. Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage. The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Architecture. In a tree, a term describing the pattern of branching of the crown or root system

Ascomycota (Ascomycetes). One of the major taxonomic groups of fungi; their spores are borne on microscopic structures called asci, which in many types are in turn borne upon the fruit body of the fungus usually taking the form of a crust or cup. These fungi have particular importance in arboriculture, as some can cause significant decay and dysfunction in the live tissue of trees.

Axil. The place where a bud is borne between a leaf and its parent shoot

Bacteria. Microscopic single-celled organisms, many species of which break down dead organic matter, and some of which cause diseases in other organisms

Bark. A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Bark included union [BI]. When two or more branches or stems are held static or where normal movement is inhibited causing a weak branch attachment. This is usually caused by a 'natural-brace' or artificial structure above the point to where the branch attach to the stem.

Basidiomycota (Basidiomycetes). One of the major taxonomic groups of fungi; their spores are borne on microscopic peg-like structures (basidia), which in many types are in turn borne on or within conspicuous fruit bodies, such as brackets or toadstools. Most of the principal decay fungi in standing trees are basidiomycetes

Bolling. A term sometimes used to describe pollard heads

Bottle-butt. A broadening of the stem base and buttresses of a tree, in excess of normal and sometimes denoting a growth response to weakening in that region, especially due to decay involving selective delignification

Bracing. The use of rods or cables to restrain the movement between parts of a tree

Branch:

- **Primary.** A first order branch arising from a stem
- **Lateral.** A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral.** A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch bark ridge. The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem

Branch collar. A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot. A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling. An irreversible deformation of a structure subjected to a bending load

Buttress zone. The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium. Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker. A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Canopy species. Tree species that mature to form a closed woodland canopy

Cleaning out. The removal of dead, crossing, weak, and damaged branches, where this will not damage or spoil the overall appearance of the tree

Compartmentalization. The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

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

Compressive loading. Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition. An indication of the physiological vitality of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Construction exclusion zone. Area based on the Root Protection Area (in square metres) to be protected during development, by the use of barriers and/or ground protection

Crown/Canopy. The main foliage bearing section of the tree

Crown lifting. The removal of limbs and small branches to a specified height above ground level

Crown thinning. The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping. A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

Crown reduction/thinning. Reduction of the canopy volume by thinning to remove dominant branches whilst preserving, as far as possible the natural tree shape

Deadwood. Dead branch wood

Decurrent. In trees, a system of branching in which there is a well-defined central main stem, bearing branches which are limited in their length, diameter and secondary branching (cf. excurrent). In fungi with toadstools as fruit bodies, the description of gills which run some distance down the stem, rather than terminating abruptly

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

Delamination. The separation of wood layers along their length, visible as longitudinal splitting

Dieback. The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease. A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Distal. In the direction away from the main body of a tree or subject organism (cf. proximal)

Dominance. In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also, the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud. An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction. In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height). Stem diameter measured at a height of 1.5 metres (UK) or the nearest measurable point. Where measurement at a height of 1.5 metres is not possible, another height may be specified

Deadwood. Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Endophytes. Micro-organisms which live inside plant tissues without causing overt disease, but in some cases capable of causing disease if the tissues become physiologically stressed, for example by lack of moisture

Epicormic shoot. A shoot having developed from a dormant or adventitious bud and not having developed from a first-year shoot

Excrecence. Any abnormal outgrowth on the surface of tree or other organism

Excurrent. In trees, a system of branching in which the crown is borne on a number of major widely-spreading and secondarily branched limbs (cf. excurrent)

Felling licence. In the UK, a permit to fell trees in excess of a stipulated number of stems or volume of timber

Flush-cut. A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root. A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Guying a form of artificial support with cables for trees with a temporarily inadequate anchorage

Habit. The overall growth characteristics, shape of the tree and branch structure

Hazard beam. An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Heartwood/false-heartwood/ripe wood. Sapwood that has become dysfunctional as part of the natural aging processes

Heave. A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also, the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

High canopy tree species. Tree species having potential to contribute to the closed canopy of a mature woodland or forest

Incipient failure. In wood tissues, a mechanical failure which results only in deformation or cracking, and not in the fall or detachment of the affected part

Increment borer. A hollow auger, which can be used for the extraction of wood cores for counting or measuring wood increments or for inspecting the condition of the wood

Infection. The establishment of a parasitic micro-organism in the tissues of a tree or other organism

Internode. The part of a stem between two nodes; not to be confused with a length of stem which bear nodes but no branches

Lever arm. A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin. The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing. A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end loading

Loading. A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Longitudinal. Along the length (of a stem, root or branch)

Lopping. A term often used to describe the removal of large branches from a tree, but also used to describe other forms of cutting

Mature Heights (approximate):

- **Low maturing** – less than 8 metres high
- **Moderately high maturing** – 8 – 12 metres high
- **High maturing** – greater than 12 metres high

Micro drill. An electronic rotating steel probe, which when inserted into woody tissue provides a measure of tissue density

Minor deadwood. Deadwood of a diameter less than 25mm and or unlikely to cause significant harm or damage upon impact with a target beneath the tree

Mulch. Material laid down over the rooting area of a tree or other plant to help conserve moisture; a mulch may consist of organic matter or a sheet of plastic or other artificial material

Mycelium. The body of a fungus, consisting of branched filaments (hyphae)

Natural brace. This feature can be defined as where two or more branches or stems connect, join, rub, fuse or entwine in the canopy of the tree. This can restrict normal movement lower down the branch which inhibits movement at the point of where the branch attaches to the stem of the tree; this is commonly known as the union, but also the junction or fork. As the tree grows and thickens, this will cause a bark included union due to the branch being tied up. If the rubbing branches are removed or die-back, this can open the union up to excessive stress and possibly cause the branch to fail. This is because the union has not been able to produce the necessary adaptive (or strengthening) growth through natural movement.

Occluding tissues. A general term for the roll of wood, cambium and bark that forms around a wound on a woody plant (cf. wound wood)

Occlusion. The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen. A micro-organism which causes disease in another organism

Photosynthesis. The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products.

Phytotoxic. Toxic to plants

Pollarding. The removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one operation, or may be phased over several years. The period of safe retention of trees having been pollarded varies with species and individuals. It is usually necessary to re-pollard on a regular basis, annually in the case of some species.

Primary branch. A major branch, generally having a basal diameter greater than 0.25 x stem diameter

Primary root zone. The soil volume most likely to contain roots that are critical to the health and stability of the tree and normally defined by reference to Table 1 of BS5837 (1991) Guide for Trees in Relation to Construction.

Priority. Works may be prioritised, 1. = high, 5. = low

Probability. A statistical measure of the likelihood that a particular event might occur.

Proximal. In the direction towards from the main body of a tree or other living organism (cf. distal)

Pruning. The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial. In the plane or direction of the radius of a circular object such as a tree stem

Rams-horn. In connection with wounds on trees, a roll of occluding tissues which has a spiral structure as seen in cross-section

Rays. Strips of radially elongated parenchyma cells within wood and bark. The functions of rays include food storage, radial translocation and contributing to the strength of wood

Red-rot. A form of decay in which reddish pigments are present but which is biochemically a white-rot; not to be confused with brown-rots which sometimes also have a reddish-brown colour

Reactive Growth/Reaction Wood. Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Removal of dead wood. Unless otherwise specified, this refers to the removal of all accessible dead, dying and diseased branch wood and broken snags

Removal of major dead wood. The removal of, dead, dying and diseased branch wood above a specified size

Respacing. Selective removal of trees from a group or woodland to provide space and resources for the development of retained trees.

Residual wall. The wall of non-decayed wood remaining following decay of internal stem, branch or root tissues

Root-collar. The transitional area between the stem/s and roots

Root-collar examination. Excavation of surfacing and soils around the root-collar to assess the structural integrity of roots and/or stem

Root protection area. An area of ground surrounding a tree that contains sufficient rooting volume to ensure the tree's survival. Calculated with reference to Table 2 of BS5837 (2005) and shown in plan form in square metres

Root zone. Area of soils containing absorptive roots of the tree/s described microscopic and dispersed in air or water. The **Primary** root zone is that which we consider of primary importance to the physiological well-being of the tree

Sapwood. Living xylem tissues

Secondary branch. A branch, generally having a basal diameter of less than 0.25 x stem diameter

Selective delignification. A kind of wood decay (white-rot) in which lignin is degraded faster than cellulose

Shedding. In woody plants, the normal abscission, rotting off or sloughing of leaves, floral parts, twigs, fine roots and bark scales

Silvicultural thinning. Removal of selected trees to favour the development of retained specimens to achieve a management objective

Simultaneous white-rot. A kind of wood decay in which lignin and cellulose are degraded at about the same rate

Snag. In woody plants, a portion of a cut or broken stem, branch or root which extends beyond any growing-point or dormant bud; a snag usually tends to die back to the nearest growing point

Soft-rot. A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Spores. Propagules of fungi and many other life-forms; most spores are

Shrub species. Woody perennial species forming the lowest level of woody plants in a woodland and not normally considered to be trees **Sporophore.** The spore bearing structure of fungi

Sprouts. Adventitious shoot growth erupting from beneath the bark

Stem/s. The main supporting structure/s, from ground level up to the first major division into branches

Stress. In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

Stress. In mechanics, the application of a force to an object

Stringy white-rot. The kind of wood decay produced by selective delignification

Storm. A layer of tissue which supports the fruit bodies of some types of fungi, mainly ascomycetes

Structural roots. Roots, generally having a diameter greater than ten millimetres, and contributing significantly to the structural support and stability of the tree

Subsidence. In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Subsidence. In relation to branches of trees, a term that can be used to describe a progressive downward bending due to increasing weight

Taper. In stems and branches, the degree of change in girth along a given length

Target canker. A kind of perennial canker, containing concentric rings of dead occluding tissues

Targets. In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping. In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Torsional stress. Mechanical stress applied by a twisting force

Translocation. In plant physiology, the movement of water and dissolved materials through the body of the plant

Transpiration. The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

Understory. A layer of vegetation beneath the main canopy of woodland or forest or plants forming this

Understory tree species. Tree species not having potential to attain a size at which they can contribute to the closed high canopy of a woodland **Vascular wilt.** A type of plant disease in which water-conducting cells become dysfunctional

Vessels. Water-conducting cells in plants, usually wide and long for hydraulic efficiency; generally, not present in coniferous trees

Veteran tree. A loosely defined term for an old specimen that is of interest biologically, culturally or aesthetically because of its age, size or condition and which has usually lived longer than the typical upper age range for the species concerned

White-rot. A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure. The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure. The force exerted by a wind on a particular object

Wind throw. The blowing over of a tree at its roots

Wound dressing. A general term for sealants and other materials used to cover wounds in the hope of protecting them against desiccation and infection; only of proven value against fresh wound parasites

Wound wood. Wood with atypical anatomical features, formed in the vicinity of a wound'