cheshire woodlands
arboricultural consultancy

ARBORICULTURAL STATEMENT

ON

PROPOSED DEVELOPMENT AT

TREE TOPS, QUARRY STREET, WOOLTON L25 6HD

ON BEHALF OF

DEVAPLAN LTD

223 QUEENS DOCK COMMERCIAL CENTRE

NORFOLK STREET, LIVERPOOL L1 0BG

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Our Ref: CW/7533-AS

Date: 16 March 2015

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1. EXECUTIVE SUMMARY

1.1 Planning permission is sought for change of use from dwelling house to children's day nursery including formation of a new vehicular access and provision of parking and a drop off area at the front of the site, at Tree Tops on Quarry Street in Woolton.

1.2 The proposals have been the subject of detailed pre-application discussions with the council's tree officer and the scheme has have been substantially modified to take account of his comments.

1.3 A total of ten 'moderate' and 'low quality' beech, horse chestnut, holly, yew and cherry trees at the front of the site, two of which are protected by a tree preservation order, will be removed for highway safety reasons to accommodate a new vehicular access, car parking and a drop-off area.

1.4 Retention of the remaining eight protected beech trees at the front of the site will maintain continuity of tree cover and the visual amenity of the local street-scene.

1.5 Residual details for the protection of retained trees during development and safeguards where construction works interface with root protection areas, can be resolved by planning condition.

2. TERMS OF REFERENCE

2.1 Instruction

2.1.1 Cheshire Woodlands is instructed by Devaplan Ltd to:

- Survey and prepare a schedule of trees to comply with the general requirements of British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BS5837)
- Annotate a topographical land survey drawing and produce a Tree Constraints Plan
- Appraise a development proposal in relation to trees and produce an arboricultural statement

2.1.2 The following documents have been considered in our evaluation:

- Topographical land survey drawing ref. S&McH\QUARRY\01
- Site plan as proposed drawing ref. 14.009.003
- The City Council of Liverpool (Land at 'Tree Tops', Quarry Street, Liverpool 25) Tree Preservation Order, 2014

2.2 Limitations

2.2.1 Assessing the potential effects of trees upon load-bearing soils beneath existing and proposed structures is not considered in this report.

2.2.2 The tree survey is carried out in sufficient detail to gather data for and inform the current project. Our appraisal of the mechanical integrity of trees on the site is of a preliminary nature and sufficient only to inform the project. The assessment of trees is carried out from ground level without invasive investigation and the disclosure of hidden defects cannot be expected.

2.2.3 Trees were viewed from within the site or from areas with public access. Our assessment was restricted where trees were ivy clad or where basal growth or other vegetation obscured lower stems and root collars.

2.2.4 This report and associated documents remain the copyright of Cheshire Woodlands and there should be no transfer of rights to any third party without our express written consent.

3. INTRODUCTION

3.1 The shaded sections of this report highlight the key issues that are specific to the project.

3.2 This assessment evaluates the effects of a development proposal on trees. The comparative values of trees are considered broadly in line with the guidance of BS5837 and retention, protection and management of trees are informed by this evaluation.

3.3 Glyn Thomas, senior consultant with Cheshire Woodlands Ltd assessed the trees and the development proposal. The tree survey was carried out on 10 October 2014.

3.4 The development proposal comprises change of use from dwelling house to children's' day nursery including formation of a new vehicular access to Quarry Street and provision of parking and drop off area at the front of the site.

3.5 This report provides sufficient supporting information to demonstrate impacts on trees and enable the local planning authority (LPA) to determine the planning application insofar as it relates to trees. It does not include detailed working specifications for the protection of trees or engineering and design features, which if required can be resolved by planning condition.

4. THE SITE

4.1 The site comprises a rectangular shaped plot to the west side of Quarry Street, with a two-storey dwelling fronting the eastern boundary with the public highway, mature lawned gardens to the rear and bounded on the north, south and west sides by residential properties.

4.2 The British Geological Survey - Geology of Britain Viewer includes 'no data' for superficial deposits in the area, but identifies the underlying bedrock as 'Chester Pebble Beds Formation - Sandstone, Pebbly (gravelly)'. No soil samples were taken during our survey.

5. STATUTORY TREE PROTECTION

5.1 A group of 12 beech trees to the eastern boundary of the site fronting Quarry Street are subjects of The City Council of Liverpool (Land at 'Tree Tops', Quarry Street, Liverpool 25) Tree Preservation Order, 2014 (see appendix 4 for further guidance).

5.2 A search on the Council's planning website confirmed that the site is not in a conservation area.

6. SURVEY METHODOLOGY

6.1 The topographical land survey overlaid with the site layout proposal drawing is the base for our tree constraints plan at appendix 2.

6.2 The trees were identified, measured and recorded in the tree survey schedule at appendix 1. Tree stem diameters and canopy spreads were mostly measured using a tape, tree heights using a tape and clinometer.

6.3 The trees were assessed on the basis of the 'visual tree assessment method' (Mattheck and Breloer 1994).

6.4 Below ground constraints are represented as 'root protection areas' (RPA), calculated in accordance with section 4.6 and table D.1 of BS5837. The RPA is a layout design tool indicating an area of ground around a tree containing sufficient roots and rooting volume to maintain tree viability.

6.5 The surveyed trees were assessed for 'Visual Prominence' and were categorised as set out in Table 1 below (see appendix 3 for further guidance).

6.6 A brief assessment for obvious signs of wildlife habitat in the surveyed trees was carried; no protected or exceptional habitats were identified and details were not recorded.

7. EVALUATION OF THE TREES

7.1 BS5837 recommends that trees be evaluated and categorised as set out in Table 1, which also provides a summary of the impact of the development proposal on trees.

7.2 Table 1

	To be retained and protected	To be removed for development	To be removed for other reasons
Category A High quality with life expectancy of at least 40 years	None	None	None
Category B Moderate quality with life expectancy of at least 20 years	Group G4 and 8 beech and 1 holly tree in group G1	2 beech, 1 yew and 3 holly trees in group G1 (G1/8 to G1/13)	None
Category C Low quality with life expectancy of at least 10 years, or small young trees	Group G3	Group G2	None
Category U Cannot be retained in context of current land-use for longer than 10 years	None	Cherry tree G1/4	None

7.3 The development proposal has been the subject of detailed pre-application discussions and the new access and parking arrangement at the front of the site has been substantially amended to take account of various matters agreed with the council's arboricultural officer during a site meeting on 30 January.

7.4 Several minor yew and holly trees and a dead cherry stem in group G1,

together with 'low quality' C category group G2 are not included in the TPO and the council's tree officer has confirmed that he would raise no objection to their removal as part of the development proposal.

7.5 Two protected beech trees at the northern end of group G1 will be removed to accommodate a new vehicular access, which is required for highway safety reasons, to provide a modified access/egress arrangement to serve new parking spaces and a safe 'drop-off' zone at the front of the building. Removal of these two trees has been agreed with the council's tree officer as part of the pre-application negotiations.

7.6 The remaining eight 'moderate quality' B category protected beech trees in group G1 together with groups G3 and G4 at the rear of the site will be retained and can be protected during site construction works in accordance with current best practice guidance at section 6 of BS5837. In this regard, we advise as follows:

- In order to avoid undue damage to the roots of adjacent retained trees, all stump grinding works will be carried out under the supervision of a competent arboriculturist.
- Pruning of the retained trees in group G1, as detailed in the 'management' column of the tree survey schedule, is proposed in order to improve ground clearances over the highway and the parking/drop-off area at the front of the building. These works are of a minor nature and will have no significant impacts on the long-term health, stability or visual qualities of the protected trees.
- Details for the removal of existing hardstanding, limited manual excavation of ground and the installation of new hard surfacing within RPAs are set out at sections 7.2 to 7.4 of BS5837 and will be implemented in the areas identified with orange diagonal and cross-hatching on the tree protection plan, where proposed construction

works interface with the RPAs of the adjacent retained trees. Providing that the appropriate safeguards are implemented in these areas, the risk of any significant long-term harm to the trees is low.

7.7 Details for the protection of retained trees, to include a tree protection plan and arboricultural method statement, can be resolved by planning condition.

8. CONCLUSIONS

8.1 The development proposal has been amended to take account of the pre-application comments of the council's tree officer and requires the removal of two 'moderate quality' protected beech trees, to accommodate a new access for highway safety reasons, and several 'low quality' beech, horse chestnut, yew, cherry and holly trees.

8.2 The majority of the protected beech trees at the front of the site and two groups of trees to the rear will be retained and can be protected during the development in accordance with current best practice guidance.

8.3 Residual details for the protection of retained trees during development, including where proposed construction works interface with RPAs, can be resolved by planning condition.

9. RECOMMENDATIONS

9.1 No tree pruning or removal works should commence on site until necessary consents have been obtained from the LPA, either in respect of the TPO or as part of a detailed planning permission.

9.2 All tree pruning and removal works should be implemented in accordance with the tree survey schedule at appendix 1 and in compliance with the requirements of BS3998:2010.

9.3 All stump grinding works should be carried out under the supervision of a competent arboriculturist.

9.4 Statutory protection of wildlife should be taken into account in the planning and execution of tree pruning and removal. See appendix 4 for further guidance.

9.5 All trees scheduled for retention should be protected during the development in accordance with a scheme of work to be agreed with the LPA, to include a tree protection plan and arboricultural method statement. All works should be implemented in accordance with the agreed details.

9.6 Any excavation of ground, removal of existing hardstanding or installation of new hard surfacing within the orange diagonal and cross-hatched areas on the tree constraints plan at appendix 2 should be carried out in accordance with a tailored, engineer-designed construction specification and method statement to be agreed with the LPA. All works should be implemented in accordance with the agreed details.

10. REFERENCES.

Anon. Geology of Britain Viewer. British Geological Survey, Nottingham. http://www.bgs.ac.uk/ (accessed 16 March 2015)

BS5837:2012. Trees in relation to design, demolition and construction - Recommendations. British Standards Institute, London.

BS3998:2010. Tree work - Recommendations. British Standards Institute, London.

Mattheck. M, and Breloer. H,. 1994. The Body Language of Trees A handbook for failure analysis. Research for Amenity Trees No. 4.

APPENDIX 1

TREE SURVEY SCHEDULE

PROJECT: TREE TOPS, QUARRY STREET, WOOLTON
CLIENT: DEVAPLAN LIMITED
REF: CW/7533-SS1
DATE: 10 OCTOBER 2014

SURVEYED BY: G THOMAS
CHESHIRE WOODLANDS LIMITED
PAGE: 1

No.	Species	Age Range	Height (m)	Crown Spread (m)	Stem Dia. (mm)	Vitality	Comments	Management	Visual prominence	Retention Value Existing	Retention Value Proposed	BS5837 RPA Radius (m)
G1	Beech *(Fagus sylvatica)* 3 Holly *(Ilex aquifolium)* 1 Yew *(Taxus baccata)* 1 Cherry *(Prunus sp.)*	SM-EM SM SM PM	≤6	≤11	≤500	D-G	• Closely spaced linear group fronting the highway • Growing within a narrow linear planting bed, retained on the south western edge by brick edging stones • The beech are probably remnants of a former boundary hedge • Several trees are growing abutting or close to a 2m high sandstone boundary wall, which shows signs of localised cracking and displacement and there is potential for future damage by annular increment growth of the lower stems • Contains several low quality suppressed trees, the removal of which would have no significant impact on the collective visual qualities of the group • Ground clearance on north east side down to 2m over the highway footway and around 4.5m over the carriageway **G1/1 Beech -** One of the principal trees in the group. Twin-stemmed from ground level. Minor cracking of adjacent boundary wall **G1/2 Beech -** Twin-stemmed from ground level with crossing, partially fused stems between 1m and 1.8m **G1/3 Beech -** One of the principal trees in the group **G1/4 dead cherry stem** **G1/5 Beech -** One of the principal trees in the group. Minor cracking of adjacent boundary wall. Main stem bifurcates at a height of 5m, at which point there is an acute included bark union of co-dominant branches with no signs of failure **G1/6 and G1/7 Beech -** Growing abutting a dilapidated 2m high close board party boundary fence	• **G1/4 and G1/8 to G1/13 –** Fell for development and grind stumps to a depth of 0.3m (works to be carried out under the supervision of a competent arboriculturist) • **Remainder –** Retain and protect during development • Prune on the south west side by removal of minor low lateral and sub-lateral branches to obtain 5m ground clearance • Prune on the north east side to obtain 3m ground clearance over the highway footway • Monitor vertical alignment of boundary wall • **G1/5 –** Monitor included bark union for signs of failure	3	B	B&U	≤6.0

Assessment was restricted where trees were ivy clad or where basal growth or vegetation obscured lower stems and root collars
All trees should be re-assessed at appropriate intervals

HEADINGS & ABBREVIATIONS

Age Range	Y = young SM = semi-mature EM = early-mature M = mature PM = post-mature
Stem Dia	Stem diameter (measured in accordance with Figure C.1 of BS5837: 2012) (MS = multi-stemmed EST = estimated)
Crown Spread	Maximum crown spread (EST = estimated)
Vitality	D = dead MD = moribund P = poor M = moderate G = good
Visual prominence	Broad indication of prominence in the landscape (0 = none 1 = very low up to 5 = very high) (G = contributes to a wider group)
Retention Category Existing	Broadly in accordance with Table 1 of BS5837: 2012 (considers the merits of the tree or group in the context of the existing land-use)
Retention Category Proposed	Broadly in accordance with Table 1 of BS5837: 2012 (considers the merits of the tree or group in the context of a development proposal)
BS5837 RPA Radius	Calculated in accordance with Table D.1 of BS5837: 2012

TREE SURVEY SCHEDULE

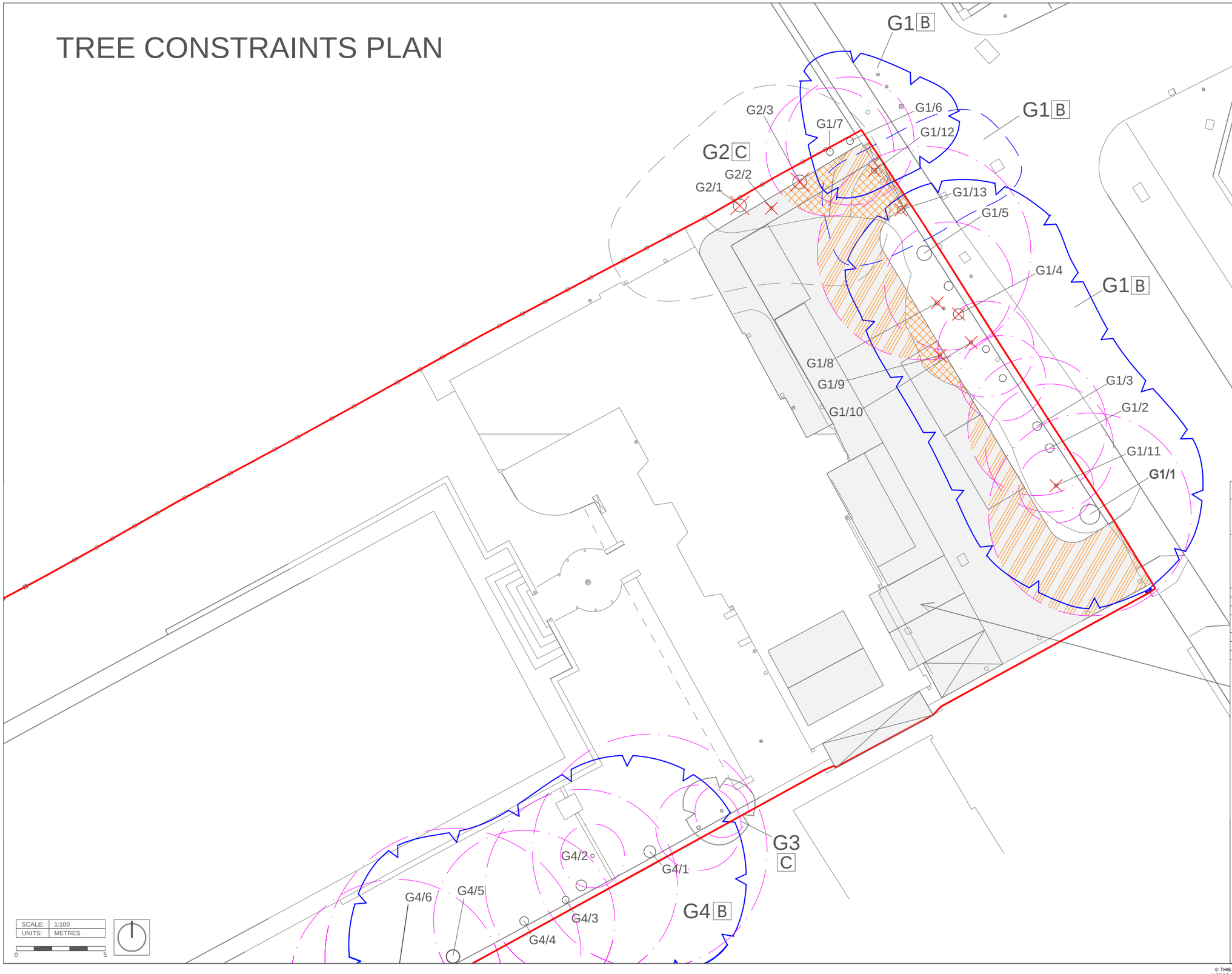
PROJECT: TREE TOPS, QUARRY STREET, WOOLTON
CLIENT: DEVAPLAN LIMITED
REF: CW/7533-SS1
DATE: 10 OCTOBER 2014

SURVEYED BY: G THOMAS
CHESHIRE WOODLANDS LIMITED
PAGE: 2

No.	Species	Age Range	Height (m)	Crown Spread (m)	Stem Dia. (mm)	Vitality	Comments	Management	Visual prominence	Retention Value Existing	Retention Value Proposed	BS5837 RPA Radius (m)
G2	1 Beech 1 Holly 1 Horse chestnut *(Aesculus hippocastanum)*	EM SM EM	≤15	≤12	120 - 530	M-G	• Closely spaced linear group within a raised planting bed, retained on the south east side by brick edging stones **G2/1 Beech -** Probably the remnant of a former boundary hedge. Minor secondary stem arises at the base. Growing close to the front corner of the adjacent building with branches on the south west side touching the front and side elevations, roof and gutters and overhanging the roof by up to 3m. Potential for substantial future growth and not suited to long-term retention without significant ongoing management to contain height and radial crown spread **G2/2 Holly -** Heavily suppressed **G2/3 Horse chestnut -** Stem and crown biased to south east. Basal and epicormic shoots. Extensive bark necrosis to the stem and primary branches and weeping lesions of Horse Chestnut Bleeding Canker to stem. Reduced vitality in the upper crown	• Fell for development and grind stumps to a depth of 0.3m	3	C	U	N/A
G3	Rowan *(Sorbus sp.)* Silver birch *(Betula pendula)*	SM	≤5	≤4	120 & 200	M	• Closely spaced group of boundary trees, close to a 1.8m high sandstone boundary wall • Suppressed on the south west side with stems and crowns biased to the north east	• Retain and protect during development • No work required	1	C	C	1.5 & 2.4
G4	1 Beech 1 Sycamore *(Acer pseudoplatanus)* 2 Norway maple *(Acer platanoides)* 1 Whitebeam *(Sorbus aria)* 1 Horse chestnut	EM Y EM EM M	≤17	≤13	150 - 600	G	• Closely spaced linear group of boundary trees • Growing abutting and adjacent to a 1.8m high sandstone boundary wall. Potential for future direct damage by annular increment growth of the lower stems and buttress roots • General ground clearance over the subject site of between 4m and 7m **G4/1 Beech -** Recently pruned to remove minor low lateral branches on the north east side. Crown slightly biased to north east **G4/2 Sycamore -** Most probably recent natural colonisation. Heavily suppressed **G4/3 1.8m high standing dead stem** **G4/4 Whitebeam -** Dense basal and epicormic shoots. Pruned in recent years to remove a low primary branch and minor sub-lateral branches **G4/5 Horse chestnut -** Stem and primary branches colonised by dense ivy to a height of 10m. Weeping lesions of Horse Chestnut Bleeding Canker and minor bark necrosis to base of stem. No obvious signs of any significant reduction in vitality **G4/6 Norway maple -** Partially occluded open cavity to mid stem. Pruned in recent years to remove low lateral and sub-lateral branches to a height of around 6m	• Retain and protect during development • **G4/5** – Sever and remove ivy to a height of 3m to facilitate a more detailed assessment of the stem. Monitor development of Horse Chestnut Bleeding Canker infection • Monitor vertical alignment of boundary wall	2	B	B	1.8 - 7.2

APPENDIX 2

TREE CONSTRAINTS PLAN



TREE CONSTRAINTS PLAN

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CLIENT	DEVAPLAN LTD
PROJECT	TREE TOPS QUARRY STREET WOOLTON
JOB REF	CW/7533-P-TC-2
DATE	16 MARCH 2015
SCALE	1:100 at A1

- SITE BOUNDARY
- PROPOSED ACCESS AND PARKING LAYOUT (DRAWING 14.009/003)
- TREE TO BE REMOVED
- GROUP OF TREES TO BE REMOVED
- GROUP OF TREES TO BE RETAINED
- EXISTING GROUND REQUIRING SPECIAL CONSIDERATION IN RELATION TO TREES
- EXISTING HARD SURFACE REQUIRING SPECIAL CONSIDERATION IN RELATION TO TREES
- A — BS 5837 RETENTION VALUE
- BS5837 ROOT PROTECTION AREA RADIUS
- BS5837 CATEGORY 'B' TREES
- BS5837 CATEGORY 'C' TREES

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APPENDIX 3

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Guidance Note - Assessment of Visual Prominence and Assessment of Retention Values

Visual Prominence Values

Determined by assessment of current and potential visual prominence and taking account of location, tree size, growth potential and useful life expectancy. Visual prominence values are classified as follows:

(0) none, (1) very low up to (5) very high

Retention Values

Trees or groups of trees are evaluated twice in order to facilitate consideration of their relative merits. Firstly, the trees are assessed and categorised in the context of the pre-development situation to provide a broad valuation of all of their attributes and the contribution to their environs. Secondly, the trees are similarly assessed and categorised in the context of a development proposal. The evaluations consider current or projected:

- life expectancy (broad categorisation)
- visual prominence (current and potential)
- landscape function
- numbers of other trees and their maturity (continuity for landscape, amenity, habitat)
- wildlife habitats (incl. continuity)
- safety
- conflicts with the built environment or other land-use
- cultural, historical or other special value

Groups of trees are assessed and categorised as a single unit.

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Pre-Development Retention Value

Each surveyed tree or group of trees is valued and placed into one of the following categories (A, B, C or U). The valuation considers the benefits and disbenefits of retaining the tree or group of trees in the pre-development context; any specific issues are noted in the tree survey schedule.

(A) Trees the retention of which in the pre-development context is most desirable and that have an estimated remaining life expectancy of at least 40 years (high value category)

Wholly appropriate to the pre-development situation and without significant conflict

(B) Trees the retention of which in the pre-development context is desirable and that have an estimated remaining life expectancy of at least 20 years (moderate value category)

Appropriate to the pre-development situation but not of highest value

(C) Trees that could be retained in the pre-development context and have an estimated remaining life expectancy of at least 10 years (low value category)

Ill-suited to the pre-development situation but could be retained with moderate conflicts

Trees of no particular merit in the pre-development context

(U) Trees unsuitable for retention in the pre-development context

Cannot reasonably be retained within the pre-development situation for longer than 10 years

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Post-Development Retention Value

With reference to a development proposal, each of the trees or groups of trees is placed in one of the following categories (A, B, C or U). The valuation considers the benefits and disbenefits of retaining the tree or group of trees in the context of the development proposal; any specific issues are noted in the tree survey schedule.

(A) Trees the retention of which is most desirable (high value category)

Retention wholly appropriate to the proposed situation and without significant conflict

(B) Trees the retention of which is desirable (moderate category)

Retention appropriate to the proposed situation but not of highest value and/or having only minor conflicts

(C) Trees which could be retained (low value category)

Retention ill-suited to the proposed situation but could be retained with moderate conflicts

Trees of no particular merit in the proposed situation

(U) Trees for removal

Cannot reasonably be retained within the proposed situation

APPENDIX 4

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GUIDANCE NOTE- STATUTORY CONTROLS

TREES AND HEDGES:

Subject to certain specified exemptions, the Town and Country Planning Act 1990, requires that an application must be made to the local planning authority (LPA), to carry out works upon or remove trees that are subject to a tree preservation order (TPO).

Six weeks' notice must be given to the LPA of intention to carry out works upon or remove trees within a conservation area and not protected by a TPO.

Local planning authority consent may be required to carry out works upon or remove trees, shrubs and hedges that are the subjects of planning conditions.

LPA consent may be required for the removal of hedgerows under the Hedgerow Regulations 1997.

Your Council's planning department will advise whether or not any of the above controls apply to your trees, shrubs and hedges.

Subject to certain exemptions, the Forestry Act (1967 specified) requires that a licence must be obtained for the felling of growing trees

Your nearest Forestry Commission office will advise whether you require a felling licence.

WILDLIFE

The Wildlife and Countryside Act 1981 (together with the amendments of 1985 & 1991, the subsequent variations to the schedule orders, and strengthening amendments made within the Countryside and Rights of Way Act 2000) forms the basis for legislation protecting Britain's flora and fauna.

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Nesting birds and all species of bat are afforded statutory protection. It is an offence to:

- disturb a nesting bird
- disturb a roosting bat or damage, destroy or block access to a bat roost
- intentionally kill, injure or take a bat
- sell, hire, barter or exchange a bat, dead or alive
- be in possession or control of a bat or anything derived from a bat

Your local Wildlife Trust or your Council's Ecologist will provide guidance on statutory controls relating to wildlife.

APPENDIX 5

GLOSSARY OF ARBORICULTURAL TERMS

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

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

Basidiomycotina (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 fork. An acute angled fork that is mechanically optimised for the growth pressure that two or more adjacent stems exert on each other

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 condition 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 the crown is borne on a number of major widely-spreading limbs of similar size (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

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

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

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

Excurrent. 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. decurrent)

Fastigiate. Having upright, often clustered branches

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

Field layer. Herbs, ferns, grasses and sedges

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

Ground layer. Mosses, ivy, lichens and fungi

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

Haloing. Removing or pruning trees from around the crown of another (usually mature or post-mature) tree to prevent it becoming supressed

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/ripewood. 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

Included bark (ingrown bark). Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

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

Microdrill. 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)

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

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, usually to a point just outside that of the previous cutting. 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 BS5837 (2005) 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

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 branchwood and broken snags

Removal of major dead wood. The removal of, dead, dying and diseased branchwood 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.

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

Rib. A ridge of wood that has usually developed because of locally increased mechanical loading. Often associated with internal cracking in the wood of the stem, branch or root.

Ring-barking (girdling). The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

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. 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

Silviculture. The practice of controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs and values

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 microscopic and dispersed in air or water

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

Tree Risk Assessment. An assessment and description of the risks and where appropriate the values associated with a tree or trees. The primary risk being considered is that from falling trees. Other risks, such as damage to infrastructure, interruption of service and building subsidence may also be considered.

- Walkover – A general view of the tree population considered in the context of the adjacent land-use to identify trees that present significantly elevated risks
- Drive-by - A general view of the tree population from a moving vehicle and considered in the context of the adjacent land-use to identify trees that present significantly elevated risks
- Individual – the assessment of risks from a single tree considered in the context of the adjacent land-use to identify trees that present significantly elevated risks

Understorey. This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Understorey 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

Vigour. The expression of carbohydrate expenditure to growth (in trees)

Vitality. A measure of physiological condition expressed through the health and growth of foliage, shoots and adaptive woody tissues.

Volunteer trees. Trees arising from natural colonisation rather than having been planted

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

Windthrow. 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

Woundwood. Wood with atypical anatomical features, formed in the vicinity of a wound

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