WHITE PEAK TREE CONSULTANCY LTD

Land adjacent to 'Gadley House' Manchester Road Buxton

Arboricultural Implication Study

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ABSTRACT

The primary purpose of this report is to make an appraisal of certain trees that stand on an area of potential development land adjacent to 'Gadley House', Manchester Road, Buxton. The report evaluates the condition and amenity value of the trees and assesses any constraints they may impose on an outline proposal to erect four detached dwellings on the south western side of Manchester Road. The report also provides information on the trees that should be removed and how the trees being retained should be protected during the development process.

CONTENTS

1 INTRODUCTION

1.1 **Brief:** I am instructed by John F Lomas to undertake a predevelopment appraisal (an arboricultural implication study') of certain trees that stand on an area of potential development land at Cavendish Gold Club, Buxton. The report evaluates the condition and amenity value of the trees and assesses any constraints they may impose on an outline proposal to erect four detached dwellings on the south-western side of Manchester Road.

1.2 The report will:

- evaluate the condition and amenity value of the trees,
- advise how the trees may impact on the proposal,
- advise how the proposal may impact upon the trees,
- provide information on any trees that should be removed and,
- provide information on how those being retained should be protected during the development process.

1.3 **Qualifications and experience:** I have based this report on my site observations and the provided information, and I have come to conclusions in the light of my experience. I have experience and qualifications in arboriculture and list the details in Appendix 1.

1.4 **Documents and information provided:** I was provided with copies of the following documents:

- a topographical survey – 1:200 @ A0 and;
- a proposed site plan – 1:200 @ A0.

1.4 **Relevant background information:** Because there are significant trees on and adjacent to the site the local planning authority (High Peak Borough Council) will require a tree survey to ensure that proper consideration is given to the trees in the context of the development proposal.

1.5 **Limitations of use and copyright:**

2 SITE VISIT/OBSERVATIONS AND COLLECTION OF DATA

2.1 **Site visit:** I carried out a site visit accompanied by John F Lomas on Tuesday January 27, 2015. All my observations were from ground level without detailed investigations. I estimated tree height, crowns spread and canopy height and used a tape measure for all other dimensions. The weather at the time of my visit was cold, overcast and windy with heavy drizzle developing towards the end of my visit. Visibility was reasonable.

2.2 **Brief site description:** Buxton is a spa town located in Derbyshire, England. It lies at around 307metres above sea level and vies with Alston, Cumbria as the highest market town in England. Cavendish Golf Club and its associated course lies to the west of Buxton on the rising ground between Manchester Road (Long Hill) to the north east and Bishops Lane to the south west. The development land is located to the north of the course on the bank immediately east of 'Gadley House' and just below Manchester Road. The generally character of the locality is rural fringe (photograph 1).

Photograph 1

2.3 **Identification and location of the trees:** I have illustrated the locations of the trees on the tree constraints plan included as Appendix 3 and the tree protection plan included as Appendix 4. These plans are for illustrative purposes only and they should not be used for directly scaling measurements. Only the full-sized scale plans accompanying the report should be for scaling measurements. All the relevant information on it is contained within this report and the provided documents.

2.4 **Tree observations:** I visually inspected the trees and recorded the information on the tree data table included as Appendix 2. The details of the report should be self-explanatory, however, abbreviations and certain terms used in the tree information schedule are explained below.

2.5 **British Standard BS: 5857:** Information relating to the subject tree is recorded in the tree data table in Appendix 3. The data collected complies that recommended in section 4 of British Standard BS 5837:2012 'Trees in Relation to Construction - Recommendations' (BS 5837).

2.6 Tree species has been recorded by both common and botanical name.

2.7 Height has been recorded in metres.

2.8 Stem diameter at 1.5 metres is recorded in millimetres.

2.9 Branch spread has been recorded in metres as a radius at four cardinal points as recommended in BS 5837.

2.10 Height of ground clearance has been recorded in metres.

2.11 'Age Class' has been recorded thus:

Yng - Young trees
Mid - Middle age trees
Mat - Mature trees
Om - Over-mature trees
Vet - Veteran trees

2.12 'Physiological condition' has been recorded (e.g. good, fair, poor, dead).

2.13 'Structural condition' has been recorded (e.g. collapsing, the presence of any decay and physical defect).

2.14 'Preliminary management recommendations' have been provided.

2.15 'Remaining contribution' has been estimated (e.g. less than 10, 10-20, 20-40).

2.16 Category grading (BS 5837 Class) has been recorded as U, A, B or C in accordance with Table 1 of BS 5837. This gives an indication as to the trees importance in relation to the characteristics of the site and its suitability for retention in the context of the proposed development on the site:

U - trees which should be removed irrespective of any development proposal
fell category - (dark red),
A - trees of high quality whose retention is most desirable
high category - (light green),
B - trees of moderate quality whose retention is desirable
moderate category - (mid blue),
C - trees low quality, which could be retained:
low category - (grey).

2.17 The subcategories 1, 2 and 3 used with the main categories are also based on those defined in table 1 of BS 5837:

3 APPRAISAL

3.1 **Relevant references:** Details of references are listed in section 6.

3.2 **General observations:** British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations' (BS 5837) give recommendations and guidance of the principals that should be applied during the development process to achieve a satisfactory juxtaposition of trees with structures. With regard to the design issues and the assessment of trees on development sites BS 5837 recognizes section 5.1.1 that:

"The constraints imposed by trees, both above and below ground (see Note to 5.2.1) should inform the site layout design, although it is recognized that the competing needs of development mean that trees are only one factor requiring consideration. Certain trees are of such importance and sensitivity as to be major constraints on development or to justify its substantial modification. However, care should be taken to avoid misplaced tree retention; attempts to retain too many or unsuitable trees on a site can result in excessive pressure on the trees during demolition or construction work, or post-completion demands for their removal."

3.3 BS 5837 adds in 5.1.2 that:

"As trees can affect and be affected by many aspects of site operations, during the conception and design process the project arboriculturist should be involved in ongoing review of layout, architectural, engineering and landscape drawings. All members of the design team should be made aware of the requirements for the successful retention of the retained trees and should make provision for these throughout the development process."

3.4 Clearly, BS 5837: advises that the physical size of trees can: dominate new development and give rise to concern about safety, cause obstruction of light and views, and incite objections about falling leaves and debris. These factors are most important when taking into consideration the juxtaposition of trees and new development, and usually this can only be resolved by allowing sufficient space for the trees or by removing the trees.

3.5 **The trees:** For the purposes of this report the trees have been treated as five individual trees, one group of trees and three areas of trees. Tree 1, Tree 2 and Group 3 stand within the curtilage of the property to the northwest known as 'Gadley' and have been included for sake of clarity. The trees included within Area 8 stand on the development land, but appear to lie outside the designated development area.

3.6 **Tree 1 and Tree 2 – *English oak:*** These two trees stand within the expansive rear garden of 'Gadley House' to the west of the proposed development area. They are typical specimens of English oak with compact crown structures and low lateral branches that extend over the boundary wall and encroach into the development land (photograph 2).

Photograph 2

3.7 It is apparent that they will not be directly affected by the current proposal because the nearest dwelling plots are likely to be positioned well away on the higher ground to the east of their location. Nonetheless, an appropriate tree protection barrier should be erected to ensure that no construction activities, material storage or vehicular movement occurs in the proximity of these trees as described below in sections 3.20-3.27.

3.8 **Group 3 – *beech, sycamore and horse chestnut:*** This mixed group of broad-leaved trees stand north and west of the proposed development area, also within the grounds of 'Gadley House'. Generally they are tall and slender specimens that have grown up together as a group and consequently have developed co-dominant crowns that emerge to one overall crown mass. Despite their generally tall habit, several of these trees have low branches that extend over the boundary to a considerable extent with one horse chestnut presenting a very low arching branch that touches the ground with the proposed development area (photograph 3).

Photograph 3

3.9 The current outline proposal takes account of these low overhanging branches and the encroaching root zones of these trees by retaining a 'buffer zone' of at least 8 metres along the boundary with 'Gadley '. This strip would remain undeveloped and allow the adjacent trees to remain unaffected by the proposal. Further information in on protection measures are included in sections 3.20-3.27.

3.10 **Tree 4, Tree 5 and Tree 6 – *willow:*** These three specimens of goat willow are typical over-mature examples with leaning and subsiding stems that reach down to the ground in places. Deadwood and broken branches are scattered throughout their crowns and they are generally decrepit in form and low in vigour (photograph 4).

Photograph 4

3.11 Willows have a relatively weak wood structure and an inherent propensity for failure; especially during severe weather conditions. This general characteristic and the specific structural defects described above prescribe that the safe useful life expectancy of these trees is limited. The removal of these trees will be required to accommodate the outline proposal, irrespective of their condition.

3.12 **Area 7 – *willow and sycamore:*** This area comprises numerous lesser specimens of goat willow that are contemporaneous with Tree 4, Tree 5 and Tree 6. At the eastern end of this group several sporadic specimens of sycamore are interspersed between the willows. The majority of the willows are in poor condition similar that that described above (photograph 5).

Photograph 5

3.13 The few sycamores within the area are generally early-mature specimens that exhibit reasonable form and vigour. Ideally all the trees and lesser woody vegetation in Area 7 should be removed to enable the outline proposal. It may be possible, if practical, to retain several trees at the far eastern end of the area close to Area 8. However, I would advise the wholesale removal of Area 7 in order to allow unimpeded development (including level changes) and to safeguard the retention of Area 8.

3.14 **Area 8 – *birch:*** With the exception of few outlying trees, this sparse area of downy birch extends to the south and east away from the proposed development area (photograph 6). Because of this it will be possible to retain the greater part of Area 8 without any risk the integrity of the trees, either during or after the development process. This will however be dependant of the proper implementation of adequate tree protection measures as outlined below in sections 3.20-3.27.

Photograph 6

3.15 **Area 9 – *ash, birch, rowan, oak, cherry, hazel, hawthorn maple:*** This area covers the greater part of the site and comprise substantial blocks of common ash, downy and silver birch, rowan, English oak, bird cherry, common hazel, common hawthorn, field maple and Norway maple. All these trees appear to have been planted as part of greater plantation scheme some years ago, as most are spaced at equidistant centres and of comparable age across each species block. Redundant stakes and partially degraded tubular tree shelters are also evident across the whole area (photograph 7).

Photograph 7

3.16 Perennial weeds and tall grasses are beginning to establish in the more open parts of the area particularly, mainly on the upper part of the slope, along the boundary wall below Manchester Road. Unfortunately, the undifferentiating removal of the majority (if not all) of the trees within Area 9 that lie the development window will be necessary if the current outline proposal is to be realised. It may be possible to retain an area of trees towards the west near to the boundary with 'Gadley House', but ideally this option should be assessed at the reserved matters stage.

3.17 Fortunately, it will be possible to integrate some new individual trees into the development in mitigation for those that are being lost. However, this will not wholly compensate for the quantity being lost and some supplementary off site planting may be appropriate. Opportunely, the relativity young age of the trees and the nature of the site should enable their replacement elsewhere in the golf course.

3.18 The species mix for new woodland planting should utilise locally occurring species, which will be of local provenance wherever possible. Irrespective of the final species choice, all the new plantation trees should comply with British Standard for Nursery

Stock BS 3936 : Part 1 : 1992. Ideally, they should be notch-planted at a spacing of around 2m x 2m. All the young trees should be protected by the use of 'tree shelters'. After planting Maintenance: weeding, beating up and maintenance of the shelters should be undertaken as required. Planting should take place immediately after completion of the development or at the earliest opportunity during the following planting season.

3.19 For the most effective impact any individual replacement trees planted within the development window should be 'Extra Heavy Standard Trees' conforming to British Standard for Nursery Stock BS 3936 : Part 1 1992, with a stem girth of 14 to 16 cm at 1m from ground level and a minimum height of 350 cm. They should be secured with twin stakes and cross strut, with tie and flat back spacer. Ideally, an irrigation/aeration pipe should be installed and the soil surface mulched at a radius of 0.5 m from the base of the tree.

3.20 **Protective barriers:** Barriers for the protection of trees on development sites should be fit for the purpose of excluding construction activity and appropriate to the type and proximity of the work. In particular attention should be paid to ensure that such barriers remain rigid and complete during all phases of development. In most instances barriers should consist of rigid framework comprising vertical post and horizontal rails well braced to resist impacts. An appropriate fence type should then be securely fixed to this framework with clamps or wire (figure 1).

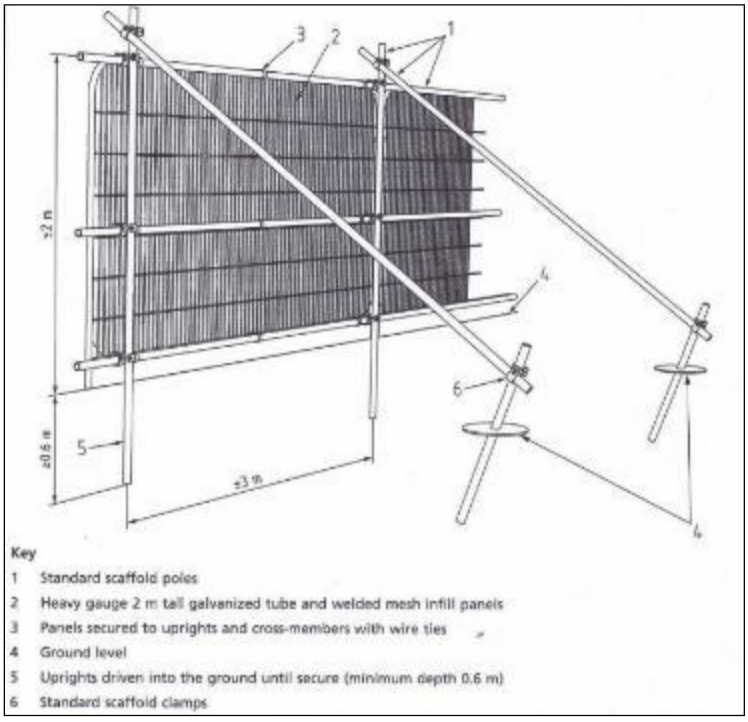

Figure 1

3.21 The protection of the subject trees and their subsequent health and future potential is totally dependent upon all persons operating within the site. Communications are vitally important to ensure that all parties understand the reasons for tree protection and its continued existence.

3.22 **Location of protective barriers:** British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations' (BS 5837) advocates the use of "root protection areas" (RPAs) formed by calculating a circle 12 times the stem diameter for single stem trees and 10 the combined diameter for multiple stemmed trees. The appropriate stem diameters, RPA radiuses, RPA areas and equivalent square RPA side dimensions for the trees on the site are indicated in table 1 below.

Table 1 - RPA information for the retained trees:

Tree No.	Stem dia. at 1.5m	RPA equates to a circle with a radius of:	RPA equates to an approximate area of:	RPA equates to a square with approximate sides of:
T1.	450mm	5.4m	91.6m²	9.6m
T2.	500mm	6.0m	113.1m²	10.6m
G3.	<600mm	6.0m	113.1m²	10.6m
T4.	<500mm	6.0m	tree to be removed	
T5.	<600mm	7.2m	tree to be removed	
T6.	<400mm	4.8m	tree to be removed	
G7.	<600mm	7.2m	majority of trees to be removed	
G8.	<350mm	4.2m	55.4m²	7.4m
A9.	av. 100mm	1.2m	majority of trees to be removed	

3.23 It is imperative that these barriers 'as specified in British Standard BS 5837:2012 'Trees in Relation to Construction' should be put up around the retained trees prior to the commencement of any construction operations. It is expected that the erection of tree protection barriers will be conditional on the approval of a planning application that calls for their use.

3.24 Optimal locations for the tree protection barriers are indicated on the tree protection plan in Appendix 4. In this case, the site is being cleared and it is very likely that the position of the tree protection barriers will reflect the location of the site perimeter fence. Nevertheless, I would advocate that to avoid any ambiguity, the precise location of the tree protective barriers be agreed on site with the local authority arboricultural officer as a reserved matter and then marked out clearly on the ground.

3.25 **Specification for the tree protection barriers:** The default specification for tree protection barriers should of a vertical and horizontal scaffold or wooden framework as specified in section 3.20 or greater.

3.26 Whatever the level of protection utilised, no storage of materials or any construction operations should occur within any of the fenced off areas. Ideally a notice similar to that shown below should be attached to the barriers (figure 2).

Figure 2

3.27 The following activities shall not be carried out under any circumstances:

(a) no fires to be lit on site within 10 metres of the nearest point of the canopy of any retained tree on or adjacent to the proposal site,
(b) no equipment, signage, fencing etc. shall be attached to or be supported by any retained tree on or adjacent to the application site,
(c) no temporary access within designated RPA without the prior written approval of the LPA,
(d) no mixing of cement, dispensing of fuels or chemicals within 10 metres of the tree stem of any retained tree on or adjacent to the application site,
(e) no soakaways to be routed within the RPA of any retained tree on or adjacent to the application site,
(e) no stripping of topsoil, excavations or changing of levels to occur within the RPA of any retained tree on or adjacent to the application site,
(f) no topsoil, building materials or other to be stored within the RPA of any retained tree on or adjacent to the application site and;
(h) no alterations or variations of the approved works or tree protection schemes shall be carried out without the prior written approval of the district planning authority.

3.28 **Excavation within RPAs:** To avoid damage to tree roots the existing ground levels should be retained within the RPAs of all the retained trees irrespective of whether they stand within or without the development window. The ground within the RPAs of these trees should not be disturbed, and the topsoil should be remain.

3.29 **Scaffolding:** The erection of any scaffolding within the RPA of any tree must be verified with the architect after agreement with the local planning authority. The weight and downward pressure during use, of any scaffolding, within the RPA of any tree must be supported on bearers of a sufficient size such as scaffolding boards. The aim of the bearers is to spread the working load across the RPA. The access point for the scaffolding should be outside the RPA.

3.30 **Structural damage:** The potential risk for any direct or indirect structural damage to the proposed development being associated with the trees on and adjacent to the site is dependent on diverse factors, such as: tree species and age, soil type, foundation depth, climate, etc. This complex interaction of tree, soil, building and other influencing factors is so inherently unpredictable, that any accurate prediction of such incidence is impractical without detailed investigation and is outside the remit of this report and it is recommended that a structural engineer be consulted on this matter. Further information on this can be found in the following papers:

(i) National House Building Council (NHBC) Standards Chapter 4.2 Building near trees,

(ii) Building Research Establishment (BRE) Digest 63 Soils and foundations: 1,

(iii) Building Research Establishment (BRE) Digest 64 Soils and foundations: 2,

(iv) Building Research Establishment (BRE) Digest 67 Soils and foundations: 3,

(v) Building Research Establishment (BRE) Digest 240 Low-rise buildings on shrinkable clay soils: Part 1,

(vi) Building Research Establishment (BRE) Digest 241 Low-rise buildings on shrinkable clay soils: Part 2,

(vii) Building Research Establishment (BRE) Digest 242, Low-rise buildings on shrinkable clay soils: Part 3 and;

(viii) Building Research Establishment (BRE) Digest 298 Low-rise building foundations; the influence of trees in clay soils.

4 SUMMARY

4.1 The current outline proposal to erect four detached dwellings on the south-western side of Manchester Road will require the removal of numerous insignificant trees

4.2 The loss of several trees (such as Tree 4, Tree 5 and Tree 6) can be justified because they are poor specimens with a low safe useful life expectancy and ideally they should be removed for reasons of good management irrespective of the proposed development. However, the extent of the current proposal and the character of the existing trees on the site determine that almost all the trees within the development window should be removed. In order to compensate for this, supplementary planting elsewhere on the golf course may be appropriate.

4.3 The remaining trees that stand around the development window can be retained and given adequate room taking account of the minimum distances for tree protection barriers advocated in BS 5837 : 2012. (see 3.20 – 3.27). Therefore, if the losses are considered acceptable with under current planning policy guidance and all necessary tree protection measures and construction methodologies advocated in this report are implemented and adhered to; the current outline proposal should be feasible within the constraints the retained trees may impose on the site.

4.4 Details of the arboricultural works recommended for the subject trees are listed in the 'tree data table' in Appendix 3.

5 OTHER CONSIDERATIONS

5.1 **Trees Subject to statutory controls:** If the subject trees are covered by a tree preservation order it will be necessary to consult the local planning authority before any works to trees other than certain exemptions can be carried out. The works specified above are necessary for reasonable management and should be acceptable to the local authority. However, tree owners/managers should appreciate that they may take an alternative point of view and have the option to refuse consent.

5.2 **Felling Licence:** The felling of trees in the United Kingdom is controlled by the Forestry Commission under the Forestry Act 1967. A 'felling licence' from the Forestry Commission is normally required to fell growing trees, although in any calendar quarter up to 5 cubic metres can be felled without licence providing not more than 2 cubic metres are sold. However, certain types of felling are exempt such as the removal of trees that are dead, dying, dangerous and or causing a nuisance.

5.3 **Trees outside the property:** The trees included is this report are not within the ownership of the applicant and it will not be possible to easily carry out the recommended works without the full co-operation of the tree owners. The implications of non-cooperation requires legal interpretation and are beyond the scope of this report. By common law, branches from trees on adjacent properties extending over boundaries can be pruned back to the boundary line without the permission of the owners. However, the material belongs to the tree owner and the same guidance on statutory controls apply as discussed in section 5.1.

5.4 **Implementation of tree work:** I advise that any recommended tree work be carried out by a contractor approved by the Arboricultural Association. Their Register of Contractors is available free from Ampfield House, Romsey, Hants, SO51 9PA (Tel: 01794 368717, admin@trees.org.uk Web: www.trees.org.uk). The contractor should carry out all tree works to BS 3998 *Recommendations for Tree Work* (1991) as modified by research that is more recent. Where possible all works will be carried out between November and March (see 5.8).

5.5 **Wildlife:** All operations should take account of wildlife needs and be planned to take advantage of weather conditions for minimum damage and disturbance.

5.6 **Bats:** Specific consideration should be given to the possible presence of roosting bats, which are protected under British law by the Wildlife and Countryside Act (WCA) 1981 (as amended), and bats are classified as European Protected Species under The Conservation (Natural Habitats, &c.) Regulations 2010. This makes it an offence to kill, injure or disturb a bat and to destroy any place used for rest or shelter by a bat. The Countryside and Rights of Way Act (CRoW) 2000 strengthens protection given by the WCA and covers 'reckless' damage or disturbance to a bat roost. Although no obvious features potentially suitable for roosting bats (such as hollows, cracks and cavities within trunks and branches) were apparent during the present survey; a thorough inspection was not undertaken by an appropriately qualified bat worker.

5.7 **Nesting Birds**: Any proposed tree removal should be carried out outside the bird breeding season (which runs from March to September inclusive) to avoid adverse impacts to any nests present. If it is necessary to carry out the work during the breeding season, then a nesting bird survey should be carried out prior to felling/removal works commencing. This is to ensure that no active nests will be affected and to ensure legal compliance. If active nests were found then working restrictions would be put in place until all chicks had fledged. All wild birds and their nests, whilst in use, are protected under the WCA 1981 (as amended) from harm or destruction during the breeding season.

5.8 **Future considerations:** The remaining trees should be inspected on a regular basis by a qualified arboriculturalist. Trees are living organisms whose health and condition can change rapidly. The conclusions and recommendations of this report are valid only for a period of one year. This period of validity maybe reduced in the case of any change in conditions to, or in proximity to, the trees.

6 BIBLIOGRAPHICAL REFERENCES

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APPENDIX 1

Qualifications and experience

1. **Qualifications:** I am Neil Richard Edmondson. I am a director and principal practice consultant of White Peak Tree Consultancy Ltd., which is an arboricultural consultancy practice based at: The Loft Room, Lyndale, Main Road, Taddington Nr. Bakewell, Derbyshire. The practice specialises in arboriculture, forestry and project management throughout the midlands and the north of England. I hold a Higher National Diploma in Arboriculture awarded by the University of Central Lancashire and also hold the 'Dick Leigh Cup' awarded to the best practical student.

2. **Practical experience:** I have 31 years' experience of studying and working in the field of arboriculture. From 1996 to 1998 I was an Arboricultural Officer at Bolton Metropolitan Borough Council where my duties included management of council owned trees and administration of the tree works contracts under compulsory competitive tendering. More recently from 1998 to 2002 I was the Senior Arboricultural Officer at Chester City Council. During time I was primarily responsible for the administration of Tree Preservation Orders, development control advice and the implementation of tree management policies. In 1994 I was member of the United Kingdom/Ireland tree climbing team that competed at the European Tree Climbing Championship at 'Parc Du Chateau De Boiseron' in the South of France.

3. **Continuing professional development:** I am a Fellow of the Arboricultural Association. In pursuance of continuing professional development I regularly communicate with other professionals on both public and private sector. In April 2004 I attended an Arboricultural Association workshop (Writing Professional Reports - Jeremy Barrell). I have attended almost every association conference since Lancaster in 1995 including the recent event at Exeter University.

4. **Relevant experience:** I have acted for many clients both public and private, notably, Astra Zeneca, Amber Valley District Council, Cheshire West and Chester Council, Cheshire East Council, High Peak District Council, North Shropshire District Council, Cass Associates, Strutt and Parker International, Manchester International Airport Authority, Gillespie's Landscape Architects, Charles Topham and Sons Limited, Roland Bardsley Limited, and Taylor Woodrow Limited providing advice on all aspects of tree management. Primarily, I undertake: tree surveys and inspections, pre-development site assessments, arboricultural implication studies, prepare method statements and carry out site supervision inspections.

APPENDIX 2

Tree schedule and explanatory notes

No	Species	Height m	Stem Dia. mm	Branch Spread m n	s	e	w	Branch Height m	Canopy Height m	Life Stage	General Observations and Preliminary Recommendations	Estimated Remaining Years	5837 Grade
Cavendish Golf Club – sheet 1													
T1.	English oak *(Quercus robur)*	15	450	4	5	5	5	2-3	2-4	Mat	Not within development area Set behind drystone wall Typical specimen Deadwood Minor epicormic shoots Protect and retain	>20	**B1**
T2.	English oak *(Quercus robur)*	16	500	6	6	7	5	2-3	2-4	Mat	Not within development area Set behind drystone wall Typical specimen Deadwood Minor epicormic shoots Low branches extending over boundary wall Split in low branch Protect and retain	>20	**B1**
G3.	Common beech *(Fagus sylvatica)*, Sycamore *(Acer pseudoplatanus), and* Horse chestnut *(Aesculus hippocastanum)*	14-20	400 *(av.)* 600 *(max.)*	6-7 *(into the site)*				3-5	0-3	Mat	Not within development area Set behind drystone wall Rather closely spaced Considerable overhang Low branches extending over boundary wall and reaching down to ground level Significant deadwood Epicormic shoots Protect and retain	>20	**B2**

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No	Species	Height m	Stem Dia. mm	Branch Spread m				Branch Height m	Canopy Height m	Life Stage	General Observations and Preliminary Recommendations	Estimated Remaining Years	5837 Grade
				n	s	e	w						
Cavendish Golf Club – sheet 2													
T4.	Goat willow *(Salix caprea)*	7	300-500 *(multiple stems)*	5	4	7	3	1	0-1	Om	Partially wind-blown specimen Fallen and subsiding branches Split and snapped branches Deadwood and peripheral decline Fell irrespective of development proposals	<10	**U**
T5.	Goat willow *(Salix caprea)*	9	400-600 *(multiple stems)*	6	7	6	5	1	0-1	Om	Poor specimen Fallen and subsiding branches Split and snapped branches Epicormic shoots Deadwood and peripheral decline Fell irrespective of development proposals	<10	**U**
T6.	Goat willow *(Salix caprea)*	8	300-400 *(multiple stems)*	6	5	5	5	1	0-1	Om	Poor specimen Fallen and subsiding branches Split and snapped branches Deadwood and peripheral decline Fell irrespective of development proposals	<10	**U**
A7.	Predominantly: Goat willow *(Salix caprea)* with sporadic Sycamore *(Acer pseudoplatanus)*	6-9	300 *(av.)* 600 *(max.)*	4-6				1-3	0-2	Mid-Om	Generally poor specimens of willow with fallen, subsiding, split and snapped branches Many with deadwood and peripheral decline All are lesser specimens than Tree 4, Tree 5 and Tree 6 Sporadic early-mature sycamore Fell to accommodate development proposals	<10	**C2**

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No	Species	Height m	Stem Dia. mm	Branch Spread m n s e w	Branch Height m	Canopy Height m	Life Stage	General Observations and Preliminary Recommendations	Estimated Remaining Years	5837 Grade
Cavendish Golf Club – sheet 3										
G8.	Downy birch *(Betula pubescens)*	8-10	250 *(av.)* 350 *(max.)*	3-4	2-3	2-3	Mid	Area appears to be outside of development area Well-established area of pioneer woodland Sporadic in comparison to Area 10 Retain and protect	>20	**B2**
A9.	Various species including: Common ash *(Fraxinus excelsior)*, Downy birch *(Betula pubescens)*, Rowan *(Sorbus aucuparia)*, English oak *(Quercus robur)*, Bird cherry *(Prunus padus)*, Field maple *(Acer campestre)* Common hazel *(Corylus avellana)*, Common hawthorn *(Crataegus monogyna)*, Norway maple *(Acer platanoides)*	5-10	100 *(av.)* 300 *(max.)*	2-3	1	0-2	Yng	Very well-established plantation area Somewhat dense in places Area littered with degrading rabbit guards Generally native species mix In need of thinning Fell to accommodate development proposals Retain were practical do so	>20	**C2**

APPENDIX 2

Tree schedule and explanatory notes

- **Mathematical abbreviations:** >: Greater than; <: Less than; m: metre; cm: centimetre; mm; millimetre; h; hectare.

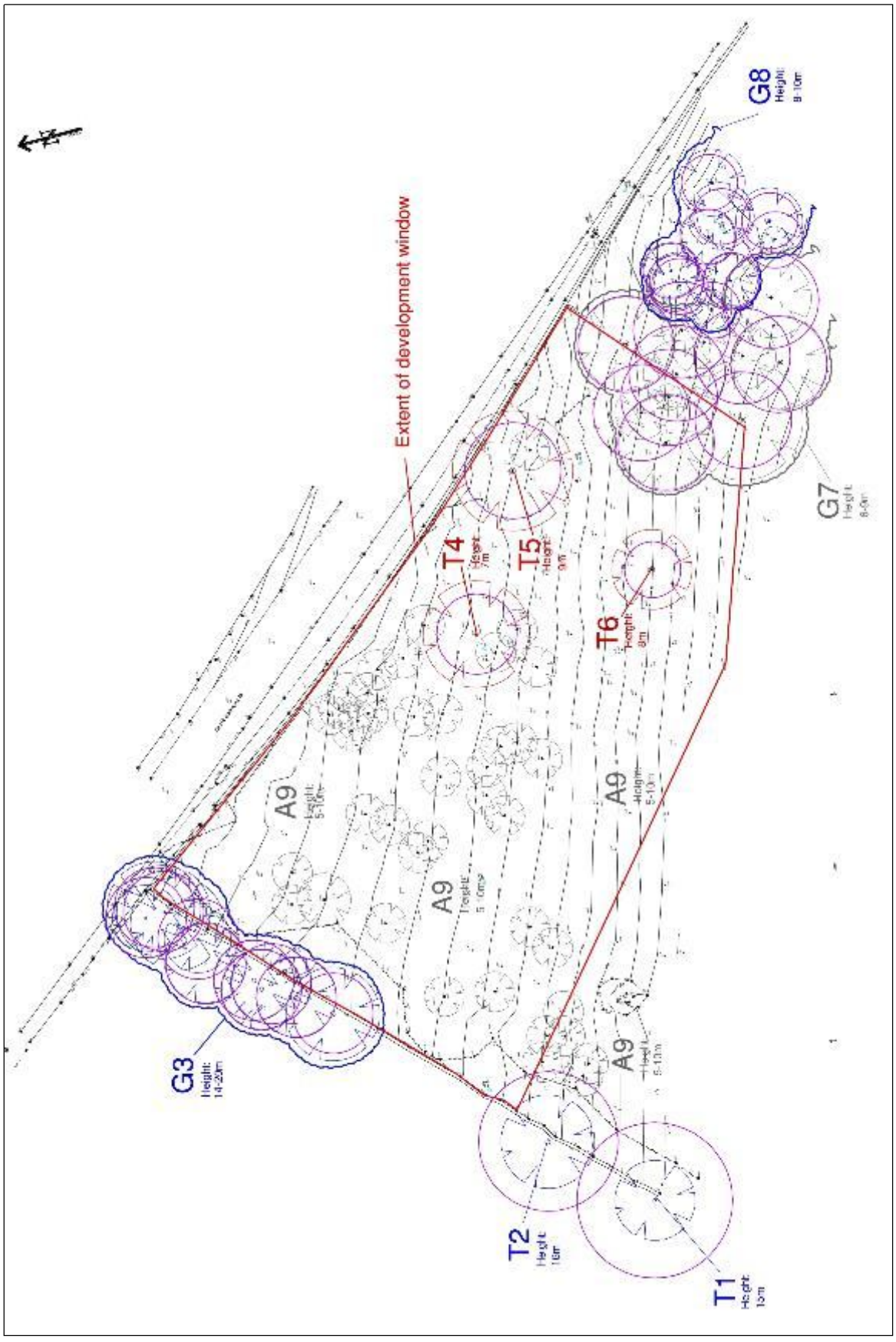
- **Measurements/estimates:** All dimensions are estimates unless otherwise indicated. Measurements taken with a tape, by simple triangulation or clinometer are indicated with a '*'. Less reliable estimated dimensions are indicated with a '?'. The distance to any structures is estimated to the nearest metre and is intended as an indication rather than a precise measurement.

- **Tree No:** The trees are indicated on the plans (see appendix 5) as 'T' individual trees, 'G' groups of trees, 'A' areas of trees, 'W' woodlands

- **Species:** The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after in brackets. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicate it with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation *sp.* if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.

APPENDIX 3

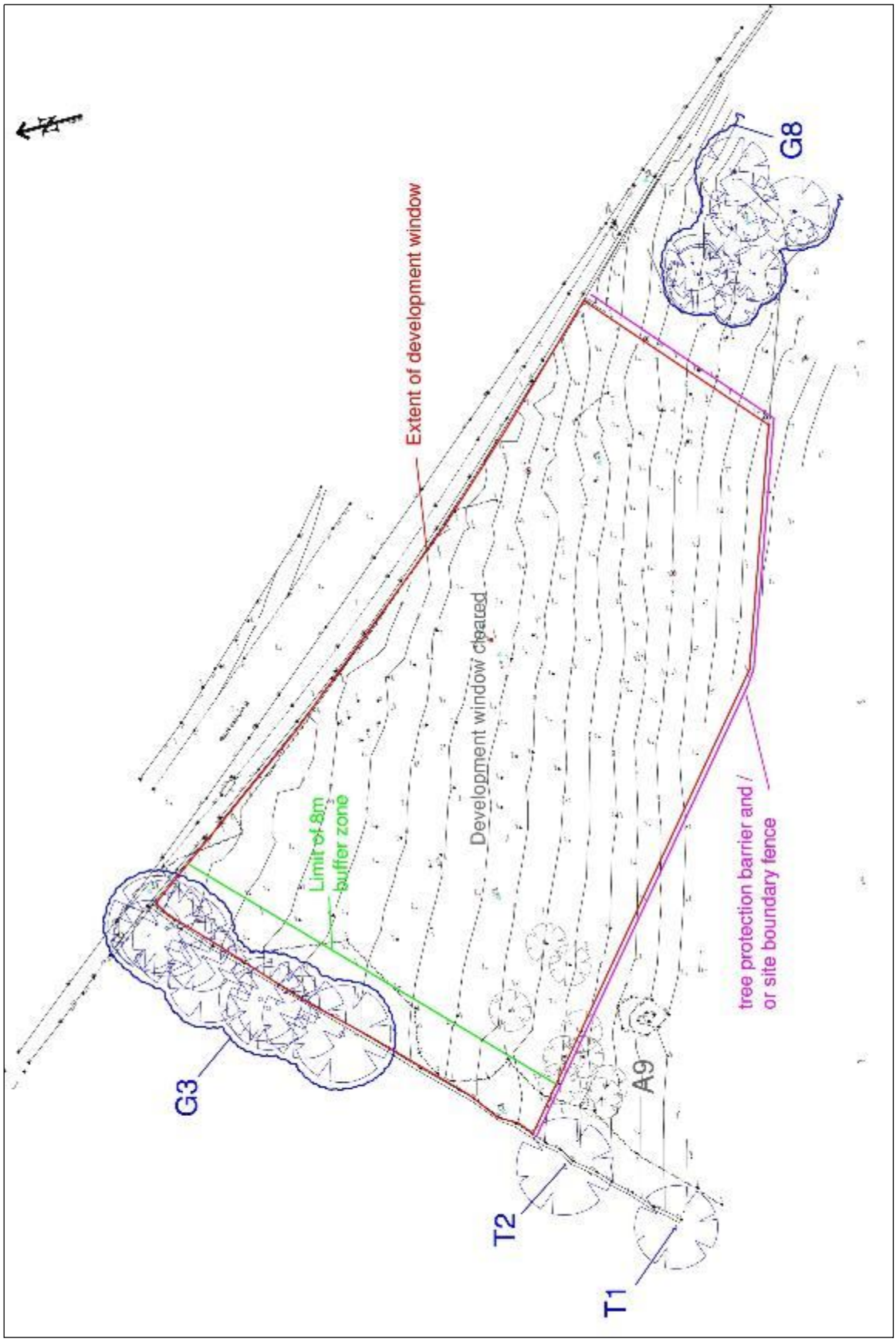
Tree constraints plan



Not to scale

APPENDIX 4

Tree protection plan



Not to scale

APPENDIX 5

Glossary of terms

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

Adventitious shoots. Shoots that develop other than from 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

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

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

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

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

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

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

APPENDIX 5

Glossary of terms

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. Branch or stem wood bearing no live tissues.
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
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
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
Epicormic shoot. A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot
Felling licence. In the UK, a permit to fell trees in excess of a stipulated number of stems or volume of timber
Girdling root. A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue
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
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
Included bark. Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face
Infection. The establishment of a parasitic micro-organism in the tissues of a tree or other organism
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
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
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

APPENDIX 5

Glossary of terms

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

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.

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 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)

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

Sapwood. Living xylem tissues

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

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

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

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

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

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

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

Windthrow. The blowing over of a tree at its roots

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

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