



**ETHICAL**  
**ARBORICULTURE**

# Arboricultural Assessment to BS5837:2012

High Causeway Whittlesey

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05/05/2022

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## References

# 1 Introduction

This report was commissioned by Mr M Taylor of Taylor Planning & Building, on behalf of Mr R King, to survey trees in connection with a planning proposal at High Causeway Whittlesey, in accordance with BS5837: 2012; Trees in Relation to Construction.

Trees can offer many benefits, including:

- Providing visual amenity, softening or complementing the effect of the built environment, and adding maturity to new developments
- Displaying seasonal change and providing opportunities for wildlife in built-up areas;
- Making places more comfortable in tangible ways by contributing screening and shade, reducing wind speed and turbulence, intercepting snow and rainfall, as well as reducing glare.

Trees are also important elements of green infrastructure, contributing to urban cooling through evapotranspiration and providing micro-climatic effects that can reduce energy demands in buildings. They, therefore, represent a key resource that can significantly contribute to climate change adaptation.

Existing trees are an important factor on construction sites, whether on or near the working areas, and trees are a material consideration in the UK planning system. Root systems stems and canopies, with allowance for future movement and growth, need to be taken into account in all projects, including those that do not require planning permission. The space required for any proposed new trees to become established is an important consideration.

During their lifetime, trees will be vulnerable to disturbance, injury, environmental changes, pests and diseases. Construction work often exerts pressures on existing trees, as do changes in their immediate environment following the construction. A tree that has taken many decades to reach maturity can be damaged irreparably in a few minutes by actions that might be unwitting, negligent or willful. The early provision of physical protection from damage is therefore critical.

Where tree retention or planting is proposed in conjunction with nearby construction, the objective should be to achieve a harmonious relationship between trees and structures that can be sustained in the long term.

As there are trees over 75mm diameter at 1500mm above ground level on this site, which could contribute to the character and appearance of the site, it is necessary to ascertain the quality and value of the trees and the likely impact that the proposed development could have on them. In addition, it is necessary to consider the impact retained trees could have on the development in the future.

Trees differ in their tolerance of root loss or disturbance, according to their age, species, and condition. In addition, root growth, while typically situated in the top metre of soil, can be affected by existing site features, including natural and man-made topography and structures that can restrict tree root growth in any direction. Consideration is given to all relevant factors when ascertaining the viability of root retention.

## 2 Site Description and Background

The proposed redevelopment site is positioned in an established area of mixed use retail units and domestic flats. The proposal is to redevelop the area to domestic flats with parking spaces provided beneath the units.

Access is obtained from Grosvenor Road via Montague way.

It would appear, although from the FDC drawing it is difficult to determine accurately, that the site is not contained within a conservation area, but the single tree contained adjacent to the access road is protected by a tree preservation order referred to as tpo 11/85 and is also contained within part of the Whittlesey conservation area.

The site survey was carried out on 04/05/2022 in clear bright conditions.

## 3 Arboricultural Impact Assessment

Having visited the site and viewed the proposed design we have identified the risks below and have included some proposed solutions to reduce the occurrence of these potential issues.

### **Potential root damage from excavations carried out during services installation**

It should be noted that the methodology used to determine these areas will not provide an accurate representation of a tree's rooting area and that many other factors (soil type, existing features, and tree species to name but a few) can and will determine the extent of a tree's rooting area.

The area and position is therefore an estimation and may be subject to change after an additional investigation by air spade excavation or root radar if additional confirmation is deemed necessary.

In the case of this proposed development, the risk of root damage from the excavation is minimal.

The proposed construction is positioned outside of the trees root protection area, and while discussion regarding services has not yet taken place it is at this stage assumed that any connections will be to existing installed routes rather than new feeds.

If the need arises to install services via the shared access road, root damage can be minimised by utilisation of suction excavation for all trench excavations, before backfilling with a Stockholm type structural soil to allow for unimpeded root growth and free movement of nutrients, water and air through the soil.

### **Additional Notes**

As can be seen in the images included within this document, the vast majority of T1's rooting area is covered in impermeable surfacing with the trunk obscured entirely by dense Ivy growth. I would highly recommend that this Ivy be removed, if only to facilitate proper inspections of the tree to satisfy their duties under the Occupiers Liability Act of 1957 & 1984.

Further to this, if an agreement can be reached over all stakeholders regarding the road surface, we would recommend that any replacement road surfacing carried out to Montague Road be of a permeable surface, to enable continued movement of water and air through the soil profile and reduce the load on any existing surface water drainage

#### 4 Root Protection Area and Zone of Influence

Tree Number	Diameter mm	Rpa radius M	Moisture demand	Height	Zone of influence
T1	1000	12	Moderate	30	22..5

The moisture demand for the species that may have a direct influence on the proposed redevelopment is **moderate**.

Please note BS5837:2012 allows for up to a 20% encroachment into the root protection area for installation of hard surfacing, as well as manipulation of the position of the RPA to allow for topographical changes and below-ground constraints that may have influenced the rooting area of the existing trees.

#### 5 Tree Barriers and Ground Protection Mats

In this instance the installation of braced tree protection barriers or ground protection mats is both impractical and unnecessary.

#### 6 Soil Assessment

A desktop assessment, using the information provided by the British Geological Survey Geology Viewer of the UK and LANDIS Soilscape viewer, of the soil conditions surrounding the proposed development has been carried out with results indicating that the superficial soil is *March garvels Member - Sand and Gravel*, with the bedrock geology defined as *Oxford Clay Formation- Mudstone*.

pH and compaction testing with penetrometer have not been carried out as there is no bare soil to facilitate this type of testing.

No testing has been carried out to confirm these soil types

#### 7 Site Monitoring

I can see no legitimate reason for arboricultural site monitoring after the installation of the CEZ/Root protection area fencing and ground mats.



## 8 Tree Survey Schedule

### BS5837 Survey Data



Ref.	Species	Measurements	General Observations	Category	Recommendations
T001	Wellingtonia (Sequoiadendron giganteum)	Height (m): 17 Stem Diam (mm): 1000 Spread (m): 4.5N, 5.5E, 5.5S, 2.5W Crown Clearance (m): 3.5 Life Stage: Mature Rem. Contrib.: 40+ Years	Diameter is estimated as extensive ivy growth prevents accurate measurement. Splits into two leaders at approximately 6 metres. The rooting area is covered in a mix of slabs, stoned access driveway and tarmac. A thorough inspection of the condition is virtually impossible without the removal of ivy. Crown height is based on the access road Lower branch not recorded as ivy prevents visibility Minor dead wood as expected in trees of the species situated in this position. Services for flats have been installed within the rooting area. Excavation for flats will have most likely caused some root severance. (Eastgate Mews)	B1  RPA Radius: 12.0m. Area: 452 sq m.	Pre construction: Please Note: These recommendations are for the tree owner as the developer has little to no control over the tree outside of access pruning. Deadwood (major greater than 25mm). Localised pruning for unrestricted access and to prevent issues arising from striking damage to both vehicles and the tree. Sever ivy at the base.  During construction: Suction excavation for any services that may have to be installed within the access road. Any backfill soil should be Stockholm structural soil to allow unimpeded growth while preventing the collapse of the access road.

9 Images



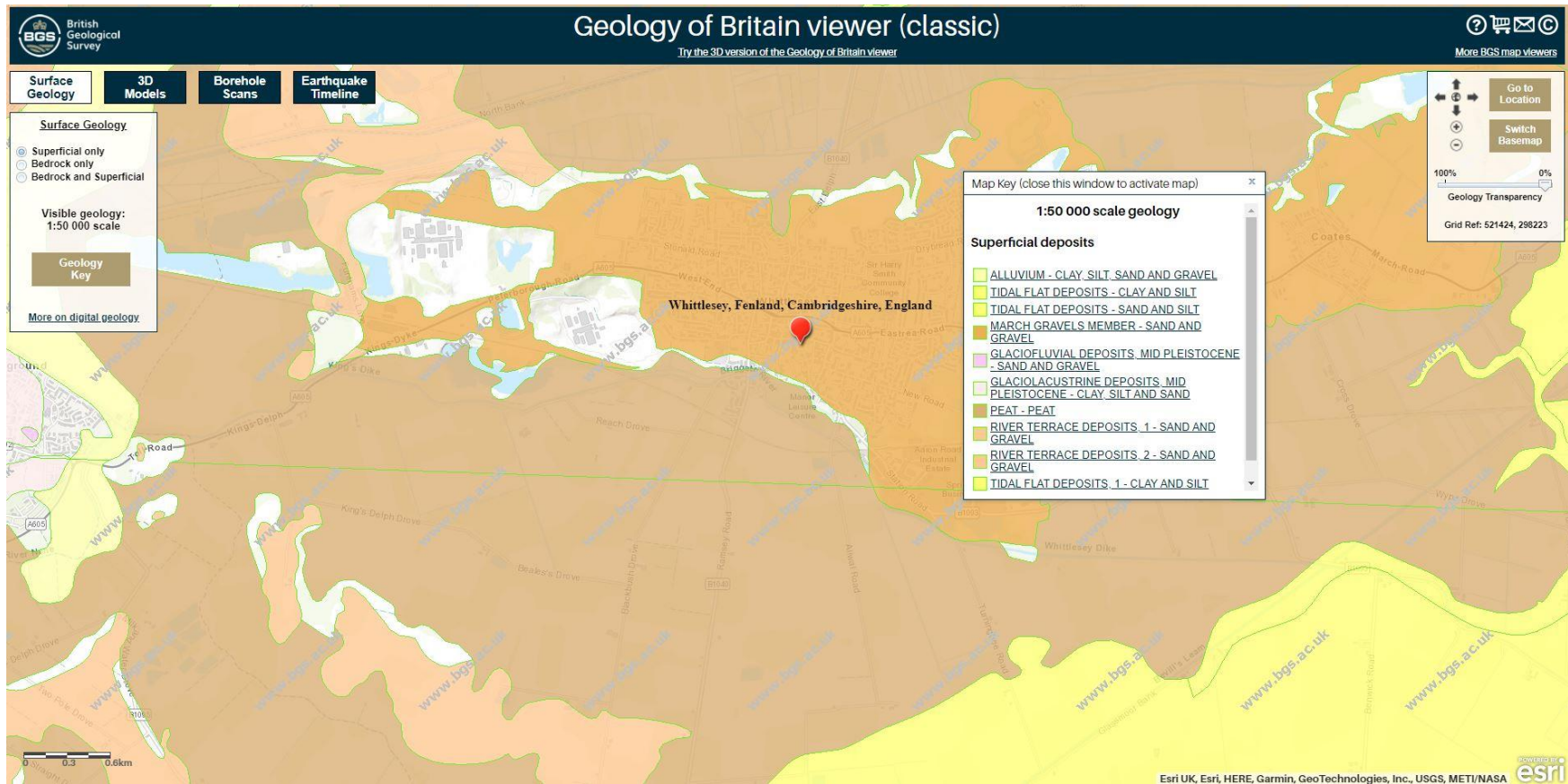
05/05/2022







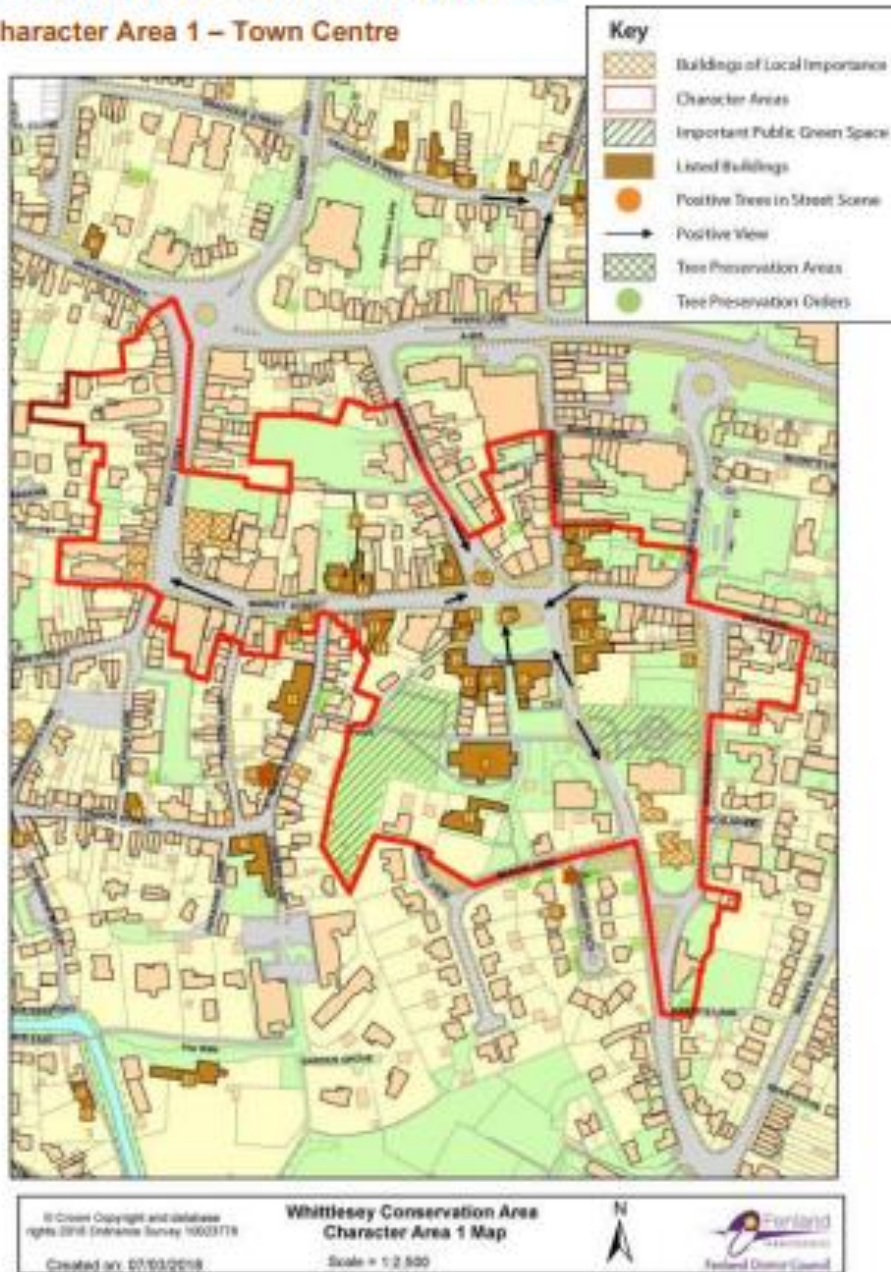




Superficial Soil Map

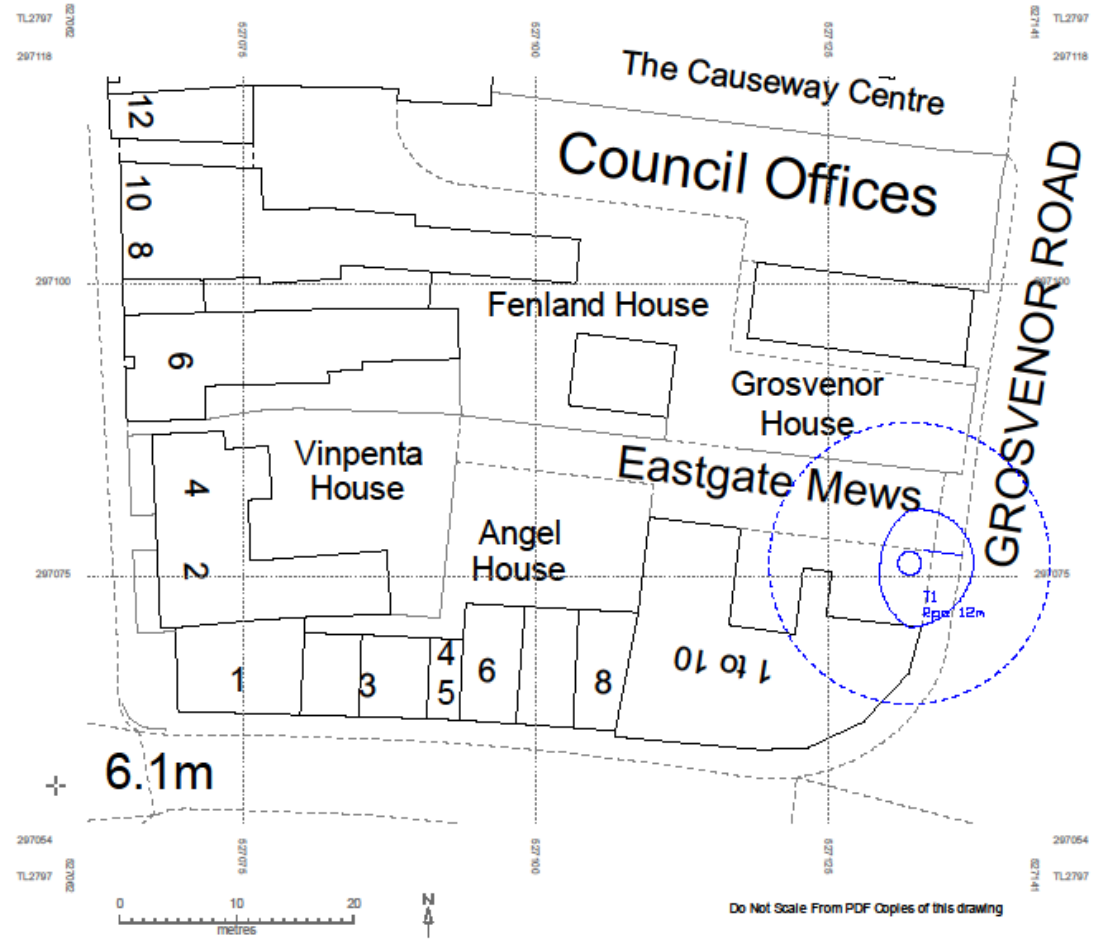
## 6.0 CHARACTER AREA ANALYSIS

### Character Area 1 – Town Centre



# Tree Constraints/Protection Drawing

Ref.	Species	Full Structure	Measurements	Spread	General Observations	Retention Category	PH
TBL	Viburnum	Tree	Height 2.7m DBH 10cm Circ. 22cm Life Stage Mature Can. Centre 10m	10m	Small tree with dense foliage. No significant defects observed. Good health.	31	Positive Impact Area 10m R.



**KEY**

- B class Tree Position
- RPA Extent

Site Address  
High Causeway Whitteley

Client  
Taylor Planning & Building Consultants

Date  
05/02/2022

Drawing Ref  
Tree Constraints Plan

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## **10 Terms and Definitions**

For the purposes of this report, the following terms and definitions apply.

### **10.1 access facilitation pruning**

One-off tree pruning operation, the nature and effects of which are without significant adverse impact on tree physiology or amenity value, which is directly necessary to provide access for operations on site.

### **10.2 arboricultural method statement**

Methodology for the implementation of any aspect of development that is within the root protection area (2.7), or has the potential to result in loss of or damage to a tree to be retained.

### **10.3 arboriculturist**

Person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction.

### **10.4 competent person**

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

### **10.5 construction**

Site-based operations with the potential to affect existing trees.

### **10.6 construction exclusion zone**

Area based on the root protection area (2.7) from which access is prohibited for the duration of the project.

### **10.7 root protection area (RPA)**

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

### **10.8 service**

Any above or below-ground structure or apparatus required for utility provision.

*NOTE examples include drainage, gas supplies, ground source heat pumps, CCTV and satellite communications.*

### **10.9 stem**

Principal above-ground structural component(s) of a tree that supports its branches.

### **10.10 structure**

Manufactured object, such as a building, carriageway, path, wall, service run, and built or excavated earthwork.

### **10.11 tree protection plan**

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

### **10.12 veteran tree**

tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

*NOTE these characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem. (BS3998:2010)*

## **11 Report Limitations**

All the trees have been inspected from ground level with the aid of binoculars using visual observation methods and a sounding mallet where required. Should a more detailed report be required then this will be outlined within the recommendations.

Tree and canopy heights have been defined with the use of a laser range finder and clinometers, with diameter being obtained via the use of girth tape. Crown diameters are measured using both a laser range finder and tape measure where practical.

Trees are living organisms whose health and condition can change rapidly. The health, condition and safety of the trees therefore should be checked on a regular basis, preferably once a year. The conclusions and recommendations in this report are only valid for a period of one year. The period of validity may be reduced in the case of any change in site conditions or to arboricultural works being carried out on the tree or trees in question.

## **12 General Information**

The enclosed report gives you information on the tree's at the property, which were assessed as needing to be covered and shows the type of tree, its height and the trunk diameter, so that a root protection area, RPA, can be worked out and plotted on the tree constraints plan, TCP.

### **12.1 Root Protection Areas/Construction Exclusion Zones**

The root protection area is a layout design tool to indicate the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree and is calculated using a theoretical circle.



The RPA is calculated as an area equivalent to a circle with a radius 12 times the diameter of the trunk measured 1.50 metres above the ground. For trees with more than one stem, one of the two calculation methods below should be used

A : square root of (stem diameter<sup>1</sup>)<sup>2</sup> + (stem diameter)<sup>2</sup> + ...(stem diameter)<sup>2</sup>

B:square root of (mean stem diameter)<sup>2</sup> x number of stems

This is illustrated on the tree survey schedule with the use of an S for single stemmed trees or a M for multi stemmed trees. However in many cases it is not expedient or practical to use a circular RPA and as such BS5837 recognises this and allows the shape of the RPA to be changed but not reduced in area, see British Standards 5837:2012 Tree's in relation to construction – recommendations, page 8, table 2, which shows the RPA in square metres.

The RPA of each tree in category A, B, and C is capped at 707 square metres which is equivalent to a circle with a radius of fifteen metres, however the shape may be changed depending on the following factors whilst still providing adequate protection for the root system:

- a) The morphology and disposition of the roots when influenced by past or existing site conditions (e.g. the presence of roads, structures and existing underground apparatus);
- b) Topography and drainage;
- c) The soil type and structure;
- d) The likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.

This area or areas are also known as the Constructor Exclusion Zone and need to be fenced off with as per figure two- Protective barrier, as shown on Page 13 of British Standards BS5837:2012, to ensure the long term retention of a tree.

## 12.2 Tree Survey

The tree survey should include all trees included in the topographical survey as well as any that might have been missed (e.g. on shrinkable soils, additional off-site trees that could have an effect on foundation design). The trees should be sequentially numbered and, where appropriate, tagged, with the tags being placed as high as is convenient on the stem of each tree.

Individual trees, groups or woodland should be indentified and assessed as such where the arboriculturist determines that this is appropriate. However, an assessment of individuals within any group should still be undertaken if there is a need to differentiate between them, e.g. in order to highlight significant variation in attributes (including physiological or structural condition).

The categorization of a group or woodland can reflect a future potential that is contingent on appropriate management being undertaken to promote the development of the better specimens, based upon established arboricultural and silvicultural principles. Such

management requirements should be noted under “general observations” within the schedule and included in the post-development management plan.

A schedule to the survey should list all the trees or groups of trees. The following information should be recorded.

- a) Sequential referencing number (to be recorded on the tree survey plan).
- b) Species listed by common name, with a key provided to scientific names.
- c) Height
- d) Stem diameter
- e) Branch spread, taken as a minimum at the four cardinal points, to derive an accurate representation of the crown (to be plotted on the tree survey plan)
- f) Existing height above ground level of
  1. First significant branch and direction of growth
  2. Canopy
- g) Life stage (e.g. young, semi-mature, early mature, mature, over mature)
- h) General observations, particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect), and/or preliminary management recommendations.
- i) Estimated remaining contribution, in years (<10, 10+, 20+, 40+);
- j) Category U or A to C grading (see 4.5) to be recorded on the survey plan.

Relevant details of shrub masses, hedges, hedgerows and stumps are expected to have been recorded during the topographical survey but should be checked by the arboriculturist for inclusion in the tree survey. In the case of regularly maintained domestic hedges and the majority of shrub masses, it will normally be sufficient to record the height and species on the tree survey plan or note these in the schedule.

### **12.3 Tree Categorization Method**

The purpose of the tree categorization method, which should be applied an arboriculturist, is to identify the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained in the event of development occurring.

For a tree to qualify under any given category, it should fall within the scope of that categories definition (U, A, B, C) and, for trees in categories A to C, it should qualify under one or more of the sub-categories (1, 2, 3). Sub-categories 1, 2 and 3 are intended to reflect the arboricultural and landscape qualities, and cultural values, respectively.

When categorizing a tree, the presence of any serious disease or tree-related hazards should be taken into account. If disease is likely to be fatal or irremediable, or likely to require sanitation for the protection of other trees, it might be appropriate for the trees concerned to be categorised U, even if the otherwise have considerable value. If structural defects are remediable, including the effect that this might have on the trees remaining value, will influence whether the tree be assigned to the category that it would otherwise merit.

Particular care is needed when evaluating young trees, especially where they occur as individual specimens. Where these are less than 150mm stem diameter at 1.5m above adjacent ground level, it might be acceptable and relatively straight forward to mitigate their loss, if necessary, with similar new tree planting. Alternatively, it might be practicable to relocate such trees within the site (e.g. using a tree spade). Whilst the presence of young trees of good form and vitality is generally desirable (i.e. those trees which have the potential

to develop into quality mature specimens), they need not necessarily be a significant constraint on the site's potential.

*NOTE It is sometimes possible to relocate mature trees. However as this is a costly and complex operation with a variable chance of success, it is a viable option only in exceptional cases.*

The tree survey might identify the presence of veteran trees on the site. The implications of their presence on the use of the surrounding land should be taken in the design process. Where such trees are to be retained, particular care should be taken in the design to accommodate them in a setting that aids their long term retention.

*NOTE Whilst veteran trees typically a range of niche habitats, they are especially valuable if ancient, due to their scarcity and high habitat values for associated species of fungi, lichens and saproxylic invertebrates, including some which are rare or endangered and occur only where such trees have been continuously present for centuries. These trees will therefore almost always be included in the A3 category.*

## **12.4 Soil Assessment**

A soil assessment should be undertaken by a competent person to inform any decisions relating to:

- The root protection area RPA;
- Tree protection;
- New planting design; and
- Foundation design to take account of retained, removed and new trees.

The assessment should determine whether the soil is shrinkable. If it is, trees and other vegetation have the potential to cause indirect damage to structures. In such cases, desiccation assessments should be carried out at a specialist laboratory to check the extent to which existing vegetation has dehydrated the soil.

Soil structure, composition and pH should be included in the assessment for the purpose of designing new planting and landscape proposals.

## **12.5 Tree Protection Plan**

The tree protection plan should be superimposed on a layout plan, based on the topographical survey and showing all hard surfacing and other existing structure within the RPA.

The plan should clearly indicate the precise location of the protective barriers to be erected to form a construction exclusion zone around the retained trees. It should also show the extent and type of ground protection, and any additional physical measures such as tree protection boxes, that will need to be installed to safeguard vulnerable sections of the trees and their RPAs where construction activity cannot be fully or permanently excluded.

These details should be incorporated into relevant subsequent drawings issued for use on the site, to ensure that all interested parties are fully aware of the areas in which access and works may or may not take place.

This document would normally be produced at the reserved matter/planning conditions stage.

## 12.6 Arboricultural Impact Assessment

This assessment should take account of the effects of any tree loss required to implement the design, and any potentially damaging activities proposed in the vicinity of retained trees. Such activities might include the removal of existing structures and hard surfacing, the installation of new hard surfacing, the installation of services, and the location and dimensions of all proposed excavations or changes in ground level, including any that might arise from the implementation of the recommended mitigation measures. In addition to the impact of the permanent works, account should be taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil.

As well as an evaluation of the extent of the impact on existing trees, the arboricultural impact assessment should include:

- a) The tree survey;
- b) Trees selected for retention, clearly identified (e.g. by number) and marked on a plan with a continuous outline;
- c) Trees to be removed, also clearly identified (e.g. by number) and marked on a plan with a dashed outline or similar;
- d) Trees to be pruned, including any access facilitation pruning, also clearly identified and labelled or listed as appropriate;
- e) Areas designated for structural landscaping that need to be protected from construction operations in order to prevent the soil structure being damaged;
- f) Evaluation of impact of proposed tree losses;
- g) Evaluation of tree constraints and draft tree protection plan
- h) Issues to be addressed by an arboricultural method statement where necessary in conjunction with input from other specialists.

## References

BS5837:2012 Trees in relation to design, demolition and construction

BS3998:2010 Tree Work - Recommendations

Modern Arboriculture. A Shigo

Trees. Their use, management, cultivation and biology. B Watson

Diseases of trees and shrubs. W.A Sinclair, H.H Lyon and W.T Johnson.

Principles of Tree hazard assessment and management. D Lonsdale

Soil Science Methods and applications. D.L Rowell

Diagnosis of ill-health in trees. R.G Strouts and T.G. Winter

Trees in Towns 2. Mark Johnson & Chris Bratt

Trees in Britain. R Phillips

Tree Root Damage to buildings Vol1 & 2. PG Biddle

Tree roots in the Built Environment. J Roberts, N Jackson & M Smith

NHBC Standards Chapter 4.2 Building near trees.