



# Rebecca Peace

Arboriculture

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Mortgage Reports  
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## BS 5837:2012 Tree Survey and Arboricultural Impact Assessment with Tree Constraints Plan

In accordance with British Standard 5837:2012 Trees in relation to design, demolition & construction - Recommendations

# 66 Park Lane, Knebworth, Hertfordshire SG3 6PW

**Report Reference 030124/RP/PL**  
**Survey Conducted: 3<sup>rd</sup> January 2024**

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| <b>Client:</b>                                     | <b>Mr Gary Withers - Agent</b><br><b>Homeowners - Client</b>                                                                                                                                                                                |
| <b>Report Ref and Drawing Ref:</b><br><b>No's:</b> | 030124/RP/PL<br>AATCP01/PL Tree Constraints Plan                                                                                                                                                                                            |
| <b>Site details:</b>                               | Site is the rear garden of 66 Park Lane, Knebworth, Hertfordshire SG3 6PW, previously used as domestic garden and small livestock                                                                                                           |
| <b>Date of Site Inspection:</b>                    | 3 <sup>rd</sup> of January 2024                                                                                                                                                                                                             |
| <b>Proposal:</b>                                   | New construction of 9 new dwellings (this is subject to change)                                                                                                                                                                             |
| <b>Report Author and Surveyor:</b>                 | Rebecca Peace <i>MArborA</i> , <b>Professional Member of the Arboricultural Association</b><br><i>HND. Am Hort. PTI Arb. Registered User Quantified Tree Risk Assessment (QTRA). Professional Member of the Consulting Arborist Society</i> |

## 1.0 Introduction

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- 1.1 This report provides an Arboricultural Impact Assessment (AIA), basic Method Statement and Tree Constraints Plan in preparation for the construction of 9 new dwellings in land at the rear of 66 Park Lane, Knebworth, Hertfordshire SG3 6PW.
- 1.2 The tree survey and report are the first stage of an arboricultural process relating to planning and the final design. This includes the preparation of supporting basic documentation (Arboricultural Impact Assessment) and Tree constraints Plans. The next stage at the time of construction will be to correlate the finalised design plans and make sure all arboricultural safeguarding and tree protection recommendations are in place.
- 1.3 The initial Tree Survey, Arboricultural Impact Assessment (AIA) and Tree Constraints Plan are compliant with BS5837:2012 (Trees in relation to design, demolition and construction – Recommendations) as requested by the landowners.
- 1.4 The survey extent is the land shown as marked on drawing **AATCP01/PL** as shown in the appendices. The tree survey is based on an overall site location survey and the PDF drawing provided.

## 2.0 The Scope of the Survey Report - Methodology & Limitations

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- 2.1** The tree survey process consisted of a ground-based visual inspection and is applied only to the areas proposed for development and nearby trees on neighbouring properties. Soil type was not assessed.
- 2.2** This report is valid for three years from the date of site inspection. The condition of trees can change following severe meteorological conditions, the effects of diseases and pests and other abiotic factors.
- 2.3** Some surveyed trees are marked on site but all are easily identifiable from plans and on site. All trees are listed in the survey data in **Appendix 1** and are plotted onto the associated plan in **Appendix 2**.
- 2.4** No definite details relating to the location or the installation of services either existing or as part of the new development have been supplied. Therefore, this report can only deal with this issue in a preliminary manner. The positioning of services should be approved by a suitably qualified surveyor.
- 2.5** Limitations of use and copyright: All rights in this report are reserved. No part of it may be reproduced or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise or stored in any retrieval system of any nature, without our written permission. Its content and format are for the exclusive use of the addressee in dealing with this site. It may not be sold, lent, hired out or divulged to any third party not directly involved in this site without the written consent of ©Rebecca Peace Arboriculture

## 3.0 Nature of Tree Stock at Site.

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- 3.1** The table of results in **Appendix 1** provides details of the condition of the trees and their suitability for retention according to BS 5837:2012. Where there are trees of particular interest merit or require reference due to their condition; these will be discussed below.
- 3.2** **BS5837:2012** The retention grade indicated in the Schedule refers to the advantages of retaining trees in the context of the current land use, taking into consideration a range of factors including life expectancy, cultural value and contributions to wildlife, landscape and amenity. The grades are defined as follows:

- **A** – High value – most desirable to retain in pre-development context
- **B** – Moderate value - desirable to retain in pre-development context
- **C** – Low value – could be retained in pre-development context
- **U** – Remove – unsuitable for retention in pre-development context, including where recommended for removal for the benefit of adjacent trees.

The system assesses not only tree health and condition but other factors such as their long-term impact on adjacent structures and good arboricultural management.

- 3.3** The land situated to the north of the residence is characterised by its open nature, with only a sparse scattering of trees. Through the boundaries, which will play a crucial role in shaping the garden for the new dwellings planned in the vicinity. The entrance to this land, to the south of the residence is marked by the presence of trees and these will require attention for safety improvements. These trees will need to undergo some remedial work, focusing on pruning or removal as necessary to ensure that they do not pose any risk to the new development or its future inhabitants. This work is essential to maintain both the aesthetic appeal and the safety of the entrance, combining it with the planned new landscape and dwellings.

#### **4.0 Root Protection Areas (RPAs) in accordance with BS5837**

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- 4.1** **BS5837:2012** makes recommendations for the provision of areas around any retained trees where their roots should be protected, known as Root Protection Areas, or RPAs, expressed in metres. For any tree, BS5837: 2012 prescribes this area according to a formula using stem diameter measurements of the trees in question. The RPAs for the trees are listed in radius (**m**) from the stem of the tree within the survey data table attached to this report.
- 4.2** The RPAs for the trees recorded by the tree surveys have been calculated in accordance with the guidance in **Chapter 4.6 of BS5837:2012**. For single stem trees, the RPA is equivalent to a circle with radius of 12 times the stem diameter. For trees with between two to five stems, the combined stem diameter is calculated by finding the square root of the sum of the squared stem diameters. For trees with more than five stems, the combined stem diameter is calculated by finding the square root of the sum of the mean stem diameter squared multiplied by the number of stems.
- 4.3** The RPAs of all trees that could affect the proposals have been recorded onto the Tree Data in **Appendix 1** for each individual site and will explain any amendments, removals or root protection methods which will need to be put into place where any development could be within the RPA.

#### **5.0 Arboricultural Impact Assessment (AIA)**

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- 5.1** The **Arboricultural Impact Assessment (AIA)** utilises the information from the survey to evaluate the effect on the trees from the proposed development and where possible recommend suitable clarifications or mitigation. All trees have been surveyed individually where possible but where there is no access or trees are close together, growing as a group with similar sizing and species then these categorised as a group.
- 5.2** This Arboricultural impact assessment. This assessment implies that these trees have significant ecological and environmental value, and their preservation and enhancement should be considered a priority.

- 5.3 **G6 and G7** are hedges located along historic field boundaries that are now facing a shift in their status. With the removal of their greenfield designation, a reassessment of their protection is necessary. In the UK, hedges like these are recognised for their substantial ecological benefits and are subject to specific protections. To enhance these hedges' capabilities in providing effective screening and noise abatement, particularly given their proximity to the busy A1 roadway, they could be strategically reinforced with suitable species. This gapping up process not only strengthens their environmental role but also aligns with their importance in landscape conservation and biodiversity support. It is proposed to erect a soundproof fence along this boundary, hopefully incorporating the hedging which can act as extra noise buffering.
- 5.4 **Tree Canopy:** The canopy is approximate and impacts the shading, aesthetics, and ecological aspects of the site.
- 5.5 **Trees along the driveway,** specifically those T1 to T14 and including Group 1, have Root Protection Areas (RPAs) that overlap with an existing driveway. This overlap has likely influenced the RPAs, as there are open areas to the west or east of the trees, depending on their location. Decompaction processes are already in place within the driveway, so any minor resurfacing or slight widening is not expected to significantly affect the trees. Notably, for Group 1, the original driveway is very close to the base of the trees, and this proximity will be maintained.  
Tree T9 in this group needs to be removed as it is dead, which will provide some additional space for potential widening or creating a passing point within the new access route.
- 5.6 **Group 2,** which is mostly situated away from the development area, will require fencing throughout the construction process. This is particularly important because the new driveway is near the Required Protection Area (RPA) of these trees. It is essential to install fencing around this area, along with appropriate signage to ensure protection during construction.
- 5.7 **T21,** an early mature to mature oak tree, has previously experienced a few problems, including a snap in the crown and damage to the base, leading to a small cavity. However, upon inspection, no significant issues were found with the tree. This tree is still growing and is likely to extend towards the house and garage areas of plots four and five. To mitigate this, one option could be to slightly reposition the houses to reduce encroachment on the Required Protection Area (RPA). Alternatively, using a more suitable foundation type for both the house and garage, such as a raft or piling foundation, could be considered. Once a decision is reached, the placement of protective fencing and ground protection matting can be finalised.
- 5.8 **Fencing and Protection:** This report contains specific details for the placement of tree protection fencing and matting. The exact measurements for the Required Protection Area (RPA) fencing positions can be found in the 'Tree Data' section, specifically under 'RPA Measurement.' It is important to ensure that all fencing is positioned outside these measurements on the site.
- 5.9 In summary, the Tree Constraints Plan assesses the impact of existing trees on the development and outlines measures to protect, remove, or replace trees as necessary. It emphasises the importance of considering tree health, ecological impact, and aesthetic value in the development process. The tree protection fencing will need to follow the RPA measurement stated in the Appendices under RPA Measurements.

## 6.0 Method Statement for all Construction Processes - Order of Arboricultural Works

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6.1 **General requirements:** The Arboricultural Method statement and Tree Protection Plan shall remain on site for the duration of the construction and landscaping works and be available to site operatives at all times. All operatives at the site shall be briefed about tree related factors as part of their site induction.

6.2 Any variation from the methodology described in this method statement shall be discussed with the supervising arboriculturist or informed site manager and agreed with the local authority Arboricultural officer if necessary.

6.3 **Initial tree works:** The tree removals and access facilitation pruning shall be carried out as the first stage of development. This will affect **T6 and T9**. These both can be replaced like for like once final landscaping is implemented.



6.4 Vegetation located within the root protection areas of retained trees shall be cleared with controlled hand tools (e.g. stump grinder/brush cutter). Plant machinery shall not be used to scrape vegetation within root protection areas or access the site until the tree protection barriers have been installed.

6.5 Trees should be checked for protected species before works are undertaken. It is against the law to disturb bats or their roosts under the Conservation of Habitat and Species Regulations. Nesting birds are protected by the Wildlife and Countryside Act. If protected species are discovered, Natural England should be contacted for advice.

6.6 The tree works contractors should carry out all tree works to **BS3998: 2010 'Tree works – recommendations'** as modified by research that is more recent. They should also carry relevant, adequate and up to date insurance.

6.7 It is recommended that an Arboricultural Association approved contractor carry out all tree works. Approved contractors are expected to work to industry best standards. The Arboricultural Association website contains contact details and information on engaging a suitable contractor.

- 6.8 **Tree protection barriers:** The root protection areas of retained trees must be left free from disturbance and protected from contamination or compaction during all stages of the proposed works. Protection shall comprise of tree protection fencing and ground protection. The tree protection fencing position is illustrated on drawing **AATPP01/PL** in the appendices.
- 6.9 The tree protection fencing and ground cover shall be installed in the locations described on the Tree Protection plan and signs shall be affixed to the fencing or near to ground protection to explain its purpose. The below diagrams show the type of signs needed to be installed.



6.10 Tree protection barriers and coverings shall be installed following the initial tree works, prior to construction traffic entering the site. They shall remain in place for the duration of construction and hard landscaping works.

6.11 Where temporary ground protection is required through the RPA for pedestrians, example specifications can include:

- A single thickness of scaffold boards on a compressible layer of wood chip or sharp sand (100mm for pedestrians or 150mm for small plant), spread across a geotextile membrane.
- A single thickness of scaffold boards on a driven scaffold frame.
- Certified ground protection matting can be used instead of the above, see section seven of this report for examples.

There will be no heavy plant access in area of Construction Exclusion Zone (CEZ)

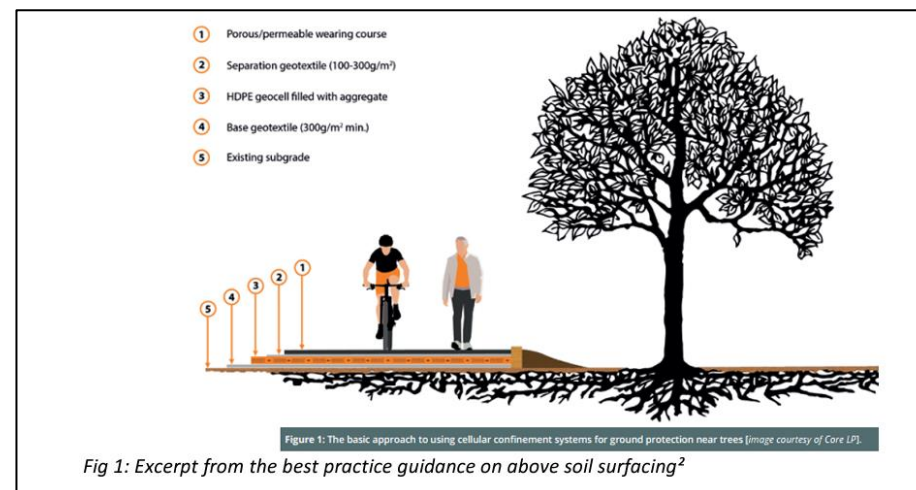
6.12 The areas protected by fencing or ground protection shall be referred to as the construction exclusion zones (CEZ). The following actions shall be prohibited within the exclusion zones:

- Vehicular access.
- Regular pedestrian access unless on suitable ground protection.
- Storage of construction materials.
- Storage or handling of harmful chemicals.
- Any change in ground level.



6.13 **Storage and handling of harmful chemicals:** Provision needs to be made to avoid the storage and handling of harmful chemicals in proximity to trees. Harmful chemicals include fuels, oils, builder's sand (which has a high salt content) and cement. Cement mixing shall only occur where there is no potential for cement washings to leech into a root protection area. Provision shall also be made to prevent fuelling or the handling of cement from occurring in areas proposed for further planting.

6.14 **Contractor facilities: As room is limited,** a small suitable location for site cabins, contractor parking and site facilities for operatives can be agreed. These facilities are located outside the root protection areas of retained trees (unless on retained hard standing surfaces). Provision must also be taken to prevent exhaust fumes or hot air from generators or any other facilities from damaging the canopies of retained trees.



- 6.15 **Excavation within root protection areas of retained trees for driveway widening:** As far as is reasonable, the excavations shall occur by hand where needed near to the RPA areas.
- 6.16 **Widening of driveway within root protection areas:** New groundworks in RPAs are potentially damaging to trees because they may disturb the soil and disrupt the existing exchange of water and gases in and out of it. With this project the use of the cellular root protection system incorporated into the new layout will be advantageous to the future growth and landscape. This can follow the hatched area on the Tree Protection Plan **AATPP01/PL**.
- 6.17 The use of above ground cellular confinement systems to install surfacing near to trees has been used for over 20 years. This involves laying a geocell mat onto a non-woven geotextile laid on the surface of the ground (no excavation required), filling it with clean stone aggregate, and topping this sub-base with a wearing course. Fig 1 right and illustration above are from the latest good practice guidance on above soil surfacing near trees.
- 6.18 This surface does not require excavation (other than tying into existing levels for example at the junction with a road) and it improves the bearing capacity of the soil by distributing stress over a wider area which prevents ground deformation. In this case, the trees are in average physiological condition and the levels are suitable for an above soil surfacing solution. It is considered that implementation of an above soil surfacing solution for the access driveway would have a negligible impact on their health and longevity of the adjacent trees in T11, T14 and G2.
- 6.19 **Levels,** no changes in levels are proposed within the RPAs of any retained trees.
- 6.20 Plant machinery again must be operated from outside the root protection area. A banksman must be used to spot overhanging branches or shallow roots that may not be visible from within the cabin of the excavator.
- 6.21 **Services:** Details of the routing of services have become available, they have been reviewed by the project arboriculturist and it can be confirmed that no works will be carried out within root protection areas. See AA01TPP/HL in Appendix 2
- 6.22 **Soft landscaping within root protection areas:** New soft landscaping within the root protection areas of retained trees shall occur as the final phase of development. The final specification for soft landscaping is to be confirmed but may include turfing and tree/shrub planting within root protection areas.
- 6.23 Where new turf is to be laid within the root protection areas of retained trees, topsoil will need to be imported. The existing soil may be lightly tilled by hand but use of rotavators will be prohibited. A maximum increase of 100mm of topsoil may be introduced to avoid suffocating root growth. Care must be taken to prevent soil be piled against tree buttresses or buttress roots. When soil or other materials are transported across a root protection area, scaffold board pathways must be used to prevent compaction of the rooting medium. It should be noted that even light pedestrian use could compact the soil, particularly in wet conditions.
- 6.24 All planting pits within root protection areas shall be individually hand excavated (no trench planting). Care must be taken to avoid severing or damaging roots with a diameter greater than 25mm.

- 6.25 In addition to the above, a system and programme of onsite monitoring by the appointed Arboricultural consultant should be agreed with the Local Authority Arboricultural Officer if it is deemed necessary. The form and frequency of site monitoring is detailed in section 4 of this report.
- 6.26 If significant root growth is disturbed during construction activities that are not within the scope of this report, the work shall cease until the project arboriculturist has been consulted. Roots greater than 25mm in diameter or dense/matted fibrous roots shall be considered significant root growth. It should be remembered that whilst root protection areas are part of industry best practice, tree root growth is influenced by a number of factors and may not conform to expected ideals.
- 6.27 If at any time during the construction process, damage is inadvertently caused to a tree, the project arboriculturist shall be notified to assess the likely implications and to prescribe potential remedial measures to be implemented. Damage can be in the form of chemical or fuel spillage, mechanical damage to either the above ground parts of the tree or the roots, fire or any other unforeseen circumstance.
- 6.28 Relation to all trees on site, it is generally recommended that the following precautions are also adhered to so as to minimise the potential for damage to trees:
- a) Ensure wide or tall loads or plant with booms, jibs and counterweights can operate without encountering the tree canopy. Any transit or traverse of plant in close proximity to the RPA of any trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is always maintained.
  - b) Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged within 10m of a tree stem or on the site at all.
  - c) It is essential that allowance be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards any tree.
  - d) Notice boards, telephone cables or other services should not be attached to any part of the trees.

***British Standards Institute - British Standard for trees in relation to construction (BS 5837:2012).***

- 6.29 It would be prudent for any person involved with the project to familiarise themselves with relevant sections from British Standard for trees in relation to construction (BS 5837:2012).

## 7.0 Site monitoring and supervision

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- 7.1 Prior to the commencement of any works or machinery and materials arriving on site a pre-commencement site meeting involving the project arborist, landowner or agent, site manager, contractors and engineer (as appropriate) will be held to ensure that all aspects of the arboricultural method statement and tree protection are understood and for all parties to swap contact details.

| Name          | Position                     | Contact Details                                                                    |
|---------------|------------------------------|------------------------------------------------------------------------------------|
|               |                              |                                                                                    |
| Rebecca Peace | Arboriculturalist Consultant | 07810063688 <a href="mailto:rebeccapeace@hotmail.com">rebeccapeace@hotmail.com</a> |
|               |                              |                                                                                    |
|               |                              |                                                                                    |

- 7.2 In accordance with section 6.3 of BS5837: 2012, the site will be monitored to ensure the arboricultural parts of the planning permission are implemented and maintained throughout the development. This covers the installation of protective fencing and/or temporary ground protection and specialist construction techniques in proximity of the trees.
- 7.3 The monitoring and supervision will be auditable. Results will be recorded and available for the Local Planning Authority and client. All arboricultural site notes will be sent to North Herts Council Tree Section within 5 days of any supervision or monitoring visits.

|                                  |              |                                      |      |
|----------------------------------|--------------|--------------------------------------|------|
| Site:                            |              | Client Reference:                    |      |
| Date of Visit:                   |              | Consultant Name:                     |      |
| Reason for Inspection:           |              |                                      |      |
| Stage of Development Activities: |              |                                      |      |
| Previously Noted Issues:         |              |                                      |      |
| Trees Affected                   | Observations | Action Taken and Date for Completion | Date |

- 7.5 The site arboriculturalist and site supervisor will inspect the tree protection at pre-determined and agreed time intervals, including:
- a) After the protective fencing has been installed, but before development commences.
  - b) At least once a month during development.
  - c) Once all development work is completed and all construction traffic is off site and the tree protection fence has been removed.
- 7.6 Any defects requiring remediation or rectification will be notified to the site foreman/manager and the client. Should protective fencing become damaged as to impair its function as a protective barrier, all works will cease in the vicinity of the damage until the fence has been repaired.

## 8.0 Legal Constraints

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- 8.1 **Trees subject to statutory controls:** The site is not in a Conservation Area. This information was found on North Herts Council website. [Link here](#). There are no Tree Preservation Orders in place on the site at the time of the survey.
- 8.2 **Greenbelt:** The land was until recently designated as Greenbelt but this status has been lifted only for this area and some surrounding fields. Given this change, careful consideration is essential in any development. This is crucial because this section will border an area that still retains its Greenbelt status. Actions taken on the newly non-Greenbelt land must be mindful of the environmental and aesthetic impact on the neighbouring Greenbelt zone. This is not legislation but will need to be considered.
- 8.3 **Statutory wildlife obligations:** The Wildlife and Countryside Act 1981 as amended by the Countryside and **The Habitat Regulations 2012** provides statutory protection to birds, bats and other species that inhabit trees. All tree work operations are covered by these provisions and advice from an ecologist should be obtained before undertaking any works that might constitute an offence. It was noted that within trees were nesting birds in the area.

## 9.0 Summary

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- 9.1 **Summary:** This report evaluates the condition of trees at 66 Park Lane, Knebworth, Herts considering the arboricultural implications of a proposed development. It classifies tree quality based on British Standard 5837:2012 and highlights the need to protect identified trees during construction. The report's scope, methodology, and limitations are outlined. The root protection areas (RPAs) for trees are calculated as per BS5837:2012 guidelines. Legal constraints related to Tree Preservation Orders and statutory wildlife obligations are also addressed.

**9.2** The assessment underscores the ecological and environmental significance of these trees, prioritising their preservation and enhancement. Hedges G6 and G7, along historic field boundaries, now require reassessment due to changes in their greenfield designation. Recognised for their ecological benefits, these hedges, especially near the busy A1 Road, could be enhanced by adding species for better screening and noise reduction. A soundproof fence is also proposed to complement this.

Tree canopy impacts site shading, aesthetics, and ecology. Trees T1 to T14, including Group 1 along the driveway, have overlapping Root Protection Areas (RPAs) with the driveway, affecting RPAs but not significantly impacted by minor resurfacing or widening. Tree T9, being dead, is to be removed for potential safety reasons.

Group 2, distant from the development, requires protective fencing throughout construction due to the proximity of the new driveway to their RPAs. T21, a maturing oak, shows root growth towards nearby plot 4 and 5, suggesting potential house repositioning or specialised foundations to protect its RPA.

The report details tree protection fencing and matting placements, with RPA fencing measurements in the 'Tree Data' section. The Tree Constraints Plan assesses tree impacts on development, focusing on tree health, ecological impact, and aesthetic value, with tree protection fencing following specified RPA measurements.

**9.3** Recommendations are based on observations at the time of survey. Trees are dynamic living organisms whose structure is constantly changing. Following site development, regular inspections (*every 24 months*) of the tree should be undertaken by a qualified Arboricultural Consultant.

## Appendices

## Appendix 1 Tree Inspection/Survey Results

Table 1. SURVEY KEY: Abbreviations and categories used in the survey are as follows:

|                                                                                      |                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tree Type and No</b>                                                              | T = Tree, G = Group, S = Shrub, H= Hedge. Number of tree and corresponding number on plan.                                                                                                                       |
| <b>Species.</b>                                                                      | Common name and scientific in name in <i>italics</i> .                                                                                                                                                           |
| <b>Height</b>                                                                        | Estimated height in metres                                                                                                                                                                                       |
| <b>DBH (Stem diameter)</b>                                                           | Diameter measured in centimetres at 1.5m above ground level. MS:=Multiple stems                                                                                                                                  |
| <b>Root Protection Area. (RPA).</b>                                                  | The root protection in metres as radial distance as measured from the centre of the tree stem. Where an * is present the R.P.A. cannot be achieved due to ground constraints, or it is located outside the site. |
| <b>Crown spread</b>                                                                  | Measured from centre to average branch spread in metres. Four points measured North, South, East and West.                                                                                                       |
| <b>Age Class.</b>                                                                    | Young (Y). Semi Mature (SM). Early Mature (EM). Mature (M). Over Mature (OM). Veteran (V).                                                                                                                       |
| <b>Physiological and Structural Condition</b>                                        | Good. (G) Fair. (F) Poor. (P) Dead.<br>In addition, specific diseases, defects or faults are described.                                                                                                          |
| <b>Recommendations for Work</b>                                                      | Recommendations for tree work where observed as necessary, including further investigations of suspected defects which may require more detailed assessment. If blank no works are recommended.                  |
| <b>Cat: Category Grading (BS5837) with estimated remaining contribution in years</b> | U or A, B, C (See table below). Less than 10 years. <10. 10-20 years. 20 -40 years. More than 40 years. 40><br><i>SULE = Safe Useful Life Expectancy</i>                                                         |

Table 2. SURVEY KEY: British Standards Categories and Criteria

| Category & definition                                                                                                                                     | Criteria (including subcategories where appropriate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                      |                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Category U</b><br>Trees in such a condition that they cannot realistically be retained as living trees in the context of current land use for <10 yrs. | <ul style="list-style-type: none"> <li>Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees</li> <li>Trees that are dead or showing signs of significant, immediate and irreversible decline</li> <li>Trees infected with significant pathogens affecting health or safety, or very low-quality trees suppressing trees of better quality.</li> </ul> <p><i>NOTE: these trees can have existing or potential conservation value making retention desirable</i></p> |                                                                                                                                                                                                                                                      |                                                                                                  |
|                                                                                                                                                           | <b>1 Mainly arboricultural qualities</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>2 Mainly landscape qualities</b>                                                                                                                                                                                                                  | <b>3 Mainly cultural values incl conservation</b>                                                |
| <b>Category A</b><br>Trees of high quality with an estimated remaining life expectancy of >40 yrs                                                         | Particularly good examples of their species, especially if rare or unusual. Those that are essential components of groups or formal or semi-formal arboricultural features                                                                                                                                                                                                                                                                                                                                                                                                                                          | Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features.                                                                                                                                              | Trees, groups or woodlands of significant conservation, historical, commemorative or other value |
| <b>Category B</b><br>Trees of moderate quality with an estimated remaining life expectancy of >20 yrs                                                     | Trees that might be included in category A but are downgraded because of impaired condition such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit category A designation.                                                                                                                                                                                                                                                                                                                                                           | Trees present in numbers, usually growing as groups or woodlands such that they attract a higher collective rating than they might as individuals. Trees occurring as collectives but situated so as to make little visual contribution to the area. | Trees with material conservation or other cultural value                                         |
| <b>Category C</b><br>Trees of low quality with an estimated remaining life expectancy of >10 years, or young trees with a stem diameter <150mm            | Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary landscape benefits.                                                          | Trees with no material conservation or other cultural value.                                     |

## Appendix 1 (Cont.)

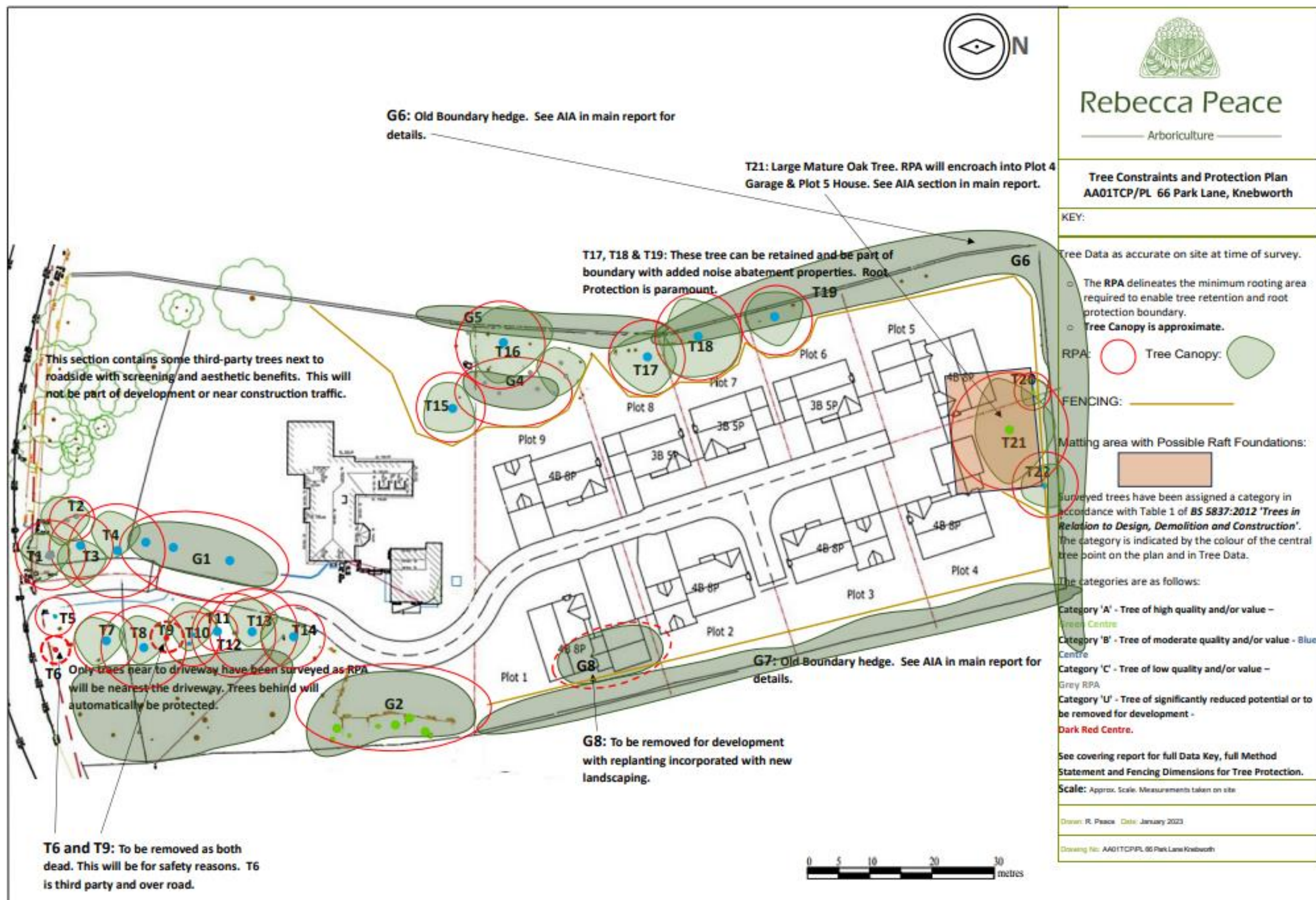
## Tree Inspection/Survey Results.

| Tree No. | Common and Botanical Name                        | Height (m) | DBH (cm) | RPA Calculation (m) | Crown Spread (m) |   |   |   | Height of ground clearance | Age Class                         | Physiological Condition | Structural Condition | Recommended Work    | Category Grading | Notes                                                                                                                                                                                        | Photo 1 & 2                                        |
|----------|--------------------------------------------------|------------|----------|---------------------|------------------|---|---|---|----------------------------|-----------------------------------|-------------------------|----------------------|---------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|          |                                                  |            |          |                     | N                | E | S | W |                            |                                   |                         |                      |                     |                  |                                                                                                                                                                                              |                                                    |
| T1       | Goat Willow ( <i>Salix caprea</i> )              | 16         | 45       | 5.4                 | 6                | 5 | 4 | 3 | 0                          | Mature                            | Fair                    | Fair with Ivy        | None as third party | C2 (10-20)       | Third party tree and roots going into drainage area.                                                                                                                                         | <a href="#">Photo 1</a>                            |
| T2       | Leylandii Cypress and Goat Willow                | 18         | 32       | 3.8                 | 2                | 2 | 3 | 2 | 2                          | Early Mature                      | Fair                    | Fair with Ivy        |                     | C2(10-20)        | Scrappy trees but important as roadside screening trees                                                                                                                                      | <a href="#">Photo 1</a>                            |
| T3       | Leyland Cypress ( <i>Cupressus × leylandii</i> ) | 16         | 42       | 5                   | 1                | 3 | 3 | 3 | 6                          | Early Mature                      | Fair                    | Fair                 |                     | B2 (20-40)       | Twin stemmed with bend in one stem (see photo)                                                                                                                                               | <a href="#">Photo 1</a>                            |
| T4       | Leyland Cypress ( <i>Cupressus × leylandii</i> ) | 18         | 67       | 8                   | 2                | 2 | 2 | 2 | 2                          | Mature                            |                         | Fair                 |                     | B2 (20-40)       | Singular specimen tree                                                                                                                                                                       | <a href="#">Photo 1</a><br><a href="#">Photo 2</a> |
| T5       | Laurel ( <i>Prunus laurocerasus</i> )            | 10         | 32       | 3.8                 | 2                | 2 | 2 | 2 | 0                          | Mature                            | Good                    | Good                 |                     | B2 (20-40)       | Good as screening and third-party tree. Will not be affected by development                                                                                                                  | <a href="#">Photo 1</a>                            |
| T6       | Unknown Dead                                     | 16         | 0        | 0                   | 0                | 0 | 0 | 0 | 0                          | Mature                            | Dead                    | Very Poor            | Fell and remove     | U (<10)          | Tree will not affect development but is close. Has been recorded as dangerous and close to entrance and access road. Highways Third party tree.                                              | <a href="#">Photo 1</a>                            |
| G1       | Beech hedging, Leylandii, Goat Willow            | 17         | 60       | 7.2                 | 2                | 2 | 2 | 2 | 0                          | Mature, Early Mature, Semi Mature | Fair                    | Fair                 |                     | B2 (20-40)       | Group of screening hedge trees to garden. Driveway has been in place since original house was built. Roots will be more concentrated on open ground to west of group and not to the driveway | <a href="#">Photo 1</a>                            |

| Tree No. | Common and Botanical Name                                                        | Height (m) | DBH (cm) | RPA Calculation (m) | Crown Spread (m) |       |       |       | Height of ground clearance | Age Class                 | Physiological Condition | Structural Condition | Recommended Work | Category Grading | Notes                                                                                                                | Photo 1 & 2                                        |
|----------|----------------------------------------------------------------------------------|------------|----------|---------------------|------------------|-------|-------|-------|----------------------------|---------------------------|-------------------------|----------------------|------------------|------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|          |                                                                                  |            |          |                     | N                | E     | S     | W     |                            |                           |                         |                      |                  |                  |                                                                                                                      |                                                    |
| T7       | Sycamore, Sweet chestnut ( <i>Acer pseudoplatanus</i> , <i>Castanea sativa</i> ) | 16         | 49       | 5.8                 | 0                | 0     | 0     | 0     | 0                          | Mature                    | Fair                    | Fair                 |                  | B2 (20-40)       | Third party Woodland trees with understory of Laurel and Portuguese laurel, scrappy but ecologically beneficial.     | <a href="#">Photo 1</a>                            |
| T8       | Sweet chestnut ( <i>Castanea sativa</i> )                                        | 17         | 62       | 7.4                 | 3                | 3     | 5     | 5     | 4                          | Mature                    | Fair                    | Fair                 |                  | B2 (20-40)       | Woodland tree so slightly scrappy                                                                                    | <a href="#">Photo 1</a>                            |
| T9       | Sweet chestnut ( <i>Castanea sativa</i> )                                        | 19         | 60       | 7.2                 | N / A            | N / A | N / A | N / A | N/A                        | Mature                    | Dead                    | Very Poor            | Fell and remove  | U (<10)          | Dead tree to be removed before development starts                                                                    | <a href="#">Photo 1</a>                            |
| T10      | Sweet chestnut x 2 ( <i>Castanea sativa</i> )                                    | 16         | 41       | 4.9                 | 3                | 3     | 3     | 3     | 6                          | Mature, Early Mature      | Fair                    | Fair                 |                  | B2 (20-40)       | Woodland trees slightly sparse                                                                                       | <a href="#">Photo 1</a><br><a href="#">Photo 2</a> |
| T11      | Sweet chestnut ( <i>Castanea sativa</i> )                                        | 19         | 31       | 3.7                 | 3                | 3     | 3     | 5     | 4                          | Early Mature, Semi Mature | Fair                    | Fair                 |                  | B2 (20-40)       |                                                                                                                      | <a href="#">Photo 1</a>                            |
| T12      | Sycamore ( <i>Acer pseudoplatanus</i> )                                          | 20         | 59       | 7                   | 3                | 1     | 3     | 5     | 6                          | Mature                    | Fair                    | Fair                 |                  | B2 (20-40)       | Woodland tree                                                                                                        | <a href="#">Photo 1</a>                            |
| T13      | Sycamore ( <i>Acer pseudoplatanus</i> )                                          | 20         | 61       | 7.3                 | 6                | 2     | 4     | 6     | 2                          | Mature                    | Fair                    | Fair                 |                  | B2 (20-40)       | Woodland edge tree                                                                                                   | <a href="#">Photo 1</a>                            |
| T14      | Sycamore ( <i>Acer pseudoplatanus</i> )                                          | 20         | 58       | 6.9                 | 5                | 3     | 5     | 6     | 3                          | Mature                    | Good, Fair              | Good                 |                  | B1 (20-40)       | On edge of driveway with smaller Leylandii underneath.                                                               | <a href="#">Photo 1</a>                            |
| G2       | Cherry, Sycamore, Sweet Chestnut, Field Maple ( <i>Acer campestre</i> )          | 20         | 61       | 7.3                 | 6                | 5     | 5     | 5     | 2                          | Mature, Early Mature      | Fair                    | Fair to Good         |                  | A2 (40+)         | Screening trees will not affect the development but the RPA and trees will need to be protected during construction. | <a href="#">Photo 1</a>                            |
| G3       | Bay tree ( <i>Laurus nobilis</i> )                                               | 6          | 24       | 2.8                 | N / A            | N / A | N / A | N / A | N/A                        | Mature, Early Mature      | Good                    | Good                 |                  | B1 (20-40)       | One Bay tree with Bay hedging. This can possible be retained as good screening.                                      | <a href="#">Photo 1</a>                            |

| Tree No. | Common and Botanical Name                                                  | Height (m) | DBH (cm) | RPA Calculation (m) | Crown Spread (m) |       |       |       | Height of ground clearance | Age Class                         | Physiological Condition | Structural Condition  | Recommended Work | Category Grading    | Notes                                                                                                              | Photo 1 & 2                                        |
|----------|----------------------------------------------------------------------------|------------|----------|---------------------|------------------|-------|-------|-------|----------------------------|-----------------------------------|-------------------------|-----------------------|------------------|---------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|          |                                                                            |            |          |                     | N                | E     | S     | W     |                            |                                   |                         |                       |                  |                     |                                                                                                                    |                                                    |
| T15      | Cherry ( <i>Prunus avium</i> )                                             | 18         | 52       | 6.2                 | 3                | 5     | 5     | 3     | 3                          | Mature                            | Fair                    | Fair                  |                  | B1 (20-40)          | One edge of woodland area                                                                                          | <a href="#">Photo 1</a>                            |
| G4       | Cherry, Holly ( <i>Ilex aquifolium</i> )                                   | 14         | 22       | 2.6                 | 1                | 1     | 1     | 1     | 0                          | Early Mature, Semi Mature         | Fair, Poor              | Fair to poor          |                  | C2 (10-20)          | This small group in front of H1 is scrappy and if removed can be replanted with better quality and species of tree | <a href="#">Photo 1</a><br><a href="#">Photo 2</a> |
| G5       | Sycamore, Oak, Field Maple, Leylandii, Holly.                              | 19         | 36       | 4.3                 | N / A            | N / A | N / A | N / A | N/A                        | Mature, Early Mature, Semi Mature | Fair                    | Fair                  |                  | B3 (20-40)          | Excellent screening and noise abatement. Larger trees in this group have been recorded individually.               | <a href="#">Photo 1</a>                            |
| T16      | Oak ( <i>Quercus robur</i> )                                               | 16         | 43       | 5.1                 | 3                | 6     | 6     | 2     | 4                          | Mature                            | Fair                    | Fair to Good          |                  | B1 (20-40)          | On edge of G5                                                                                                      | <a href="#">Photo 1</a>                            |
| T17      | Beech ( <i>Fagus sylvatica</i> )                                           | 17         | 56       | 6.7                 | 6                | 3     | 5     | 6     | 3                          | Mature                            | Fair                    | Fair with recent work |                  | B1 (20-40)          | On lean with uneven crown                                                                                          | <a href="#">Photo 1</a>                            |
| T18      | Beech ( <i>Fagus sylvatica</i> )                                           | 19         | 65       | 7.8                 | 6                | 4     | 6     | 6     | 0                          | Mature                            | Fair                    | Fair                  |                  | B1 (20-40)          | Scrappy tree in hedge line. Previous reduction works.                                                              | <a href="#">Photo 1</a>                            |
| T19      | Beech ( <i>Fagus sylvatica</i> ) x 2                                       | 17         | 53       | 6.3                 | 4                | 5     | 5     | 2     | 0                          | Early Mature                      | Fair                    | Fair with recent work |                  | B1 (20-40)          | Trees are as part of the boundary hedge.                                                                           | <a href="#">Photo 1</a>                            |
| G6       | Hawthorn, Blackthorn ( <i>Crataegus monogyna</i> , <i>Prunus spinosa</i> ) | 13         | 25       | 3                   | N / A            | N / A | N / A | N / A | N/A                        | Mature, Early Mature, Semi Mature | Fair                    | Fair but scrappy      |                  | No grading as hedge | This is an old boundary hedge, See section in AIA regarding information. Could be third party                      | <a href="#">Photo 1</a>                            |
| G7       | Hawthorn, Blackthorn ( <i>Crataegus monogyna</i> , <i>Prunus spinosa</i> ) | 12         | 18       | 2.1                 | 2                | 2     | 2     | 2     | 0                          | Mature, Early Mature, Semi Mature | Fair                    | Fair                  |                  | No grading as hedge | Again, not third party hedge and could be protected                                                                | <a href="#">Photo 1</a><br><a href="#">Photo 2</a> |
| T20      | Oak ( <i>Quercus robur</i> )                                               | 9          | 23       | 2.7                 | 3                | 3     | 3     | 3     | 1                          | Young                             | Good, Fair              | Good                  |                  | A1 (40+)            | Small younger tree possible daughter tree of T21                                                                   | <a href="#">Photo 1</a>                            |
| T21      | Oak ( <i>Quercus robur</i> )                                               | 16         | 67       | 8                   | 6                | 6     | 6     | 5     | 2.5                        | Early Mature                      | Good                    | Good                  |                  | A1 (40+)            | Small cavity at base, good wound                                                                                   | <a href="#">Photo 1</a><br><a href="#">Photo 2</a> |

| Tree No. | Common and Botanical Name               | Height (m) | DBH (cm) | RPA Calculation (m) | Crown Spread (m) |       |       |       | Height of ground clearance | Age Class                        | Physiological Condition | Structural Condition | Recommended Work | Category Grading | Notes                                                                                               | Photo 1 & 2             |
|----------|-----------------------------------------|------------|----------|---------------------|------------------|-------|-------|-------|----------------------------|----------------------------------|-------------------------|----------------------|------------------|------------------|-----------------------------------------------------------------------------------------------------|-------------------------|
|          |                                         |            |          |                     | N                | E     | S     | W     |                            |                                  |                         |                      |                  |                  |                                                                                                     |                         |
|          |                                         |            |          |                     |                  |       |       |       |                            |                                  |                         |                      |                  |                  | wood, can be monitored but not a safety concern. Old snapped out limb but again not a concern       |                         |
| T22      | Sycamore ( <i>Acer pseudoplatanus</i> ) | 17         | 43       | 5.1                 | 3                | 4     | 4     | 3     | 2                          | Early Mature                     | Good, Fair              | Fair with twin stems |                  | B2 (20-40)       | Self-set on boundary                                                                                | <a href="#">Photo 1</a> |
| G8       | Fruit Trees mainly Damson               | 3          | 12       | 1.4                 | N / A            | N / A | N / A | N / A | N/A                        | Semi Mature, Young               | Fair                    | Fair                 |                  | B2 (20-40)       | Group of fruit trees. To be removed because of development and replanted as part of new landscaping | <a href="#">Photo 1</a> |
| G9       | Fruit, Beech hedging and shrubbery      | 5          | 12       | 1.4                 | N / A            | N / A | N / A | N / A | N/A                        | Early Mature, Semi Mature, Young |                         | Fair to poor         |                  | C2 (10-20)       | Mainly old garden shrubs                                                                            | <a href="#">Photo 1</a> |



### Appendix 3. Glossary of Terms & Abbreviations

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- **Compression fork/Co-dominant stem.** Can be a failure point at a fork between two branches or limbs, which, as they grow, press against each other, causing a build-up of stresses similar to the effect you would get if a wedge were hammered into the fork. Increased end-loading as the limbs grow can lead to the fork failing.
- **Cavity.** Hole in a tree resulting from decay or damage.
- **Deadwood.** Twigs or branches in the crown of the tree which have died off. This can indicate the tree's inability to transport fluid and/or nutrients to its extremities signifying that the tree is under stress or has failing systems. It can also take place naturally when a branch affects a process known as "self-pruning". This occurs when the energy needed to sustain the live branch outweighs the energy it produces.
- **Decay.** This can be minor, such as on the surface of a shallow wound, or severe, with large sections of the trees structure being decayed. It is a problem that can progress to the point where the tree collapses.
- **Epicormic growth.** This can sometimes indicate a problem within the tree's systems. Epicormic growth is produced by the tree to gain a greater ability to photosynthesize when it needs extra resources. Some trees, such as Lime, produce epicormic growth, particularly from the base, as part of their natural growth habit.
- **Lean.** A lean does not necessarily mean inherent instability but when a tree's stem loses structural integrity, it can become a hazard, especially if the weakness is on the side to which the tree is leaning.
- **Loosened bark.** This indicates a problem under the surface in either the wood or the inner layers of bark (cambium). Bark can fall away from decaying wood behind it, or can start to die off due to a range of reasons (bacterial infections etc). The bark can then no longer transport fluid or nutrients around the tree.
- **Mechanical Damage.** Damage caused by non-biological means i.e. vehicle impact or damage caused by animals trying to eat bark. Damage of this kind can penetrate into the structure and is more often found on the surface of the tree.
- **Reaction wood/growth.** Where weakness or decay within a tree occurs, the tree will grow material to compensate for it. It is often seen as 'cable' like structures with patches of uneven bark which indicate irregular growth patterns. Another form of reaction growth can be seen as 'bulges' on a trees structure. Large amounts of reaction growth indicate advanced decay or weakness within the tree structure.
- **RPA Root Protection Area.** Theoretical rooting area of a tree as defined in BS5837:2012 Trees in relation to construction.
- **Sail Area.** The area of the tree that is affected by the wind.
- **Weak unions.** The unions between the stem (trunk) and structural limbs or branches sometimes develop weakly, and as the tree ages can become unstable. This can be exacerbated when the tree is affected by other problems. Also, certain tree species are prone to developing weak unions.

## Appendix 4 Internet and Reading References

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### General

**BS3998:2010** - Tree Work - Recommendations. BSI British Standards, London.

**BS5837:2012** - Trees in Relation to Design, Demolition and Construction – Recommendations. BSI, London.

**National Joint Utilities Group (2007)**. Volume 4: NJUG Guidelines for the Planning,

**Installation and Maintenance of Utility Apparatus in Proximity to Trees** (Issue 2) – Operatives Handbook.

<https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals>

### Tree Protection

<https://ecogrid.co.uk/popular-uses/tree-root-protection/>

<http://www.ground-guards.co.uk/sectors/>

<http://www.geosyn.co.uk/product/cellweb-tree-root-protection>



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