

# BS 5837 Arboricultural Report

Impact Assessment



at

**19 Belsize Square  
South Hampstead  
London  
NW3 4HT**

**Dated**

**15<sup>th</sup> October 2021**



**CROWN**  
Tree Consultancy

Branching out through England and Wales



## Contents

<b>1.</b>	<b>Introduction</b>	<b>3</b>
1.1.	Instruction	3
1.2.	Scope and Purpose of the Report	3
1.3.	References	3
1.4.	Survey Details and Findings	3
1.5.	Author	4
<b>2.</b>	<b>Site Overview</b>	<b>5</b>
2.1.	Brief Description	5
2.2.	Coordinates	5
2.3.	Survey Extent	5
<b>3.</b>	<b>Vegetation Overview (independent of proposals)</b>	<b>6</b>
3.1.	Preliminary Management Recommendations	6
3.2.	Work Priority and Future Inspections	6
3.3.	Tree Protection Status – Site Specific	6
3.4.	Tree Protection – General Notes	7
3.5.	Species Present – Additional Information	7
<b>4.</b>	<b>Arboricultural Impact Assessment</b>	<b>9</b>
4.1.	Overview	9
4.2.	Tree Removal	9
4.3.	Mitigation Planting	10
4.4.	Impact on Tree Canopies	10
4.5.	Impact on Tree Roots	10
4.6.	Demolition Activities	11
4.7.	Hazardous Materials	11
4.8.	Cabins and Site Facilities	11
4.9.	Boundary Treatments	11
4.10.	Impact of Retained Trees on the Development	12
4.11.	Summary	12
<b>5.</b>	<b>Photographs</b>	<b>13</b>
<b>Appendix 1: BS 5837: 2012 – Guidance Notes</b>		<b>14</b>
<b>Appendix 2: Explanation of Tree Data &amp; Glossary</b>		<b>16</b>
<b>Appendix 3: Survey Methodology</b>		<b>19</b>
<b>Appendix 4: Author's Qualifications</b>		<b>20</b>
<b>Appendix 5: Further Information</b>		<b>22</b>
<b>Appendix 6: Tree Data Schedule and Site Plan(s)</b>		<b>23</b>



# 1. Introduction

## 1.1. Instruction

1.1.1. We are instructed by Sarah Lindars of Dan Pearson Studio to:

- Undertake an Arboricultural Survey at 19 Belsize Square and assess all trees potentially within influencing distance of proposed development within the site.
- Plot the trees on a Tree Constraints Plan and record the data in a Tree Data Schedule.
- Provide an overview of the site and any management recommendations.
- Determine if any of the trees are growing within a conservation area or are protected by a tree preservation order.
- Provide guidance for architects or developers to enable them to understand and design within the existing tree constraints.
- Assess the potential impact of the development proposals and provide guidance as to appropriate mitigation measures.
- Produce an Arboricultural Impact Assessment for submission to the local authority once the design has been finalised.
- Produce a Tree Protection Plan and Arboricultural Method Statement specifying how the retained trees shall be protected from inadvertent damage by demolition or construction activity.

## 1.2. Scope and Purpose of the Report

1.2.1. This report is designed to accompany a planning application for development proposals at the above site. Its purpose is to assist and inform the planning process. It is produced according to the guidance and recommendations within BS 5837: 2012 - *Trees in Relation to Design, Demolition and Construction*.

1.2.2. The accompanying Arboricultural Method Statement specifies the principles to be adopted during construction and demolition that will minimise any impacts on trees. However, specific construction activities proposed within Root Protection Areas may need to be agreed in more detail if requested by the local authority at the reserved matters stage (for an outline planning applications) or via planning conditions.

## 1.3. References

1.3.1. We have liaised with the our client to attain an adequate understanding of the project to enable us to carry out an accurate assessment of the proposals and to specify suitable tree protection measures.

## 1.4. Survey Details and Findings

1.4.1. A visual ground level inspection of all trees was undertaken on the 14<sup>th</sup> of September 2021 by Jack Dunn. No climbed inspections or specialist decay detection were undertaken. Details of how the survey was undertaken can be found in Appendix 1.

1.4.2. The tree locations shown on the accompanying plans which are reproduced in Appendix 6 have been plotted according to measurements taken on site.



PDF readers select *page-width* for detail & *page-view* for scrolling

Arboricultural Report to BS 5837: 2012 for: Dan Pearson Studio

Crown Ref: 010933

Site: 19 Belsize Square, NW3 4HT

Author: Joe Taylor

Date: 15<sup>th</sup> October 2021

---

1.4.3. The findings of the survey are presented in The Tree Data Schedule which is provided as a separate document as well as being appended to the end of this document within Appendix 6. The vegetation is further discussed in Section [3](#).

1.4.4. A definition of the Retention Categories can be found in Appendix 1. All other terms used within the Tree Data Schedule are defined and explained in Appendix 2. A more detailed description of the survey method is detailed in Appendix 3.

## 1.5. Author

1.5.1. This report was compiled by Joe Taylor - FdSc (Arboriculture), M. Arbor A. Details of the author's experience that qualify him to produce such a report are detailed in Appendix 4.



## 2. Site Overview

### 2.1. Brief Description

- 2.1.1. Number 19 Belsize Square is a semi-detached, residential property with gardens to front and rear.
- 2.1.2. The smaller front garden is largely given over to pedestrian surfacing and contains no significant vegetation.
- 2.1.3. The larger rear garden is given over to a small patio and soft landscaping. The vegetation within the rear garden is overgrown and contains one Retention Category C tree (T9), a cherry laurel (T4), a dead tree (T5) and several shrubs.
- 2.1.4. In adjacent gardens grow several trees whose roots may extend into the site.
- 2.1.5. The Tree Constraints Plan and Tree Data Schedule (see Appendix 6) should be referred to for descriptions and locations of all trees.

### 2.2. Coordinates

- 2.2.1. The site coordinates are 51°32'48.08"N 0°10'9.74"W and the altitude is approximately 58m above sea level<sup>1</sup>.

### 2.3. Survey Extent

- 2.3.1. The area indicated below<sup>2</sup> shows the extent of the site.



<sup>1</sup> To access satellite imagery and street views of the site these co-ordinates may be entered into: <http://maps.google.co.uk/>

<sup>2</sup> Image taken from Google Earth and may not be current



### 3. Vegetation Overview (independent of proposals)

This section summarises all the recommendations within the Tree Data Schedule regardless of whether trees are to be retained, felled or pruned to facilitate the proposed development. It does not specify works that may be required to facilitate the development proposals. The protection status of the trees is also reported in this section.

#### 3.1. Preliminary Management Recommendations

3.1.1. The following recommendations are made in order to maintain the trees in an acceptable condition:

3.1.2. T5 is dead and should be removed to prevent potential damage or harm due to tree or limb failure.

3.1.3. All other trees were deemed to be in an acceptable condition.

#### 3.2. Work Priority and Future Inspections

3.2.1. The table below suggests a schedule for completing the works recommended in the Tree Data Schedule based on the perceived risk:

Work Priority	Definition	Tree Number
<b>Urgent</b>	As soon as possible	None
<b>Very High</b>	Within 1 Month	None
<b>High</b>	Within 3 Months	None
<b>Moderate</b>	Within 1 year	T5
<b>Low</b>	Within 3 years	None

3.2.2. The table below suggests a schedule of future inspections based on the condition and location of each tree:

Inspection Frequency (years)	Tree Number
<b>0.5</b>	None
<b>1</b>	None
<b>1.5</b>	None
<b>3</b>	T1, T2, T3, T4, T6, T7, T8 and T9

3.2.3. The trees should be inspected sooner if there is a noticeable decline in their condition, or following extreme weather events.

#### 3.3. Tree Protection Status – Site Specific

3.3.1. On the 9<sup>th</sup> of September 2021, we were informed by Rav Curry of London Borough of Camden that:

- The site is within a conservation area.



- There are no tree preservation orders affecting trees within the site.
- There is a tree preservation order affecting a tree immediately adjacent to the site. the tree affected is T1 (our numbering system).

### 3.4. Tree Protection – General Notes

- 3.4.1. Before undertaking works to trees protected by a tree preservation order, consent needs to be obtained from the local authority which will provide application forms and advice to potential applicants. The removal of dead wood is exempt.
- 3.4.2. Where the works are proposed for reasons of safety or ill health, a report from a suitably qualified arborist will usually be required. Trees that are dead or imminently dangerous are technically exempt from protection, as are dead branches. If the tree work is not urgently necessary however, at least five working days notice of intention should be given to the local authority. In any case it would be prudent to take photographs before undertaking works without prior consent being granted. Unauthorised works to protected trees may result in a criminal prosecution and a large fine (unlimited).
- 3.4.3. Where trees are located in a conservation area (but not protected by a TPO), works are not permitted without first giving the local authority 6 weeks' notice of intention. During this time the local authority may elect to create a tree preservation order or to inform the applicant that they have no objection to the proposed works. If the local authority does not respond within 6 weeks, then the intended work may be undertaken. Note: the local authority cannot refuse consent for works to trees within a conservation area; they may only create a tree preservation order if they wish to have further control over what works are undertaken.
- 3.4.4. Where planning permission is granted and tree works have been approved as part of the planning consent, no further application is required in respect of protected trees and no further notice is required in respect of trees within a conservation area.

### 3.5. Species Present – Additional Information

- 3.5.1. The table below contains general information about the tree *species* (rather than the actual tree *specimens*) included in the survey. Its purpose is to assist readers who are unfamiliar with the characteristics of the various species.

Species	Typical Height at Maturity (m)	Typical Canopy Spread at Maturity (m)	General Notes
Ash	25	18	Large deciduous tree with a straight bole and a high open domed crown. Native to Britain and commonly found in woodlands and adjacent roadsides. Not suitable for small gardens. Easily identified by its oppositely arranged pinnate leaves and black buds. Branches are relatively brittle resulting in a fairly high incidence of small branch failure in windy conditions. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Fraxinus+excelsior">http://www.pfaf.org/user/Plant.aspx?LatinName=Fraxinus+excelsior</a> for more info.
Cherry Laurel	10	8	Large evergreen shrub, native to Asia Minor to Iran, Bulgaria and Serbia. Bright, glossy green large leaves. White flowers in erect tails in mid spring and with black 15mm cherry-like fruits (toxic if eaten in bulk). Commonly planted as a hedge though it tends to sprawl. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Prunus+laurocerasus">http://www.pfaf.org/user/Plant.aspx?LatinName=Prunus+laurocerasus</a> for more info.
Horse Chestnut	25	18	Deciduous tree native to Albania and N Greece. Naturalised throughout the UK. Iconic landscape tree. Susceptible to attack by Bleeding Canker, as well as Leaf Miner and Leaf Blotch. Should be inspected regularly if located close to high public use areas. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Aesculus+hippocastanum">http://www.pfaf.org/user/Plant.aspx?LatinName=Aesculus+hippocastanum</a> for more info.



Arboricultural Report to BS 5837: 2012 for: Dan Pearson Studio

Crown Ref: 010933

Site: 19 Belsize Square, NW3 4HT

Author: Joe Taylor

Date: 15<sup>th</sup> October 2021

Species	Typical Height at Maturity (m)	Typical Canopy Spread at Maturity (m)	General Notes
Lime	25	12	Very common street tree. Several species exist; the one most often found in woods is 'common lime' which produces a mass of suckers at the stem base, making it very cheap to propagate. Limes have non-symmetrical heart shaped leaves which are much loved by aphids (hence the sticky honeydew on cars parked beneath). Limes are tolerant of heavy pruning and are often managed as pollards. Old limes tend to support a lot of small dead branches. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Tilia+x+europaea">http://www.pfaf.org/user/Plant.aspx?LatinName=Tilia+x+europaea</a> for more info.
Plum	6	8	Small fruit tree. Many varieties available. Usually white flowering. Fruits may be green, yellow, red or dark purple. Often quite an untidy looking tree.
Sycamore	25	16	Deciduous tree native to S. Europe, widely naturalised in the UK. Often regarded as a weed species due to its invasive nature and ability to tolerate most conditions. Responds well to pruning. Not a good tree to park beneath in summer due to the sticky sap secreted by aphids. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Acer+pseudoplatanus">http://www.pfaf.org/user/Plant.aspx?LatinName=Acer+pseudoplatanus</a> for more info

3.5.2. The figures quoted regarding typical height and canopy spread should be treated as approximate. Actual heights and spreads vary according to several environmental factors such as soil conditions, climate and presence of competing vegetation. The figures quoted are not the maximum dimensions that the species may attain.



## 4. Arboricultural Impact Assessment

### 4.1. Overview

4.1.1. It is proposed to construct a new garden room and improve the existing landscaping within the rear garden, as indicated on the plans in Appendix 6. The existing layout is indicated in black, and the footprint of the proposed layout is indicated in green.

4.1.1. The table below summarises the potential impact on trees due to various activities.

Activity	Trees Potentially Affected
Tree Removal: Retention Category A	None
Tree Removal: Retention Category B	None
Tree Removal: Retention Category C	T4
Tree Removal: Retention Category U	T5
Tree Pruning	T9
RPA: Garden Room Foundations	T3
RPA: Other Foundations	None
RPA: New Hard Surface	T3 and T9
RPA: Replace Existing Hard Surface	None
RPA: Underground Services	None Anticipated
RPA: Change of Ground Levels	None
RPA: Soil Compaction	Trees adjacent the construction area (preventable by installing tree protection measures)

4.1.2. Other potentially damaging activities often associated with construction sites include demolition or the careless use of plant machinery, hazardous materials, or fires. All of the above potential impacts are considered in detail throughout this section.

4.1.3. The accompanying Arboricultural Method Statement (duplicated in Appendix 6) specifies the measures proposed to minimise all possible potential risks of damage to the retained trees.

### 4.2. Tree Removal

4.2.1. All trees to be removed are indicated on the Tree Removal Plan and are listed below:

- **Retention Category A:** It is proposed to retain all Retention Category A trees.
- **Retention Category B:** It is proposed to retain all Retention Category B trees.
- **Retention Category C:** It is proposed to remove the Retention Category C shrub, T4. This is located so close to the proposed garden room that its retention is not possible  
  
This is a 3.5m tall cherry laurel which is located within the rear garden and is not visible from public vantage points. Consequently, it is considered to have a low amenity value. Its removal shall not have a significant impact on the visual amenity of the locality, and it is not considered to be a material planning consideration.
- **Retention Category U:**  
  
It is not necessary to remove any Retention Category U trees to facilitate the proposal. However, it is proposed to remove T5 due to its poor condition.



Trees within this category should be removed regardless of development proposals. Consequently, the removal of Category U trees is not considered to be a direct impact of the development.

4.2.2. None of the trees to be removed are protected by a tree preservation order or considered worthy of special protection, or are considered to be a material planning consideration

4.2.3. Details specific to each tree can also be found in the Tree Data Schedule.

#### **4.3. Mitigation Planting**

4.3.1. The trees/shrubs to be removed are of such low amenity value that no mitigation planting is considered necessary. However, I understand that it is proposed to plant numerous new trees/shrubs as part of a post development landscaping scheme.

#### **4.4. Impact on Tree Canopies**

4.4.1. It is proposed to remove the lower branches of T9 to a height of 2m where they overhang the proposed new footpath. This shall ensure adequate clearance height so as to prevent accidental breakage. The pruning works should be undertaken sympathetically (working to BS 3998: 2010 guidelines).

4.4.2. Such a small amount of pruning shall have no impact on local visual amenity and is not considered to be a material planning consideration.

4.4.3. All other tree canopies shall be unaffected by the proposals.

#### **4.5. Impact on Tree Roots**

##### **4.5.1. Foundations:**

4.5.2. The foundations for the new garden room will extend into to the very edge of the theoretical Root Protection Area of T3. However, less than 3% of the Root Protection Area shall be affected (see the Impact Assessment Plan) so the potential impact is considered to be negligible.

4.5.3. To minimise root severance, it is proposed to excavate the foundations within the Root Protection Area of T3 using hand tools only to a depth of 0.6m. Deeper excavation may be undertaken using a mechanical excavator so long as it operates from a suitable load spreading surface or from outside all Root Protection Areas. Excavation for the foundations shall not extend more than 200mm beyond the build line in the direction of the tree. This will keep the extent of excavation towards the tree down to the minimum amount possible. Any roots growing close to the edge of the excavation should be kept intact or pruned. These measures shall ensure that the impact of such a small incursion will be minimal.

##### **4.5.4. New Surfaces:**

4.5.5. The new pedestrian surfacing will extend into to the theoretical Root Protection Area of T3 and T9. To minimise the impact on tree roots, the following mitigation is proposed:

- Excavation shall be limited to 250mm.
- Excavation shall be undertaken using hand tools only.
- If significant rooting activity is encountered, the finished surface shall be raised to accommodate them.
- Any edging structure used shall be installed without excavation below this depth.
- Any sub-base used shall not contain any fines (finely crushed aggregate material).
- Pavements shall be used and dry jointed (i.e. no mortar joints) to permit infiltration of rainwater through to the ground beneath.



#### 4.5.6. **Underground Services:**

- 4.5.7. No underground services should be installed through any Root Protection Area without consulting the project arborist and if necessary, gaining approval from the local authority.

#### 4.5.8. **Changes in Ground Levels:**

- 4.5.9. No changes of ground levels in excess of 100mm within Root Protection Areas shall be made without consulting the arborist and if necessary, gaining approval from the local authority.

#### 4.5.10. **Soil Compaction:**

- 4.5.11. The majority of tree roots lie within the upper soil horizons. This is because the availability of oxygen decreases with depth and roots need to breathe to stay alive. In addition, nutrients are more readily available in the form of organic matter close to the soil surface.
- 4.5.12. Healthy soils contain about 25% air space between solid particles. Increased loading of the soils caused by construction activity causes air to be squeezed out as the soil becomes compacted preventing roots from breathing. Even an increase in pedestrian activity may cause some soil compaction.
- 4.5.13. It is important therefore that ground compaction and soil disturbance over Root Protection Areas should be avoided during the construction phase. This may be done by installing protective fencing and ground protection measures as recommended within the accompanying Arboricultural Method Statement.



### 4.6. **Demolition Activities**

- 4.6.1. There are no structures that require demolition or significant surfaces that require removal close to trees.

### 4.7. **Hazardous Materials**

- 4.7.1. All hazardous materials (including cement and petrochemical products) will need to be controlled according to COSHH regulations in order to ensure there is no detrimental impact on tree health. Provision shall need to be made to ensure that cement and cement run-off are contained outside of all Root Protection Areas.

### 4.8. **Cabins and Site Facilities**

- 4.8.1. Consideration should be given to the location of any site welfare facilities in terms of potential impact on trees. Where it is proposed to install cabins or site facilities in Root Protection Areas, the project arborist should be consulted, and approval obtained from the local authority.

### 4.9. **Boundary Treatments**

- 4.9.1. We are not aware of any changes are proposed to the existing boundary features that might impact on trees.



#### **4.10. Impact of Retained Trees on the Development**

- 4.10.1. Adequate space has been allowed between all retained trees and the proposal. Consequently, the proposal shall not result in increased pressure to remove or prune any of the retained trees.
- 4.10.2. The garden room is not considered to be a living space so the shade cast by the trees is not considered to be relevant from a planning perspective.
- 4.10.3. The foundations and any new surfaces should be designed to accommodate all potential impacts due to future tree rooting activity. These include potential vegetation related subsidence, vegetation related heave, and lifting of surfaces / light structures due to direct root pressure.

#### **4.11. Summary**

- 4.11.1. Only two low quality, small trees are to be removed to enable the build.
- 4.11.2. Several new trees/shrubs are to be planted to mitigate against tree removal and to ensure tree cover is maintained throughout the site.
- 4.11.3. Adequate space has been allowed between the proposal and all trees such that no future pressure to overly-prune or remove trees shall occur as a consequence of the proposal.
- 4.11.4. One tree (T9) requires minimal pruning to create an adequate clearance from the proposal.
- 4.11.5. Foundations are proposed within the Root Protection Area of T3. However, the small extent of RPA affected coupled with the sympathetic foundation design shall ensure no detrimental impact.
- 4.11.6. All new hard surfacing within RPAs shall be installed sympathetically and with minimal excavation.
- 4.11.7. So long as suitable protection measures are implemented during demolition and construction stages, I see no arboricultural reasons why the proposal should not proceed.
- 4.11.8. Suitable protection measures are specified in the accompanying Arboricultural Method Statement ref CCL/10933 The Method Statement is thorough and enforceable so may be conditioned upon the granting of planning consent.



PDF readers select *page-width* for detail & *page-view* for scrolling

Arboricultural Report to BS 5837: 2012 for:

Dan Pearson Studio

Crown Ref: 010933

Site:

19 Belsize Square, NW3 4HT

Author: Joe Taylor

Date:

15<sup>th</sup> October 2021

## 5. Photographs

Photo 1.



Photo 2.



Photo 3.



Photo 4.



Photo 5.



Photo 6.





## Appendix 1: BS 5837: 2012 – Guidance Notes

This Standard prescribes the principles to be applied to achieve a satisfactory juxtaposition of trees and structures. It sets out to assist those concerned with trees in relation to design, demolition and construction to form balanced judgements.

It acknowledges the positive contribution trees may offer to a site, as well as the negative aspects of retaining inappropriate trees. It addresses the negative impacts that construction activity may have upon trees and offers mitigation strategies to minimise these impacts.

The Standard suggests a three stage approach to ensure best practice is followed when developing close to trees:

### A1.1 Stage 1: Survey Details and Notes

A ground level visual survey was undertaken. No climbed inspections or specialist decay detection were undertaken. Only trees with a stem diameter over 75mm, which lie within the site boundary or relatively close to it, were included.

Where applicable, trees with significant defects have been highlighted and appropriate remedial works have been recommended. However, this report should not be seen as a substitute for a full *Safety Survey* or *Management Plan* which are specifically designed to minimise risk and liability associated with responsibility for trees.

Wherever practicable dimensions were obtained using diameter tapes, logger's tapes, distometers and clinometers. Where obstacles prevent accurate measurement, dimensions are estimated. Trees on privately owned third party are surveyed from the best available vantage point and observations relating to the condition of these trees should be treated accordingly. All height measurements should be regarded as approximate.

Data is recorded for each tree and is presented in a Tree Data Schedule. Each tree is allocated a **Retention Category** according to its size, amenity value, condition and safe useful life expectancy. The categories are allocated independently of development proposals. Our interpretation of the Retention Categories is explained below:

#### A1.1.1 Retention Categories

**A Category:** Trees of high quality and amenity value. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

**B Category:** Trees of moderate quality and amenity value. Usually these are maturing trees or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

**C Category:** Trees of low quality or small specimens with a relatively low amenity value. These trees are not considered to be a material planning constraint and their removal will generally be seen as acceptable in order to facilitate development.

**U Category:** Trees of such low quality that their removal is recommended regardless of development proposals.

Occasionally trees are borderline and do not fall neatly into one of the categories A, B or C. In such cases we apply a superscript (+/-) such that:

**C<sup>+</sup>** Indicates borderline C/B, though Category C is deemed to be most appropriate.

**B<sup>-</sup>** Indicates borderline C/B, though Category B is deemed to be most appropriate.



The British Standard suggests that each of the A, B and C categories may be further subdivided (A1, A2, A3, B1, B2, B3 etc) such that subcategory 1 denotes mainly arboricultural values, subcategory 2 denotes mainly landscape values and subcategory 3 denotes mainly cultural values (including conservation). Multiple subcategories may be used.

Our experience suggests that these subdivisions lack clarity and can be confusing. Within this report subcategories are **not** denoted. Where appropriate, the use of phrases such as 'Part of a formal group', or 'Has a high ecological value', or 'Offers good screening to the site' are incorporated into the observation section of the Tree Data Schedule. We believe this conveys all relevant landscape and cultural information without any confusion.

**Tree Constraints Plan (TCP).** This indicates the position, crown spread, Retention Category and Root Protection Area of each tree. It is used to inform where development may proceed without causing damage to trees.

**Root Protection Area (RPA).** This is the area around each tree likely to contain the majority of roots. It should ideally remain undisturbed to avoid a detrimental impact on tree health. For single stemmed trees it is calculated according to the formula "radius of RPA" = "12 x stem diameter". Where a tree has more than one stem, the equivalent-single-stem diameter is usually recorded. This is calculated by adding the squares of the stems and then finding the square root of this total. The radius of the Root Protection Area is then calculated by multiplying the equivalent-stem-diameter by 12.

**Shade Constraints.** The previous Standard (BS 5837 2005) suggested that shade constraints should be indicated on the TCP. These are denoted as a circle-segment drawn northwest to due east with a radius equal to the height of the tree. These do not represent the actual shade pattern which varies through the seasons. Rather, they indicate the area most shaded by the tree throughout the course of the year. Ideally habitable room windows should be located outside of these shade constraints. Where we consider it appropriate, we will include shade constraints information on our Impact Assessment Plan or Proposed Layout Plan.

## A1.2 Stage 2: Arboricultural Impact Assessment

After the initial survey and the production of the Tree Constraints Plan, arborists and designers are encouraged to work together to establish a design proposal with minimal impact on the high quality trees. An assessment should be made of all possible impacts including the impact that the trees may have upon the proposal. The arborist may recommend mitigation strategies to minimise these impacts and help achieve a more harmonious juxtaposition between buildings and trees.

## A1.3 Stage 3: Arboricultural Method Statement

This type of report specifies the measures necessary to protect trees against damage from construction activity. The Method Statement should be written in a manner that it may be conditioned and enforced by the local authority upon granting of planning permission. The site manager should be familiar with all aspects of the Method Statement and should ensure that all persons working on the site are aware of those aspects which appertain to their work. This includes service installation engineers and operators of plant machinery.



## Appendix 2: Explanation of Tree Data & Glossary

This section explains the terms used in the **Tree Data Schedule** (see Section 3 and Appendix 6).

### A2.1 General Observations

<b>Numbering System:</b>	Each item of vegetation has its own unique number prefixed by a letter such that T1=Tree 1, G2=Group 2, H3=Hedge 3 and W4=Woodland 4, S5=Shrub 5.
<b>Age Categories:</b>	
<b>Young</b>	Usually less than 10 years old.
<b>Semi-Mature</b>	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
<b>Early-Mature</b>	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
<b>Mature</b>	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
<b>Veteran</b>	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
<b>Over Mature</b>	As for veteran except management is not considered worthwhile.
<b>Species:</b>	Common names and Latin names are given.
<b>Height:</b>	Measured from ground level to the top of the crown.
<b>Stem Diameter:</b>	Taken at 1.5m above ground level where possible. On multi-stemmed trees this measurement may be taken at ground level, though usually an indication of the number of stems and average diameter is given, e.g. 3 x 30cm.
<b>Crown Height:</b>	Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.
<b>Tree Diagram:</b>	This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.
<b>Crown Spread:</b>	Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.
<b>Observations:</b>	If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.
<b>Recommendations:</b>	Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.
<b>Priority Scale:</b>	Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:
<b>Urgent</b>	To be carried out as soon as possible.
<b>Very High</b>	To be carried out within 1 month.
<b>High</b>	To be carried out within 3 months.
<b>Moderate</b>	To be carried out within 1 year.
<b>Low</b>	To be carried out within 3 years.
<b>Inspection Frequency:</b>	An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.
<b>Vigour:</b>	An indication of growth rate and the tree's ability to cope with stresses:
<b>High</b>	Having above average vigour.
<b>Moderate</b>	Having average vigour.
<b>Low</b>	Having below average vigour.
<b>Very Low</b>	Tree is struggling to survive and may be dying.
<b>Physiological Condition:</b>	
<b>Good</b>	Healthy and with no symptoms of significant disease.
<b>Fair</b>	Disease present or vigour is impaired.
<b>Poor</b>	Significant disease present or vigour is extremely low.
<b>Very Poor</b>	Tree is dying.
<b>Structural Condition:</b>	
<b>Good</b>	Having no significant structural defects.
<b>Fair</b>	Some defects observed though no high priority works are required.
<b>Poor</b>	Significant defects found. Tree requires monitoring or remedial works.
<b>Very Poor</b>	Major defects which will usually require significant remedial works or tree removal.
<b>Amenity Value:</b>	
<b>Very High</b>	Exceptional specimen, observable by a large number of people.
<b>High</b>	Attractive specimen, observable by a significant number of people.
<b>Moderate</b>	One of the above factors is not applicable.
<b>Low</b>	Unattractive specimen or largely hidden from view.
<b>Life Expectancy:</b>	The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).
<b>Retention Category:</b>	These are explained in detail in Appendix 1.

### A2.2 Evaluation of Defects

Cavities, wounds, deadwood etc are all evaluated as follows:

<b>Major</b>	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
<b>Significant</b>	A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
<b>Minor</b>	A defect that is not likely to compromise the tree's structural integrity.



## General Glossary

<b>Aerobic</b>	Conditions in which oxygen is freely available, or to biomechanical processes that depend on the presence of oxygen.
<b>Anaerobic</b>	A condition marked by the absence of oxygen; Generally such areas are unsuitable for normal life and growth of plant tissues. These sites tend to be populated by bacteria capable of surviving low oxygen conditions often associated with Slime Flux.
<b>Arboriculture</b>	The culture and management of trees as groups and individuals primarily for amenity and other non-forestry purposes.
<b>Arborist</b>	A person possessing the technical competence through experience and related training to provide management of trees or other woody plants in a landscape setting. Generally involved with the development or management of trees for visual amenity or land management rather than the growth of trees for product or profit.
<b>Barrier zone</b>	A layer within an annual increment of wood which contains abnormal xylem cells, laid down by the cambium in response to wounding or other trauma.
<b>Bracket</b>	A type of fruiting body produced by various fungal species, plate like to hoof like in shape and often a one sided attachment to the wood or bark.
<b>Branch bark ridge</b>	A ridged area located at the union of a branch to a trunk or stem.
<b>Branch Collar</b>	Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigour or begins to die, the collar usually becomes more pronounced and completely encircles the branch.
<b>Brown Rot</b>	Form of decay where cellulose is degraded, while lignin is only modified.
<b>Buttress Root</b>	Roots that emerge from the base of the tree stem, normally large and well developed that rapidly reduce in diameter to create the Root Plate this offers structural support for the tree. Buttress roots divide rapidly forming the connection between the stem and the transport roots.
<b>Cabling Bracing</b>	Installing cables within the crown of a tree to prevent collapse.
<b>Cambium</b>	A thin layer of actively growing and dividing cells, located between the xylem (sapwood) and bark of a plant; the part responsible for radial growth of a tree stem or branch.
<b>Canopy</b>	The topmost layer of twigs and foliage in a woodland, tree or group of trees.
<b>Canker</b>	A localised area of dead bark and cambium on a stem or branch, caused by fungal or bacterial organisms, characterised by woundwood development on the periphery. This may be annual or perennial.
<b>Cavity</b>	An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
<b>Chlorotic</b>	Also Chlorosis. A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.
<b>Co-dominant stems/trunk</b>	Are forked branches or trunks of nearly the same size in diameter and lacking a normal branch union.
<b>Compacted soils</b>	Soils in which the air-space (oxygen space) has been reduced or eliminated, reducing water infiltration and percolation, reducing root presence and inhibiting new root development.
<b>Compartmentalisation</b>	The physiological process that creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms.
<b>Compression Wood</b>	Abnormal wood formed on the lower side of branches and curved stems, with physical properties different from normal wood.
<b>Conservation Area</b>	In Great Britain, designated areas of architectural or historical interest, in which there are special procedures for planning applications. Additionally tree works cannot generally be undertaken without prior notification (Currently 6 weeks) to the relevant local planning authority. See also Tree Preservation Orders.
<b>Core Sample</b>	A sample of wood extracted from a trunk or branch, using an increment borer tool. The resulting core can be analysed for characteristics of growth, wood strength, structure, decay, and for species identification.
<b>Crotch</b>	The union of two or more branches; the auxiliary zone between branches.
<b>Crown</b>	The upper canopy of a tree, including upper trunk, scaffold branches, secondary branches, stems and leaves.
<b>Crown lifting / raising</b>	Crown Lift The removal of the lowest branches, usually to a given height. It allows more residual light and greater clearance underneath for vehicles etc.
<b>Crown reduction</b>	The reduction of a tree's height or spread while preserving its natural shape.
<b>Crown thinning</b>	The removal of some of the density of a tree's crown, usually 5-25% allowing more light through its canopy and reducing wind resistance.
<b>Deadwood (noun)</b>	Deadwood is often present within the crown or on the stems of trees. It may be an indication of ill health, however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).
<b>Deadwood (verb)</b>	The removal of dead branches from a tree's canopy, usually of a specified size (in diameter).
<b>Decay</b>	Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
<b>Decay Detection</b>	The assessment of decay within a tree has been traditionally difficult, but recent advances have made it possible to achieve accurate representations of the internal section of a tree in both 2D and 3D, removing doubt over the condition of the tree and allowing accurate management decisions.
<b>Defoliation</b>	The losing of plants foliage.
<b>Dieback</b>	Progressive death of buds, twigs and branch tissues, on individual limbs resulting in Deadwood, or throughout the canopy, extreme cases can result in Stag Heading.
<b>Epicormic shoots</b>	Fast growing, weakly attached shoots/branches that often grow as a response to stress factors upon a tree or branch removal.
<b>Failure</b>	In connection with tree hazards, a partial or total fracture within the wood tissue or loss of cohesion between roots and soil. (In total failure affected parts will snap or tear away completely, Partial failure there is a crack or deformation, which results in an altered distribution of mechanical stress.
<b>Feeder Roots</b>	Fine fibrous Water and nutrient absorbing roots located in the outer root system.
<b>Flush-Cut</b>	In trees and shrubs, a pruning cut close to the parent stem, which removes the branch bark ridge.
<b>Foliage</b>	The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.
<b>Formative pruning</b>	The trimming of a tree to remove weaknesses and irregularities which may lead to problems. The formative pruning operation is aimed at reducing the potential for future weaknesses or problems within the tree's crown.
<b>Girdling Root</b>	In woody plants, a root that grows across the buttress, or across other roots, eventually causing constriction of the radial growth.



<b>Growth Increment</b>	The incremental growth added as new annual ring develops each season over existing wood. This is seen as (growth) rings in cross-sections of wood.
<b>Hazard beam</b>	An upwardly curved branch in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).
<b>Heartwood</b>	Inner non functioning tissues that provide structural support to trunk.
<b>Heave</b>	In relation to shrinkable clay soils, expansion due to rewetting of a volume of soil previously subjected to the removal or water by plant / trees following felling or root severance. Also in relation to root growth, the lifting of pavements and other structures by radial expansion. Also in relation to tree stability, the lifting of one side of a wind rocked root plate.
<b>Included Bark</b>	Bark that becomes embedded in a crotch between branch and trunk or between co-dominant stems, usually found in narrow or tight crotches, and causes a weak structure.
<b>Increment Borer</b>	A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments.
<b>Limb</b>	A large lateral branch growing from the main trunk or from another larger branch.
<b>Lopping</b>	In trees, a general term that related to the removal of branches from a tree.
<b>Mycelium</b>	A mass of growing filaments (hyphae) formed by fungi.
<b>Mycorrhizae</b>	The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.
<b>Occluding tissue</b>	The general term of wood, cambium and bark that develop around the site of a wound on a woody plant
<b>Pathogen</b>	A microorganism that causes diseases within another organism.
<b>Phloem</b>	The principle conductive tissue that the products of Photosynthesis are transported around the plant
<b>Pollard</b>	A term for a pollarded tree.
<b>Pollard head</b>	The swollen section of branch / stem that forms behind the pollarding cut.
<b>Pollarding</b>	The complete or partial removal of the crown of a young tree so as to encourage the development of numerous branches either for amenity or historically as fodder, repeated management is required cyclically to maintain the feature
<b>Reaction Wood</b>	Wood with distinctive anatomical characteristics, formed in parts of leaning or crooked stems and in branches to provide additional strength / support. In hardwoods, tension wood usually forms. In conifers, compression wood is usually found.
<b>Reaction Zone</b>	A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.
<b>Remedial pruning</b>	The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.
<b>Resistograph</b>	Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.
<b>Root Barriers</b>	Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.
<b>Root Collar</b>	The basal area of the tree; transition zone from trunk to root. Also sometimes called trunk flare.
<b>Root Plate</b>	The primary support area for the tree; an area of the root system close to the base that structurally anchors the tree to the soil.
<b>Root Zone</b>	The area and volume of soil around the tree in which roots are expected. May extend to three or more times the branch spread of the tree, or several times the height of the tree.
<b>Sail Area</b>	That area or the tree subjected to wind load.
<b>Sapwood</b>	Xylem wood tissue, usually light in colour, representing the outer growth rings of the wood. Usually living, reactive wood tissue, in a healthy tree. See heartwood
<b>Scaffold limbs / scaffold Branches</b>	The branches that from the main network framework of the crown of a tree.
<b>Soft Rot</b>	A kind of wood decay, were a fungi degrades cellulose within the cell wall, without causing overall degradation.
<b>Soil Compaction</b>	The compression of soil, causing a reduction of pore space and an increase in the density of the soil. Air is squeezed out and nutrients become locked. Tree roots cannot grow in compacted soil.
<b>Sonic Decay Detection</b>	Non invasive method whereby sound waves are passed through the tree and the speed is measured. Slow speeds indicate decay and a tomography picture representing the inner stem is produced.
<b>Stag Heading</b>	In a tree, a state of dieback were dead branches protrude beyond the current living crown.
<b>Stump Grinding</b>	The removal of a tree stump using a specialist grinding machine.
<b>Subsidence</b>	In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.
<b>Suppressed</b>	Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.
<b>Target</b>	Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.
<b>Target Pruning</b>	The pruning of a branch were the wound affects only branch material, often result in a target shaped wound.
<b>Tension Wood</b>	Reaction wood typically formed on the upper side of limbs or curved stems; characterized by lack of cell wall lignifications (higher ratios of cellulose to lignin).
<b>Tight Union / Tight Crotch</b>	Also, narrow crotch. A crotch with a narrow angle between branches, often having included bark.
<b>Tomography</b>	The comparison of sound or stress waves through the tree allows the creation of a 2D or 3D representation of the internal structure of a stem or branch section and highlights areas of damage. Virtually non-injurious.
<b>Topping</b>	Cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay and structural weakness within the crown.
<b>Tree Preservation Order</b>	In Great Britain, an order made by the local planning authority, where consent must be gained before undertaking all but exempt works to a tree.
<b>Veteran Tree</b>	Veteran trees are often found in large parks or estates and commonly affected by extensive decay or have been subject to extensive works. These trees are retained for historical importance and often pose greater risk than normal, which is generally justified. They need careful management and often propping or bracing to support them, some require fencing to limit access.
<b>Vigour</b>	Active, healthy growth of plants: ability to respond to stress factors.
<b>Visual Tree Assessment (VTA)</b>	An assessment of the mechanical condition of trees based upon their 'body language'. Trees are dynamic and respond to faults / decay / environmental factors in various ways, these responses can be indicative of structural integrity.
<b>Wetwood</b>	An infection caused by bacteria living inside the plant tissues. The bacteria ferment the plant fluids, resulting in death of nearby cells, and often causing exudations of fluid from the bark, often referred to as a Slime Flux.
<b>White Rot</b>	A kind if wood decay were a fungi attacks the lignin within the wood matrix
<b>Witches Broom</b>	A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.
<b>Wood</b>	Secondary Xylem; the main structural support and water conducting tissue of trees and shrubs.
<b>Wound Wood</b>	Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound
<b>Xylem</b>	Plant tissues with special function of translocation of water and dissolved nutrients.



## Appendix 3: Survey Methodology

Ground level visual surveys are carried out using the *Visual Tree Assessment* technique described by Mattheck and Broeler (1994) and endorsed by the Arboricultural Association (LANTRA Professional Tree Inspection course, 2007).

Structural condition is assessed by inspecting the stem and scaffold branches from all angles looking for weak branch junctions or symptoms of decay. Particular attention is paid to the stem-base. Cavities are explored using a metal probe in order to assess the extent of any decay. If this is not possible further inspection is recommended in the form of a climbed inspection or using specialist decay detection equipment.

The physiological condition is assessed by inspecting the stem, branches and foliage for symptoms of disease. The overall vigour of the tree is also taken into account.

Where significant defects are observed, recommendations are made according to a scale of priority in order to reduce the likelihood of structural failure. The position of the tree and its potential targets are taken into account.

Measurements are obtained using a diameter tape, clinometer, distometer and loggers tape. Where this is not practical measurements are estimated.

Some trees are surveyed as groups, though this is usually avoided close to areas likely to be developed.

Finally, a *Retention Category* is allocated as described in Appendix 1.1.1.



## Appendix 4: Author's Qualifications

### **Qualifications & Experience of Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.**

#### **Early Career**

Before and whilst attending college and university (1983 – 1990) Ivan worked as a gardener and also within the building industry where he received training in a broad range of building skills. In 1989 Ivan obtained a BSc (Hons) in psychology at Leeds University followed by a P.G.C.E at The University of Wales in 1990. After one year of teaching he returned to the construction activity and worked on new builds, refurbishments and groundworks until 1995.

#### **Arboriculture**

In 1996 Ivan obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then received further arboricultural consultancy training with Peter Wynn Associates for one year before establishing a tree surgery and landscaping business in 1998.

In 2005 Ivan commenced full time employment with JCA Ltd, an Arboricultural Association registered consultancy where he soon adopted a senior role responsible for five consultants. During this time he obtained a FDSc (Arboriculture) at the University of Lancashire, which he passed with distinction.

Since 2013, Ivan has been the Director and Principal Consultant of Crown Consultants Ltd which provides Arboricultural Reports for the purposes of Development, Safety, Management, Mortgage, Subsidence, Mitigation and Litigation. In 2015, he acted as tree officer for Barnsley Council and has since provided consultancy services to other local authorities.

He has obtained the LANTRA *Professional Tree Inspector* Qualification promoted by the Arboricultural Association and recognised as appropriate for all levels of tree inspection.

He is a long-standing member of the Consulting Arborist Society and has obtained CAS accreditations for Tree Inspection, Planning, Mortgage Reports (Subsidence Risk Assessment) and for his expert witness work.

At the time of writing, he has written approximately thirty CPR compliant reports (civil and criminal) covering a range of subjects including Subsidence Damage, Personal Injury, Direct Root Damage, Professional Negligence, TPO Breaches.

He has given written and oral evidence.

Ivan is a long-standing professional member of the Arboricultural Association and the International Society of Arboriculture.

He is a licensed Quantified Tree Risk Assessment user.

Ivan has undertaken Bond Solon expert witness training and has obtained the University of Cardiff Expert Witness certificate.

Between 2008 and 2017 he was registered as a Sweet and Maxwell Checked Expert Witness.

### **Qualifications & Experience of Emma Hoyle FDSc (Arboriculture), ED (Forestry & Arboriculture), M. Arbor. A.**

Emma is a qualified Arboricultural Consultant educated to Level 5 in Arboriculture at Askham Bryan College, is a professional member of the Arboricultural Association and is a LANTRA accredited *Professional Tree Inspector*. She has worked for Crown Consultants since 2015 and has since written numerous reports relating to all aspects of arboriculture including; planning and development, vegetation related subsidence, tree preservation orders and tree risk assessment. Emma regularly attends seminars and events in order to keep abreast with current knowledge and best practise in Arboriculture.

Prior to becoming an arboricultural consultant, Emma worked for two reputable tree surgery firms from 2008 and became an NPTC Qualified tree surgeon after completing a Level 3 Extended Diploma in Forestry and Arboriculture at Askham Bryan College. Emma also has experience in other areas of arboriculture such as forest clearance, tree planting, tree maintenance and landscaping.

### **Qualifications & Experience of Joe Taylor - MArborA, FdSc (Arboriculture)**

Joe began his career in Arboriculture as a tree surgeon/climber. During his time as a tree surgeon, Joe has achieved City & Guilds NPTC qualifications in Chainsaw Maintenance and Cross Cutting, Tree



---

### Climbing and Rescue, Safe Use of Manually Fed Wood-chipper and Supporting Colleagues Undertaking Tree Related Operations.

Joe obtained a Foundation Degree in Arboriculture at Askham Bryan College in 2015 which he passed with merit. Joe is a professional member of the Arboricultural Association, the International Society of Arboriculture and the Royal Forestry Society and regularly attends industry related seminars in order to keep abreast of industry best practice.

Studying at Askham Bryan College reinforced Joe's passion for trees and drove his enthusiasm to learn more. Learning how trees interact with their surrounding environment and their importance within our urban and rural landscapes highlighted an interest in pursuing a career in consultancy.

Since working for Crown Consultants Joe has undertaken numerous surveys and produced numerous reports for the purpose of planning (BS 5837), tree condition surveys, subsidence risk assessments, root surveys and decay detection investigations.

### **Qualifications & Experience of Sarah Alway - TechArborA, FdSc (Arboriculture).**

Sarah recently obtained an FdSc in Arboriculture and Tree Management at the University of Central Lancashire which she passed with distinction. She is a member of the Arboricultural Association and regularly attends seminars and events to keep abreast developments in industry knowledge and current best practise in Arboriculture.

Sarah has been working closely alongside the principal consultant and managing director of Crown Consultants since the company was established in 2008. During that time, she has gained experience in all aspects of the business such as reporting, CAD, administration, accounting, and business management. Additionally, she has assisted consultants with numerous reports relating to all aspects of arboriculture including BS:5837 planning and development, vegetation related subsidence, tree preservation orders and tree risk assessment. She has also assisted with tree surveys for several years and since qualifying has been undertaking her own surveys.

In addition to working for Crown Tree Consultants Ltd producing reports, Sarah also likes to expand her knowledge of the wider Arboricultural industry by training in other areas of tree services and management. She has recently completed a training programme in tree-planting and volunteer management, including education in tree planting and natural dam building to help mitigate against the risks of heavy flooding (Natural Flood Management). Sarah also regularly volunteers with two local climate action groups who plant trees and build leaky dams.

As Sarah's career develops, she intends on focusing her attention on sustainable innovation in arboriculture and how green urban spaces could pave the way for the forests of the future.



PDF readers select page-width for detail & page-view for scrolling

Arboricultural Report to BS 5837: 2012 for: Dan Pearson Studio

Crown Ref: 010933

Site: 19 Belsize Square, NW3 4HT

Author: Joe Taylor

Date: 15<sup>th</sup> October 2021

## Appendix 5: Further Information

### Building Near Trees – General

National Joint Utilities Group publication # 10 (1995), *Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees*. Downloadable at [www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf](http://www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf)

NHBC Standards Chapter 4.2., *Trees and Buildings*.

Horticulture LINK project 212. (University of Cambridge, 2004), *Controlling Water Use of Trees to Alleviate Subsidence Risk*.

### Tree Planting and aftercare

See [www.trees.org.uk/leaflets.php#](http://www.trees.org.uk/leaflets.php#) for downloadable leaflets on selecting a garden tree, planting, aftercare and veteran tree management.

### British Standards

BS 5837: 2012. Trees in Relation to Design, Demolition and Construction – Recommendations.

Bs 3998: 2010. Recommendations for Tree Work.

BS 3936: 1992. Nursery Stock. Part 1: Specification for Trees and Shrubs.

BS 3936: 1992. Nursery Stock. Part 10: Specification for Groundcover Plants.

BS 4043: 1989. Transplanting Root-balled Trees.

BS 8004: 1986. Foundations.

BS 8103: 1995. Structural design of Low-Rise Buildings.

BS 8206: 1992. Lighting for Buildings.

BS 8545:2014. Trees: From nursery to independence in the landscape – Recommendations

BS 3882: 2007. Topsoil.

BS 4428: 1989. General Landscaping Operations (excluding hard surfaces).

### Permission to do Works to Protected Trees / Tree Law

Forestry Commission (Edinburgh, 2003), *Tree Felling – Getting Permission*. Country Services Division - Forestry Commission. Downloadable at [www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/\\$FILE/wgsfell.pdf](http://www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/$FILE/wgsfell.pdf)

Transport and the Regions (Department of the Environment, 2000), *Tree Preservation Orders, A Guide to the Law and Good Practice*. Downloadable at [www.communities.gov.uk/publications/planningandbuilding/tposguide](http://www.communities.gov.uk/publications/planningandbuilding/tposguide)

C. Mynors, *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, London, 2002)

Communities and Local Government website with numerous downloadable documents, from:

<http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

### Lighting Levels

P.J. Littlefair, B.R.E. 209: *Site layout planning for daylight and sunlight A guide to good practice*. B.R.E. Bookshop, London.

British Standards Institution. Code of practice for day lighting. *British Standard BS 8206: Part 2* (1992).

Chartered Institution of Building Services Engineers. *Applications manual: Window Design* (London, 1987).

NBA Tectonics. A study of passive solar housing estate layout. *ETSU Report S-1126*. Harwell, Energy Technology Support Unit (1988).

I.P. Duncan; D. Hawkes, Passive solar design in non-domestic buildings. *ETSU Report S-1110*. Harwell, Energy Technology.

P. J. Littlefair, Measuring Daylight, *BRE Information Paper 23/93 f3.50*. (Advises on measuring daylight under the real sky or an artificial sky, allowing for the changing nature of sky light).

### High Hedges

Communities and Local Government website with numerous downloadable documents, from:

<http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

### Tree Specific Websites

[www.crowntrees.co.uk](http://www.crowntrees.co.uk)

Crown Consultants site containing useful information

[www.trees.org.uk](http://www.trees.org.uk)

Arboricultural Association

[www.rfs.co.uk](http://www.rfs.co.uk)

Royal Forestry Society of England, Wales and N. Ireland

[www.treehelp.info](http://www.treehelp.info)

The Tree Advice Trust

[www.woodland-trust.org.uk](http://www.woodland-trust.org.uk)

The Woodland Trust

[www.treecouncil.org.uk](http://www.treecouncil.org.uk)

The Tree Council



PDF readers select *page-width* for detail & *page-view* for scrolling

Arboricultural Report to BS 5837: 2012 for: Dan Pearson Studio

Crown Ref: 010933

Site: 19 Belsize Square, NW3 4HT




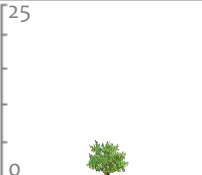
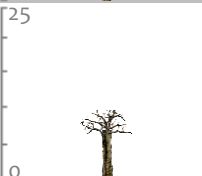
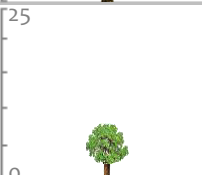

Author: Joe Taylor



Date: 15<sup>th</sup> October 2021

---

## Appendix 6: Tree Data Schedule and Site Plan(s)

The Tree Data Schedule and any drawings accompanying this report follow this page.  
They are also provided as separate documents for ease of printing and screen viewing.

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N W E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour	Amenity Value
										Physiological Condition	Life Expectancy (yrs)
								Priority	Inspect Freq (yrs)	Structural Condition	Retention Category
T1	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	15	1.5	70	6 6 6		Position: Situated on third party land. Form: Multi-stemmed at 4m with a balanced crown. History: Previously reduced. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Good  Good	High  40+  <b>A</b>
								n/a	3		
T2	Early-Mature <b>Sycamore</b>  Acer pseudoplatanus.	14	4	40	6 6 6		Position: Situated on third party land. Form: Multi-stemmed at 3m with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Good  Fair	Moderate  40+  <b>B</b>
								n/a	3		
T3	Early-Mature <b>Lime</b>  Tilia sp.	14	4	60	4 5 4		Position: Situated on third party land. Form: Twin-stemmed at 0.5m with a slightly unbalanced crown. History: One stem topped at 5m. Defects: <b>Minor deadwood to lower crown.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Good  Fair	Low  40+  <b>C</b>
								n/a	3		
T4	Young <b>Cherry Laurel</b>  Prunus laurocerasus.	3.5	0.5	8	2 1 1		Position: Situated within the rear garden. Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate  Good  Good	Low  40+  <b>C</b>
								n/a	3		
T5	Semi-Mature <b>Dead Tree</b>	9	7	32	0.5 2 3		Position: Situated within the rear garden. Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>Dead tree.</b> Other: Vegetation prevented detailed inspection.	Remove.		Dead  <b>Dead</b>	Dead  <b>Dead</b>  <b>U</b>
								Moderate	N/A		
T6	Young <b>Sycamore</b>  Acer pseudoplatanus.	7	3	13	1 2.5 1		Position: Situated on third party land. Form: Single stemmed with a slight lean and an unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Poor specimen. Limited inspection, dimensions estimated.	No action required.		Moderate  Fair  Fair	Low  40+  <b>C</b>
								n/a	3		
T7	Early-Mature <b>Sycamore</b>  Acer pseudoplatanus.	12	4	45	4 4 4		Position: Situated on third party land. Form: Multi-stemmed at 3.5m with a balanced crown. History: Previously topped at 3.5m. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Good  Fair	Low  40+  <b>C</b>
								n/a	3		

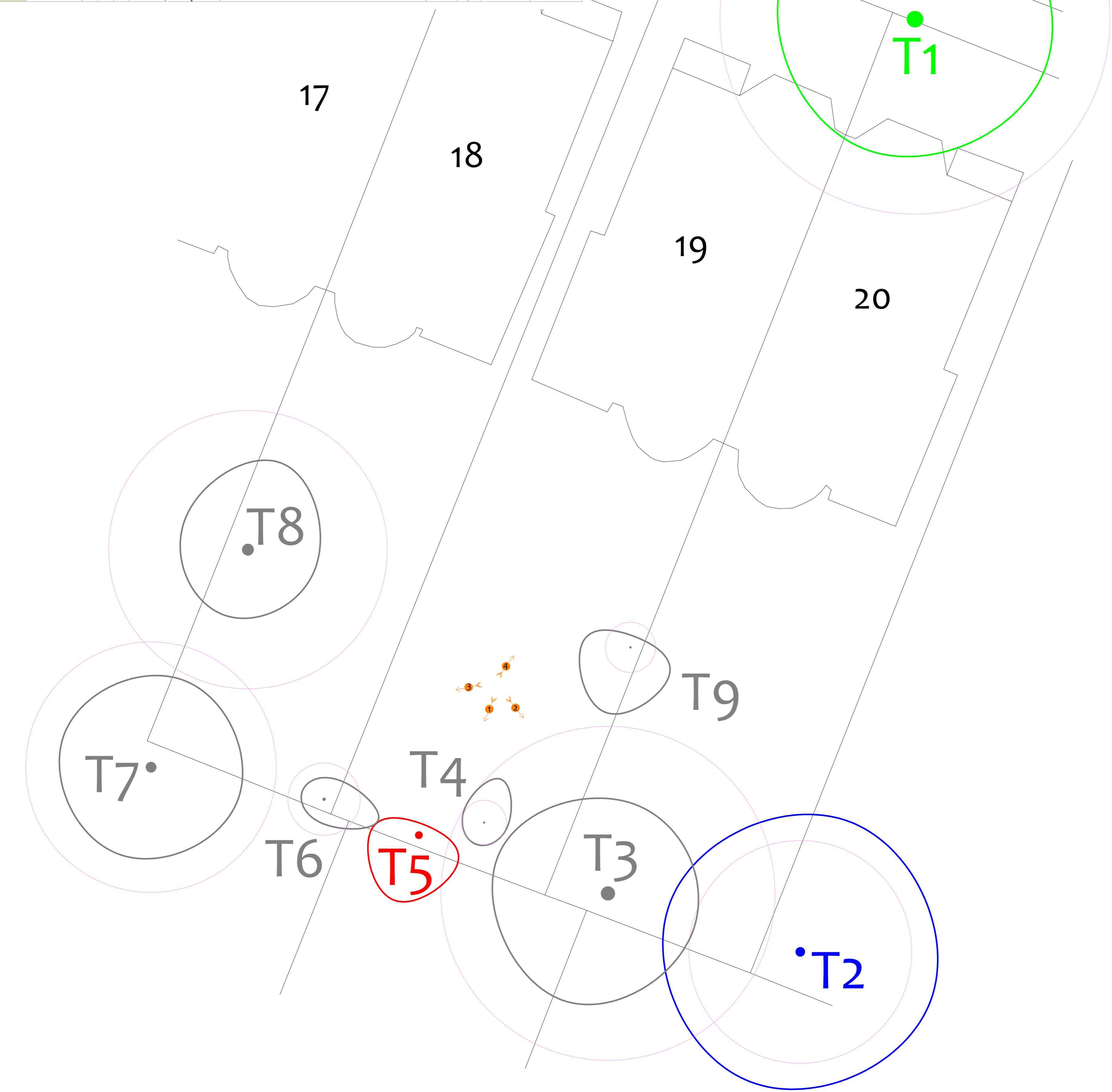
Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N W      E S	Scaled Tree Diagram (m) <div><div></div><div>909</div></div>	Notes	Recommendations (Independent of any development proposals)		Vigour	Amenity Value
										Physiological Condition	Life Expectancy (yrs)
								Priority	Inspect Freq (yrs)	Structural Condition	Retention Category
T8	Early-Mature  Ash  Fraxinus excelsior.	12	4	50	3      4 3      3 3	<div><div></div><div>2500</div></div> 	Position: Situated on third party land. Form: Multi-stemmed at 6m with a slightly unbalanced crown. History: Previously reduced heavily. Defects: <b>No significant defects observed.</b> Other: Potential for Ash Die Back. Limited inspection, dimensions estimated.	No action required.		Moderate  Good  Fair	Low  40+  C
								n/a	3		
T9	Young  Plum  Prunus sp.	4	0.5	9	2      0.5 2      2 3	<div><div></div><div>2500</div></div> 	Position: Adjacent eastern boundary. Form: Multi-stemmed at ground level with an unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate  Good  Good	Low  40+  C
								n/a	3		

Tree Data Schedule

Reference C-Crown H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m)	S	N	W	E	Scaled Tree Diagram (m)	Notes	Recommendations		Vigour	Annuity Value	
												Priority	Inspect (Free Tree)		Physiological Condition	Life Expectancy (yrs)
T1	Mature Horse Chestnut <i>Aesculus hippocastanum</i>	15	1.5	70	6	6	6	6	6		Position: Situated on third party land. Form: Multi-stemmed at 4m with a balanced crown. History: Previously reduced. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	High	40+
												n/a	3	Good	Good	
T2	Early-Mature Sycamore <i>Acer pseudoplatanus</i>	14	4	40	6	6	6	6	6		Position: Situated on third party land. Form: Multi-stemmed at 3m with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	Moderate	40+
												n/a	3	Good	Fair	
T3	Early-Mature Lime <i>Tilia sp.</i>	14	4	60	5	4	5	4	4		Position: Situated on third party land. Form: Twin-stemmed at 0.5m with a slightly unbalanced crown. History: One stem topped at 5m. Defects: <b>Minor deadwood to lower crown.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	Low	40+
												n/a	3	Good	Fair	
T4	Young Cherry Laurel <i>Prunus laurocerasus</i>	3.5	0.5	8	1	1	1	1	1		Position: Situated within the rear garden. Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Low	40+
												n/a	3	Good	Good	
T5	Semi-Mature Dead Tree	9	7	32	2	3	2	3	2		Position: Situated within the rear garden. Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>Dead tree.</b> Other: Vegetation prevented detailed inspection.	Remove.		Dead	Dead	Dead
												Moderate	N/A	Dead	Dead	
T6	Young Sycamore <i>Acer pseudoplatanus</i>	7	3	13	1	2.5	1	1	1		Position: Situated on third party land. Form: Single stemmed with a slight lean and an unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Poor specimen. Limited inspection, dimensions estimated.	No action required.		Moderate	Low	40+
												n/a	3	Fair	Fair	
T7	Early-Mature Sycamore <i>Acer pseudoplatanus</i>	12	4	45	4	4	4	4	4		Position: Situated on third party land. Form: Multi-stemmed at 3.5m with a balanced crown. History: Previously topped at 3.5m. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	Low	40+
												n/a	3	Good	Fair	
T8	Early-Mature Ash <i>Fraxinus excelsior</i>	12	4	50	3	3	3	3	3		Position: Situated on third party land. Form: Multi-stemmed at 6m with a slightly unbalanced crown. History: Previously reduced heavily. Defects: <b>No significant defects observed.</b> Other: Potential for Ash Die Back. Limited inspection, dimensions estimated.	No action required.		Moderate	Low	40+
												n/a	3	Good	Fair	
T9	Young Plum <i>Prunus sp.</i>	4	0.5	9	2	3	2	3	2		Position: Adjacent eastern boundary. Form: Multi-stemmed at ground level with an unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Low	40+
												n/a	3	Good	Good	



Tree Constraints Plan



Drawing No:	CCL 10933 / TCP	Rev: 1
Title:	Tree Constraints Plan (Existing Layout)	
Site:	19 Belsize Square NW3 4HT	
Scale:	0 1 2 3 4 5 1:100	Paper Size: A1



Tree Retention Categories	
	Category A tree
	Category B tree
	Category C tree
	Category U tree




Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.

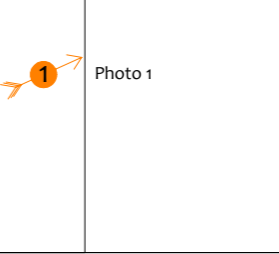
Trees of moderate quality with a life expectancy of 20+ years. Usually maturing trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees.

Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.

Trees unsuitable for retention due to their very poor conditions.

Tree Constraints Plan  
Existing Layout

	BS 5837 Root Protection Area (radius = 12xstem diameter)
	Root Protection Area needing amendment due to site conditions, e.g. presence of existing road or building.
	Root Protection Area having been amended to account for site conditions
<b>T1</b> = Tree No 1 <b>G2</b> = Group No 2 <b>H3</b> = Hedge No 3	



MN = Measured North:

Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Root Protection Area	
			Radius (m)	Area (sq. m)
T1	Horse Chestnut	15	8.4	222
T2	Sycamore	14	4.8	72
T3	Lime	14	7.2	163
T4	Cherry Laurel	3.5	1.0	3
T5	Dead Tree	9	3.8	46
T6	Sycamore	7	1.6	8
T7	Sycamore	12	5.4	92
T8	Ash	12	6.0	113
T9	Plum	4	1.1	4

Excerpts from the  
Arboricultural  
Impact Assessment

Overview

It is proposed to construct a new garden room and improve the existing landscaping within the rear garden, as indicated on the plans in Appendix 6. The existing layout is indicated in black, and the footprint of the proposed layout is indicated in green.

The table below summarises the potential impact on trees due to various activities.

Activity	Trees Potentially Affected
Tree Removal: Retention Category A	None
Tree Removal: Retention Category B	None
Tree Removal: Retention Category C	T4
Tree Removal: Retention Category U	T5
Tree Pruning	T9
RPA: Garden Room Foundations	T3
RPA: Other Foundations	None
RPA: New Hard Surface	T3 and T9
RPA: Replace Existing Hard Surface	None
RPA: Underground Services	None Anticipated
RPA: Change of Ground Levels	None
RPA: Soil Compaction	Trees adjacent the construction area (preventable by installing tree protection measures)

Other potentially damaging activities often associated with construction sites include demolition or the careless use of plant machinery, hazardous materials, or fires. All of the above potential impacts are considered in detail throughout this section.

The accompanying Arboricultural Method Statement (duplicated in Appendix 6) specifies the measures proposed to minimise all possible potential risks of damage to the retained trees.

Tree Removal

All trees to be removed are indicated on the Tree Removal Plan and are listed below:

- Retention Category A:** It is proposed to retain all Retention Category A trees.
- Retention Category B:** It is proposed to retain all Retention Category B trees.
- Retention Category C:** It is proposed to remove the Retention Category C shrub, T4. This is located so close to the proposed garden room that its retention is not possible.

This is a 3.5m tall cherry laurel which is located within the rear garden and is not visible from public vantage points. Consequently, it is considered to have a low amenity value. Its removal shall not have a significant impact on the visual amenity of the locality, and it is not considered to be a material planning consideration.

- Retention Category U:**

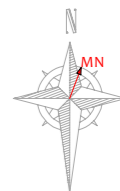
It is not necessary to remove any Retention Category U trees to facilitate the proposal. However, it is proposed to remove T5 due to its poor condition.

Trees within this category should be removed regardless of development proposals. Consequently, the removal of Category U trees is not considered to be a direct impact of the development.

None of the trees to be removed are protected by a tree preservation order or considered worthy of special protection, or are considered to be a material planning consideration.

Mitigation Planting

The trees/shrubs to be removed are of such low amenity value that no mitigation planting is considered necessary. However, I understand that it is proposed to plant numerous new trees/shrubs as part of a post development landscaping scheme.



Impact Assessment Plan  
(Existing Layout with Proposals Overlaid)

Proposed Layout (Pale Green)

It is proposed to remove the lower branches of T9 to a height of 2m where they overhang the proposed new footpath. This shall ensure adequate clearance height so as to prevent accidental breakage. Such a small amount of pruning shall have no impact on local visual amenity and is not considered to be a material planning consideration.

The new pedestrian surfacing will extend into to the theoretical Root Protection Area of T3 and T9. To minimise the impact on tree roots, the following mitigation is proposed:

- Excavation shall be limited to 250mm.
- Excavation shall be undertaken using hand tools only.
- If significant rooting activity is encountered, the finished surface shall be raised to accommodate them.
- Any edging structure used shall be installed without excavation below this depth.
- Any sub-base used shall not contain any fines (finely crushed aggregate material).
- Pavements shall be used and dry jointed (i.e. no mortar joints) to permit infiltration of rainwater through to the ground beneath.

The foundations for the new garden room will extend into to the very edge of the theoretical Root Protection Area of T3. However, less than 3% of the Root Protection Area shall be affected (see the Impact Assessment Plan) so the potential impact is considered to be negligible.

To minimise root severance, it is proposed to excavate the foundations within the Root Protection Area of T3 using hand tools only to a depth of 0.6m. Deeper excavation may be undertaken using a mechanical excavator so long as it operates from a suitable load spreading surface or from outside all Root Protection Areas. Excavation for the foundations shall not extend more than 200mm beyond the build line in the direction of the tree. This will keep the extent of excavation towards the tree down to the minimum amount possible. Any roots growing close to the edge of the excavation should be kept intact or pruned. These measures shall ensure that the impact of such a small incursion will be minimal.

Drawing No:	CCL 10933 / IAP Rev: 1
Title:	Impact Assessment Plan (Existing Layout with Proposals Overlaid)
Site:	19 Belize Square NW3 4HT
Scale:	0 1:100 5 Paper Size: A1



Tree Retention Categories
Category A tree
Category B tree
Category C tree
Category U tree

Green circle with dot	Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.
Blue circle with dot	Trees of moderate quality with a life expectancy of 20+ years. Usually maturing trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees.
Red circle with dot	Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.
Red circle with X	Trees unsuitable for retention due to their very poor condition.

Impact Assessment Plan  
Existing Layout with Proposals Overlaid

BS 5837 Root Protection Area (radius = 12xstem diameter)
Root Protection Area needing amendment due to site conditions, e.g. presence of existing road or building.
Root Protection Area having been amended to account for for site conditions
T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3

X	Tree to be removed to facilitate the proposal
X	Tree to be removed due to its low quality
Scissors icon	Proposed pruning

MN = Measured North:  
Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Root Protection Area		
			Radius (m)	m <sup>2</sup>	Square (m)
T1	Horse Chestnut	15	8.4	222	14.9
T2	Sycamore	14	4.8	72	8.5
T3	Lime	14	7.2	163	12.8
T4	Cherry Laurel	3.5	1.0	3	1.7
T5	Dead Tree	9	3.8	46	6.8
T6	Sycamore	7	1.6	8	2.8
T7	Sycamore	12	5.4	92	9.6
T8	Ash	12	6.0	113	10.6
T9	Plum	4	1.1	4	1.9

