

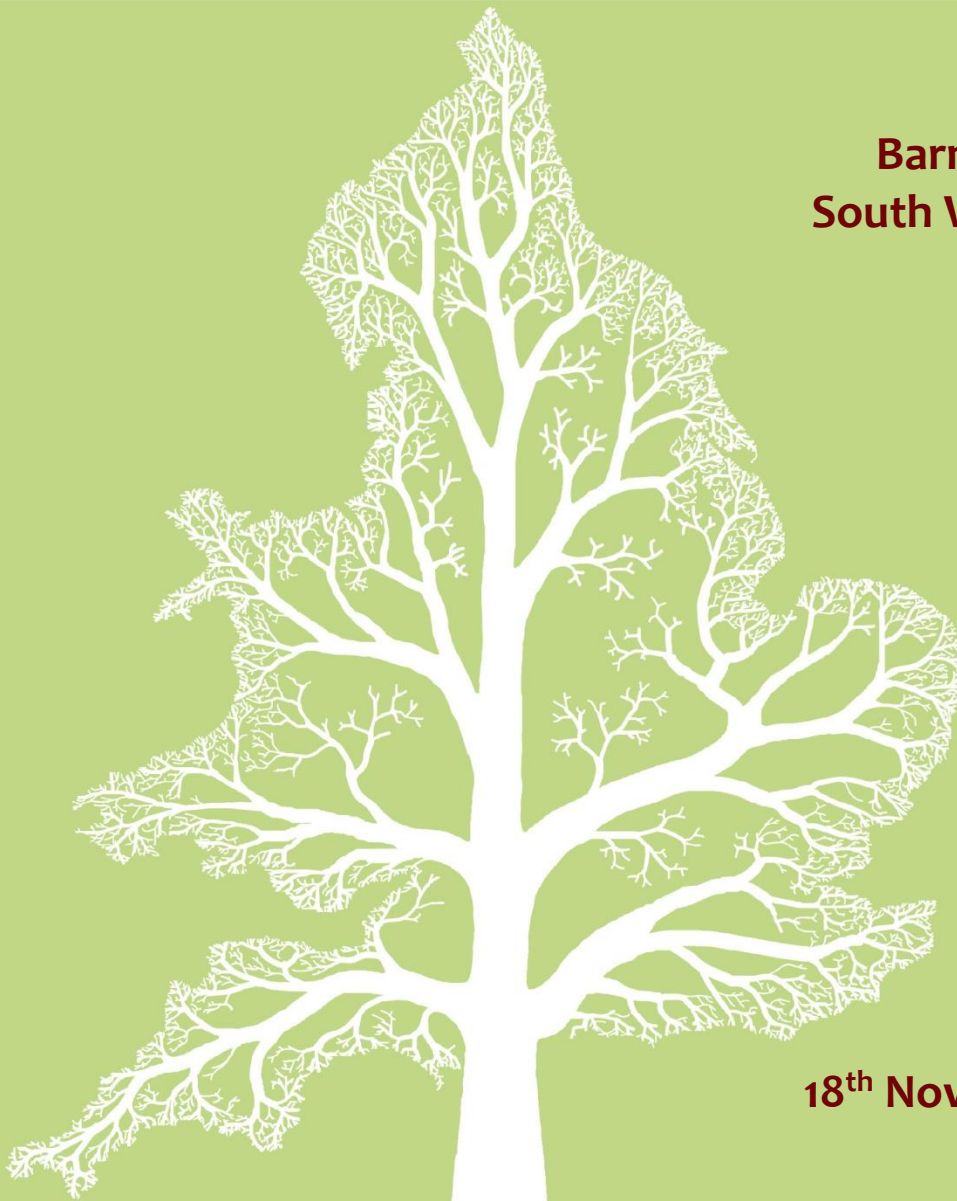
# BS 5837 Arboricultural Report

Impact Assessment & Method Statement



at

**Barnes Hospital  
South Worple Way  
Barnes  
SW14 8SU**



**Dated**

**18<sup>th</sup> November 2021**



**CROWN**  
Tree Consultancy

Branching out through England and Wales

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# 1. Introduction

## 1.1. Instruction

1.1.1. We are instructed by Star Land Realty UK Ltd to:

- Undertake an Arboricultural Survey at Barnes Hospital 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 our client and studied topographical surveys and projected ground levels 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 29<sup>th</sup> March 2021 by Ivan Button. 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.

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 Emma Hoyle FDS (Arboriculture), ED (Forestry & Arboriculture), M. Arbor. A. Details of the author's experience that qualify her to produce such a report are detailed in Appendix 4.

## 2. Site Overview

### 2.1. Brief Description

- 2.1.1. Barnes Hospital (the site) is a rectangular plot of land largely occupied by hard standing and derelict buildings.
- 2.1.2. Along the front boundary of the site which runs parallel with South Worple Way, grow three Retention Category B trees (T4, T7 and T8,) one Retention Category A tree (T6) and one Retention Category C tree (T5). Two Retention Category B Poplars and a Retention Category C Holly (T3) grow close to the north-east corner of the site situated between two buildings.
- 2.1.3. Along the southern boundary of the site grow six Retention Category B trees (T18, T19, T20, T23, T25 and T26) and four Retention Category C trees (T17, T21, T22 and T24). Other small Retention Category C trees grow within the site (T12, T27 and T28).
- 2.1.4. Adjacent the western boundary, located within Mortlake Cemetery, grows one Retention Category A tree (T11), five Retention Category B trees (T9, T10, T13, T15 and T16) and one Retention Category C tree (T14).
- 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°28'2.09"N 0°15'21.96"W and the altitude is approximately 6m 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. T1 and T2, two large Lombardy Poplars, were observed to have significant included bark trapped between their stem junctions where they grow at an acute angle (also known as a 'V' shaped fork). Such forks are considerably weaker when compared to a 'U' shaped fork whereby the 'U' shape enables the stems to widen without bark becoming trapped in between them. Where a 'V' shaped fork is present, the bark eventually becomes trapped in between the stems creating a weakness in the stem structure. Included bark is a common cause of tree failure as it inhibits structural integrity. Consequently, we recommend these two trees are reduced in height to 10m in order to reduce the load stresses placed on the weakened unions.

3.1.3. T5 is a semi-mature Lime tree which has been reduced in the past. This tree was observed to have cavities developing at old pruning wounds and deadwood to its lower crown. We recommend this tree is reduced back to its old pruning points and any deadwood is removed when undertaking such works.

3.1.4. T6 is a mature London Plane. This tree has been pollarded historically at approximately 4m above ground level and left to grow unmanaged. Trees that are harshly pruned in this manner should not be allowed to lapse. To do so is poor arboricultural practice and potentially hazardous. The new canopy of lapsed trees will be supported by scaffold branches with weaker attachments than maiden trees. This is because they begin their life as epicormic shoots and are attached at a point where the stem timber is exposed (and decay is inevitably present). Instead, trees that have been topped should be managed by cyclical pruning to prevent their canopies from growing dangerously large. Local authority owned plane trees are routinely managed in such a manner. This is particularly important for lapsed pollards that overhang public highways such as T6. We therefore recommend that T6 is managed by reducing it to a height of no more than 10m and a radial canopy spread of 4m. It should then be cyclically pruned back to these dimensions every 5 years, or thereabouts.

3.1.5. T10 is an early mature Horse Chestnut situated on third party land. A significant tear wound was observed to the south-east of the trees stem with decay developing and a fungal bracket of the decay fungi *Ganoderma sp* present. In order to ascertain the extent of decay present, we recommend undertaking a climbed decay detection investigation. The area of decay is located approximately 3.5m above ground level so the use of a decay detection device such as a Residril is likely to be the most appropriate tool. Depending on the results from the investigation, further management recommendations or remedial pruning works may be recommended.

3.1.6. T14 is a mature Horse Chestnut situated on third party land. This tree was observed to have significant cavities developing at old pruning wounds, is showing signs of dieback to its upper canopy and has areas of cracking bark which indicates that the tree may be exhibiting early symptoms of an infection of Bleeding Canker of Horse Chestnut (*Pseudomonas syringae pv. Aesculi*). The website: [www.forestresearch.gov.uk/fr/INFD-](http://www.forestresearch.gov.uk/fr/INFD-)

6KYBGV gives further information on this disease. We recommend undertaking remedial pruning to remove any dead, dying or defective branches from the trees canopy and undertaking a climbed inspection of the cavities to ascertain the extent of decay associated with them.

3.1.7. T19 is an early mature Bhutan Pine. This tree was observed to have a tear wound from a torn-out branch to its upper canopy, scattered deadwood and branch stubs to its lower crown. We recommend remedial pruning is undertaken to remove any dead, dying, torn out or defective branches. Such works will reduce the risk of falling branches in windy weather conditions and encourage natural healing processes.

3.1.8. 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	T10 and T14
<b>Moderate</b>	Within 1 year	T1, T2, T5, T6 and T19
<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:

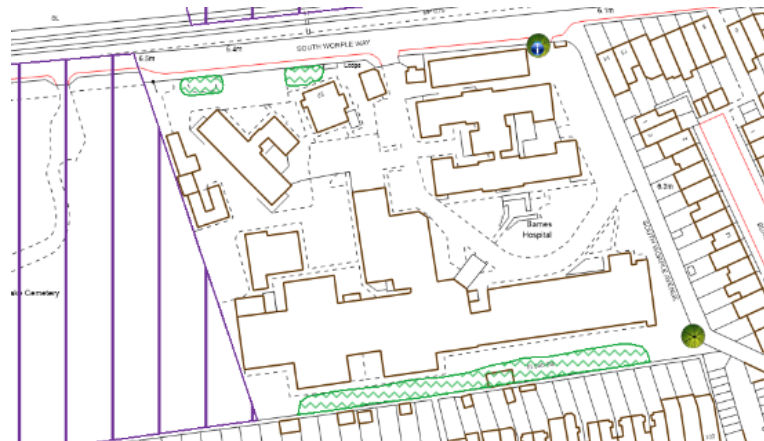
Inspection Frequency (years)	Tree Number
<b>0.5</b>	None
<b>1</b>	T9, T10, T11, T13, T14, T15 and T16
<b>1.5</b>	T1, T2, T4, T5, T6, T7, T8, T12, T19, T20, T21, T23, T24, T25 and T26
<b>3</b>	T3, T17, T18, T22, T27 and T28

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 9<sup>th</sup> July 2021, we were informed by James Stach of London Borough of Richmond upon Thames that:

- The site lies immediately adjacent to a conservation area (see purple hatched area on the screenshot overleaf). Trees included within our survey that are affected by this conservation area are T9, T10, T11, T13, T14, T15 and T16.
- There are tree preservation orders affecting trees within the site as indicated in green on the screenshot overleaf. Trees included within our survey we believed to be protected are T4, T5, T6, T7, T8 and trees T19 to T26.



### 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.



Species	Typical Height at Maturity (m)	Typical Canopy Spread at Maturity (m)	General Notes
Cherry	8	10	Many cultivars available, bred for their abundance of spring flowers, edible cherries or ornamental bark (e.g. Tibetan Cherry). Usually white or pink flowering, often in very early spring. Usually with a single bole to around 2.5m and multi-stemmed thereafter. Most varieties have excellent autumn colour.
False Acacia	20	12	Deciduous fast growing tree native to the US. Part of the pea family and its roots fix nitrogen. Bright yellow 'Frisia' cultivar is widely planted in gardens. All parts are toxic except the flowers which appear in June. Seed pods ripen in winter. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Robinia+pseudoacacia">http://www.pfaf.org/user/Plant.aspx?LatinName=Robinia+pseudoacacia</a> for more info.
Holly	16	12	Evergreen tree native across Western Europe. Many cultivars available, often with variegated leaves. Females produce bright red berries. Good wildlife value. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Ilex+aquifolium">http://www.pfaf.org/user/Plant.aspx?LatinName=Ilex+aquifolium</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.
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.
Lombardy Poplar	35	8	Distinctive, narrowly columnar deciduous tree with triangular leaves. Native to Italy. Gnarled bole supports numerous ascending branches that taper towards a narrow-pointed crown. Often planted in rows. Tolerates a wide range of soils and climates. Upright habit can lead to weak branch junctions and a tendency for branch failure. Fast growing. Tolerant of heavy pruning.
London Plane	30	20	Deciduous tree arisen in cultivation probably as a cross between the Oriental Plane and the American Buttonwood. Has attractive bark which peels off in small plates leaving a multicoloured flecked pattern. Very common as a street tree, especially throughout London where it dominates the streetscape. Often managed as a pollard in order to constrain its large size to more manageable proportions, especially where there are clay soils and adjacent buildings. Somewhat susceptible to the decay fungus <i>Inonotus hispidus</i> . Visit <a href="http://en.wikipedia.org/wiki/Platanus">http://en.wikipedia.org/wiki/Platanus</a> for more info.
Silver Birch	16	10	Deciduous native tree. A pioneer species requiring good lighting levels that will readily colonise open ground. Relatively short lived and surpassed in woodland by dominant species such as oak and beech. Attractive white bark and graceful, delicate form make this a popular garden tree. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Betula+pendula">http://www.pfaf.org/user/Plant.aspx?LatinName=Betula+pendula</a> for more info.
Silver Maple	30	20	Deciduous tree native to N. E. America. Cut leaved version is regularly planted. Outstanding autumn colour. Irregular, airy domed crown, often with weeping outer branches.

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 demolish the majority of existing buildings and construct a new residential development as indicated on the plans in Appendix 6. The existing layout is indicated in grey, the footprint of the proposed basement layout is indicated in dashed pink and the proposed ground floor layout is indicated in pale green. The existing vehicular access from South Worple Way in the north-east corner of the site shall be maintained and resurfaced. Fifty new car parking spaces are to be provided along with bicycle storage.

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	T1, T2, T3, T12, T27 and 2m tall Stag's Horn Sumach
Tree Removal: Retention Category U	None
Tree Pruning	T7, T8 and T22
RPA: Building Foundations	T6 and T7
RPA: Other Foundations	None
RPA: New Pedestrian Surface	T4, T5, T6, T17, T18, T19, T20, T21, T22, T23, T25
RPA: Replace Existing Hard Surface	T6, T7, T8, T9 and T10
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 Impact Assessment Plan and listed below:

- **Retention Category A:** It is proposed to retain all Retention Category A trees.
- **Retention Category B:** It is proposed to remove the following Retention Category B trees: T1 and T2. These two trees are located so close to the existing buildings and the main pedestrian circulation route that their retention is not practicable. They are not considered to have a high amenity value and their removal shall not have a major negative impact upon local amenity. They are not protected by a tree preservation order or conservation area and substantial mitigation tree planting is proposed.
- **Retention Category C:** It is proposed to remove the following Retention Category C trees: T3, T12, T27 and 2m tall Stag's Horn Sumach. These trees are located so close to the proposed development that their retention is not practicable. These are relatively small trees and are hidden from public vantage points. Consequently, they are

considered to have a low amenity value and their removal shall not have a significant impact on the visual amenity of the locality. None of the trees to be removed are protected by a tree preservation order or conservation area and substantial mitigation tree planting is proposed.

- **Retention Category U:** Our survey did not identify any Retention Category U trees.

### 4.3. Mitigation Planting

4.3.1. As part of the proposed development, sixty-four new trees are to be planted throughout the site along with a variety of hedges and other shrubs and vegetation. The long-term impact of the development shall be a significant increase in tree cover and an improvement in local amenity.

4.3.2. Please refer to Exterior Architecture's Landscape Strategy for further details.

### 4.4. Impact on Tree Canopies

4.4.1. It is proposed to remove the lower branches of T8 to a height of 5m where they overhang the vehicular entrance (canopy currently starts at 3m above ground level). This shall ensure adequate clearance height for construction vehicles to prevent accidental damage occurring to overhanging branches.

4.4.2. T7 and T22 also require minimal canopy pruning on one side to create a suitable clearance from the nearest proposed building. Approximately 1.5m of T7's canopy and 1m of the T22's canopy requires pruning.

4.4.3. Such pruning to T7, T8 and T22 shall not significantly harm or disfigure the trees so long as pruning works are undertaken sympathetically (working to BS 3998: 2010 guidelines).

4.4.4. The canopies of all other retained trees are located sufficiently far from proposed building works and sufficiently high over access routes throughout the site that they shall not be impacted upon by any construction activity. Restrictions are placed on activities throughout the site to ensure that no canopies are accidentally damaged –see the accompanying Arboricultural Method Statement.

### 4.5. Impact on Tree Roots

4.5.1. A boundary wall separates T9, T10, T11, T13, T14 T15 and T16 from the site. The foundations of this wall are likely to influence the pattern of root proliferation such that roots are likely to be less prolific within the site at shallow depths. Furthermore, the roots of these trees are unlikely to proliferate within the site beneath the existing impermeable hard surfacing and existing buildings (particularly adjacent T11, T13, T14 and T15). This is because the soils in these areas are likely to be compacted with reduced water and oxygen penetration making them anaerobic and inhospitable to roots. Instead, their roots are likely to proliferate in the soft ground in which they grow.

#### 4.5.2. Building Foundations:

4.5.3. The foundations for one of the new residential buildings will extend into to the outer portion of the theoretical Root Protection Area of T6 and a tiny portion of the RPA of T7. Such a tiny portion of the RPA of T7 will be affected (circa 2%), the potential impact is considered to be negligible. In order to ensure impact upon T6 is kept to the minimum amount possible, it proposed to install the building and basement foundations in a manner that does not disturb the soils beyond the footprint of the building. This may be done via contiguous piling, sheet piling, pinning or any similar method which restricts excavation to the basement and building footprint.

4.5.4. Furthermore, the canopy reduction of T6, which is recommended irrespective of the development proposals, will result in a reduction in demand for water and nutrients

from the root system. Consequently, the loss of roots due to proposed excavations shall be off-set by the canopy management which shall maintain a balanced root-shoot ratio.

4.5.5. **New Surfaces:**

4.5.6. The replacement of the existing hard surfacing with soft landscaping shall improve rooting conditions for T6 and T7. So long as the existing surface is removed carefully and excavation does not occur beneath the existing surface and its sub-base, there shall be no detrimental impact upon these trees.

4.5.7. The Impact Assessment Plan indicates where it is proposed to replace the existing asphalt surface over the theoretical Root Protection Areas of T8, T9 and T10. In order to ensure little to no impact, the following mitigation is proposed:

- A suitable load spreading surface shall be in place at all times during demolition and construction activities.
- No excavation shall occur beneath the existing surface and its sub-base.
- Only hand tools shall be used, or a small mechanical excavator supervised by a project arborist shall be used to lift the existing surface.
- The proposed surface shall be permeable.
- A gravel sub-base containing no fine particles shall be incorporated into the design. This shall be contained within a cellular confinement system to ensure that the weight of vehicles will be evenly spread over a wide area. This shall prevent excessive soil compaction and reduce the depth of sub-base required.

4.5.8. Given that the existing surface is not considered to be permeable, the new permeable surface shall improve rooting conditions below.

4.5.9. Where new, low impact pedestrian surfaces and landscaping is proposed over Root Protection Areas, excavation shall not exceed a depth of 150mm, and permeable surfaces are proposed. Consequently, the potential impact upon trees shall be minor. Hand tools should be used wherever possible for excavation.

4.5.10. **Underground Services:**

4.5.11. 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.

4.5.12. **Changes in Ground Levels:**

4.5.13. 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.

4.5.14. **Soil Compaction:**

4.5.15. 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.

4.5.16. 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.



4.5.17. 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. In order to avoid inadvertent damage to roots, branches or stems, care shall need to be taken when demolishing buildings or removing surfaces close to trees. The use of a (carefully marshalled) mechanical excavator shall be acceptable so long as the adjacent walls are demolished inwards onto the building footprint, and foundations/surfaces are carefully lifted and pulled in a direction away from nearby trees. Machinery operatives shall need to be made aware of this requirement.

4.6.2. The tree protection measures specified within the accompanying Arboricultural Method Statement should be installed prior to the commencement of all demolition activities (including soil stripping) to prevent any detrimental impact on tree health. Where this is not practicable, demolition of structures within Construction Exclusion Zones shall be undertaken very early on in the demolition phase and the protective barriers installed immediately thereafter.

#### **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.

4.8.2. On this site there is ample room for the siting of cabins and storage of materials / spoil during the construction phase without impacting on trees.

#### **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. It is considered that adequate space has been allowed between the trees to be retained and the proposed buildings.

4.10.2. 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.

4.10.3. The proposed buildings to the south of the site are located further away from trees than the existing building is located. Consequently, the proposed buildings adjacent the southern boundary shall result in improved juxtaposition between trees and buildings.



## 5. Photographs

Photo 1.



Photo 2.



Photo 3.



Photo 4.



Photo 5.



Photo 6.





Photo 7.



Photo 8.



Photo 9.



Photo 10.



Photo 11.



Photo 12.





Photo 13.



Photo 14.



Photo 15.



Photo 16.



Photo 17.



Photo 18.





Photo 19.



Photo 20.



Photo 21.



Photo 22.



Photo 23.



Photo 24.



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## 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.
Hazard beam	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).
Heartwood	Inner non functioning tissues that provide structural support to trunk.
Heave	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.
Included Bark	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.
Increment Borer	A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments.
Limb	A large lateral branch growing from the main trunk or from another larger branch.
Lopping	In trees, a general term that related to the removal of branches from a tree.
Mycelium	A mass of growing filaments (hyphae) formed by fungi.
Mycorrhizae	The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.
Occluding tissue	The general term of wood, cambium and bark that develop around the site of a wound on a woody plant
Pathogen	A microorganism that causes diseases within another organism.
Phloem	The principle conductive tissue that the products of Photosynthesis are transported around the plant
Pollard	A term for a pollarded tree.
Pollard head	The swollen section of branch / stem that forms behind the pollarding cut.
Pollarding	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
Reaction Wood	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.
Reaction Zone	A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.
Remedial pruning	The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.
Resistograph	Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.
Root Barriers	Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.
Root Collar	The basal area of the tree; transition zone from trunk to root. Also sometimes called trunk flare.
Root Plate	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.
Root Zone	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.
Sail Area	That area or the tree subjected to wind load.
Sapwood	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
Scaffold limbs / scaffold Branches	The branches that from the main network framework of the crown of a tree.
Soft Rot	A kind of wood decay, were a fungi degrades cellulose within the cell wall, without causing overall degradation.
Soil Compaction	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.
Sonic Decay Detection	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.
Stag Heading	In a tree, a state of dieback were dead branches protrude beyond the current living crown.
Stump Grinding	The removal of a tree stump using a specialist grinding machine.
Subsidence	In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.
Suppressed	Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.
Target	Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.
Target Pruning	The pruning of a branch were the wound affects only branch material, often result in a target shaped wound.
Tension Wood	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).
Tight Union / Tight Crotch	Also, narrow crotch. A crotch with a narrow angle between branches, often having included bark.
Tomography	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.
Topping	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.
Tree Preservation Order	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.
Veteran Tree	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.
Vigour	Active, healthy growth of plants: ability to respond to stress factors.
Visual Tree Assessment (VTA)	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.
Wetwood	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.
White Rot	A kind if wood decay were a fungi attacks the lignin within the wood matrix
Witches Broom	A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.
Wood	Secondary Xylem; the main structural support and water conducting tissue of trees and shrubs.
Wound Wood	Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound
Xylem	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.**

Between 1983 and 1995 Ivan worked primarily within the construction industry and received training in a broad range of practical building skills and general construction principles. During this time he obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales.

In 1995, Ivan obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then worked for an Arboricultural Consultancy for one year before establishing a tree surgery and landscaping business in 1998. In 2005 Ivan commenced full time employment with a leading Arboricultural Association approved consultancy and soon adopted a senior role responsible for five consultants.

He obtained a FDSc in arboriculture at the University of Lancashire, which he passed with distinction and is now a Director and Principal Consultant of Crown Consultants Ltd. He is accredited as a LANTRA *Professional Tree Inspector*. A qualification produced in association with the Arboricultural Association and generally recognised as appropriate for all levels of tree inspection.

Ivan is a professional member of the Arboricultural Association, the International Society of Arboriculture and the Consulting Arborist Society

Ivan is trained and licensed in QTRA (Quantified Tree Risk Assessment). He has undertaken professional expert witness training provided by Bond Solon and has been registered as a Sweet and Maxwell Checked Expert Witness from 2008-2017, after which the service was no longer offered.

Throughout 2009 acted as the principal Tree Officer for Barnsley Metropolitan Borough Council.

Ivan has produced several hundred Arboricultural Reports for the purposes of Development, Safety, Management, Mortgage, Subsidence, Mitigation and Litigation.

### **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.

## 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-110*. 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





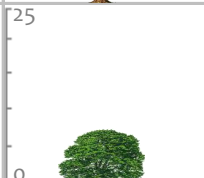


Communities and Local Government website with numerous downloadable documents, from: <http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

### Tree Specific Websites

<a href="http://www.crowntrees.co.uk">www.crowntrees.co.uk</a>	Crown Consultants site containing useful information
<a href="http://www.trees.org.uk">www.trees.org.uk</a>	Arboricultural Association
<a href="http://www.rfs.co.uk">www.rfs.co.uk</a>	Royal Forestry Society of England, Wales and N. Ireland
<a href="http://www.treehelp.info">www.treehelp.info</a>	The Tree Advice Trust
<a href="http://www.woodland-trust.org.uk">www.woodland-trust.org.uk</a>	The Woodland Trust
<a href="http://www.treecouncil.org.uk">www.treecouncil.org.uk</a>	The Tree Council

## **Appendix 6: Tree Data Schedule, Site Plans and Arboricultural Method Statement.**


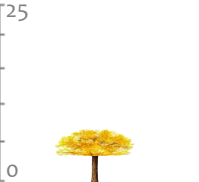
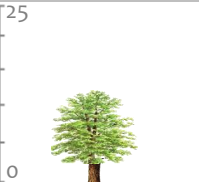

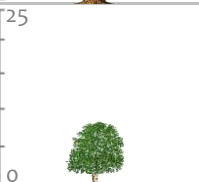
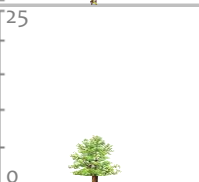
The Tree Data Schedule and any drawings accompanying this report follow this page. They are also provided as separate documents for ease of printing and screen viewing.

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m)			Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour		Amenity Value	
					W	N	E			Priority	Inspect Freq (yrs)	Physiological Condition	Life Expectancy (yrs)		
					S	Structural Condition	Retention Category								
T1	Early-Mature <b>Lombardy Poplar</b>  Populus nigra.	16	3	75	2.5			3.5	3.5		Form: Multi-stemmed at 3m with a slightly unbalanced crown. History: Previously reduced. Defects: <b>Scattered deadwood throughout and included bark between stem junctions.</b>	Reduce in height to 10m.		Moderate	Moderate
					3	Moderate	1.5	Good	Fair			10-20	<b>B</b>		
T2	Early-Mature <b>Lombardy Poplar</b>  Populus nigra.	16	3.5	74	3	3.5	3.5		Form: Multi-stemmed at 3m with a slightly unbalanced crown. History: Previously reduced. Defects: <b>Significant included bark between stem junctions and dead twigs to lower crown.</b>	Reduce in height to 10m.		Moderate	Moderate		
					1.5	Moderate	1.5			Good	Fair	10-20	<b>B</b>		
T3	Semi-Mature <b>Holly</b>  Ilex aquifolium.	8	0	30	2	2	2		Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Moderate		
					2	n/a	3			Good	Good	20-40	<b>C</b>		
T4	Semi-Mature <b>Lime</b>  Tilia sp.	13	2	42	5	4.5	5.5		Form: Twin-stemmed at 3m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown reduction. Defects: <b>Scattered dead branches throughout.</b> Other: Epicormic shoots prevented detailed inspection of stem base, Limited inspection, dimensions estimated.	No action required.		Moderate	Moderate		
					5.5	n/a	1.5			Good	Fair	20-40	<b>B -</b>		
T5	Semi-Mature <b>Lime</b>  Tilia sp.	7	0	32	4	3	3		Form: Twin-stemmed at 2m with an unbalanced crown. History: Previously reduced. Defects: <b>Cavities developed at old pruning wounds and deadwood to lower crown.</b> Other: Vegetation prevented detailed inspection of stem base (Limited inspection, dimensions estimated).	Reduce back to old pruning points.		Moderate	Low		
					4	Moderate	1.5			Good	Poor	20-40	<b>C</b>		
T6	Mature <b>London Plane</b>  Platanus x hispanica.	17	4	98	10	10	12		Form: Twin-stemmed at 4m with a slightly unbalanced crown. History: Lapsed pollard. Defects: <b>No significant defects observed.</b>	Reduce to a height of no more than 10m and a radial spread of no more than 3-4m.		Moderate	High		
					12	Moderate	1.5			Good	Fair	20-40	<b>A -</b>		
T7	Semi-Mature <b>Lime</b>  Tilia sp.	8.5	3	46	5	3.5	4.5		Form: Multi-stemmed at 3.5m with a slightly unbalanced crown. History: Previously reduced. Defects: <b>Minor cavity developed at old pruning wound on stem at 3m above ground level.</b> Other: Epicormic shoots prevented detailed inspection of base, some dimensions estimated.	No action required.		Moderate	Moderate		
					4.5	n/a	1.5			Good	Fair	40+	<b>B</b>		

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m)			Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour		Amenity Value	
					W	N	E			Priority	Inspect Freq (yrs)	Physiological Condition		Life Expectancy (yrs)	
					S							Structural Condition		Retention Category	
T8	Semi-Mature <b>Lime</b>  Tilia sp.	10	3	36	4	4.5	4.5		Form: Multi-stemmed at 3m with a balanced crown. History: Previously reduced. Defects: <b>Small scattered dead branches throughout.</b> Other: Epicormic shoots prevented detailed inspection of stem.	No action required.		Moderate	Moderate		
					3.5					n/a	1.5	Good	40+		
T9	Semi-Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	10	4	40	5.5	5.5	5.5		Position: Situated on third party land. Form: Single stemmed and vertical with a balanced crown. History: Occasional pruning wounds due to crown lifting. Defects: <b>Cavities developed at old pruning wounds.</b> Other: Limited inspection, dimensions estimated, ivy growing up stem.	No action required.		Low	Moderate		
					5.5					n/a	1	Fair	20-40		
T10	Early-Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	16	3.5	60	9	8	7		Position: Situated on third party land. Form: Twin-stemmed at 3m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown reduction. Defects: <b>Significant tear wound to south east with decay developing and ganoderma observed beneath tearwound.</b> Other: Limited inspection, dimensions estimated.	Decay detection required.		Moderate	High		
					7					High	1	Good	10-20		
T11	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	17	5	95	9	9	8.5		Position: Situated on third party land. Form: Multi-stemmed at 3m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown lifting. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	High		
					9					n/a	1	Good	20-40		
T12	Early-Mature <b>Cherry</b>  Prunus sp.	5	1	42 @ Base	4.5	4	4.5		Form: Multi-stemmed at 0.5m with a balanced crown. History: No evidence of significant pruning. Defects: <b>Included bark between stem junctions.</b>	No action required.		Moderate	Moderate		
					4.5					n/a	1.5	Good	20-40		
T13	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	15	2	80	5	7	7		Position: Situated on third party land. Form: Single-stemmed to a height of 3m. History: Occasional pruning wounds due to crown lifting. Defects: <b>Cavities developed at old pruning wounds.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	High		
					5.5					n/a	1	Good	40+		
T14	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	14	1.5	75	3.5	5	6.5		Position: Situated on third party land. Form: Multi-stemmed at 3m with a slightly unbalanced crown. History: Multiple pruning wounds due to crown lifting. Occasional pruning wounds due to crown reduction. Defects: <b>Significant cavities developed at old pruning wounds, showing signs of dieback and cracking bark observed.</b> Other: Limited inspection. dimensions estimated.	Remedial prune and undertake climbed inspection of cavities.		Moderate	Moderate		
					6					High	1	Fair	<10		

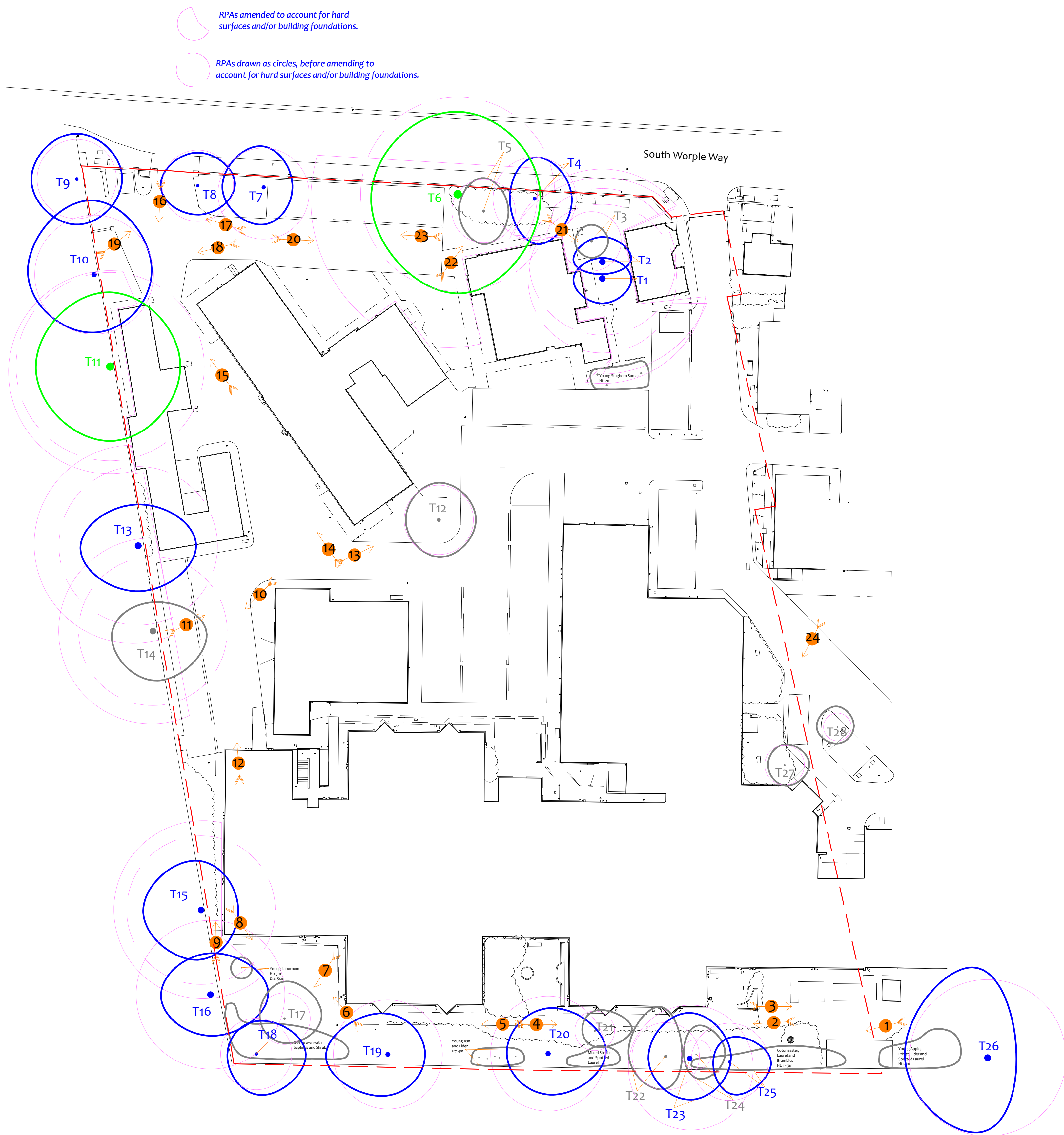


Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m)			Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour		Amenity Value	
					W	N	E			Priority	Inspect Freq (yrs)	Physiological Condition		Life Expectancy (yrs)	
												S	Structural Condition	Retention Category	
T15	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	17	2	75	7	6	4.5	6	Position: Situated on third party land. Form: Tripplle-stemmed at 3m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown reduction. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.				Moderate	Moderate
										n/a	1	Good	Fair	40+	<b>B</b>
T16	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	19	1.5	75	6	5	7	5	Position: Situated on third party land. Form: Twin-stemmed at 3m with a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate	Moderate		
										n/a	1	Good	Fair	40+	<b>B</b>
T17	Semi-Mature <b>Silver Maple</b>  Acer saccharinum.	7	3	26	3	4.5	4.5	3	Form: Multi-stemmed at 3.5m with a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Low		
										n/a	3	Fair	Good	40+	<b>C</b>
T18	Semi-Mature <b>Ash</b>  Fraxinus excelsior.	9	3	36	3.5	4	6	5	Form: Single stemmed with a slight lean and 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		
										n/a	3	Good	Good	40+	<b>B</b>
T19	Early-Mature <b>Bhutan Pine</b>  Pinus wallichiana.	13	3.5	55	7.5	5	4.5	5	Form: Single stemmed and vertical with a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>Torn out branch from upper canopy, scattered deadwood and branch stubs to lower crown.</b>	Remdial prune.		Moderate	Moderate		
										Moderate	1.5	Good	Good	40+	<b>B</b>
T20	Early-Mature <b>Bhutan Pine</b>  Pinus wallichiana.	13	2	58	5	5.5	7	5	Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: Occasional pruning wounds due to crown lifting. Defects: <b>No significant defects observed.</b> Other: Ivy prevented detailed inspection of stem.	No action required.		Moderate	Moderate		
										n/a	1.5	Good	Good	40+	<b>B</b>
T21	Semi-Mature <b>Silver Birch</b>  Betula pendula.	8.5	3	20	1.5	2.5	4.5	2	Form: Single stemmed with a slight lean and an unbalanced crown. History: No evidence of significant pruning. Defects: <b>Scattered dead twigs to lower crown.</b> Other: Ivy prevented detailed inspection of stem.	No action required.		Moderate	Low		
										n/a	1.5	Good	Good	20-40	<b>C</b>

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m)			Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour		Amenity Value	
					W	N	E			Priority	Inspect Freq (yrs)	Physiological Condition	Life Expectancy (yrs)	Retention Category	
					S	Structural Condition									
T22	Semi-Mature <b>False Acacia</b>  Robinia pseudoacacia.	9	4.5	34	4.5	6	2	4		Form: Twin-stemmed at 2m with a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>Scattered dead twigs throughout.</b>	No action required.		Moderate	Moderate	
											n/a	3	Good	20-40 <b>C +</b>	
T23	Semi-Mature <b>Bhutan Pine</b>  Pinus wallichiana.	16	6	63	5	5.5	5	5		Form: Twin-stemmed at 5m with a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Debris prevented detailed inspection some dimensions estimated.	No action required.		Moderate	High	
											n/a	1.5	Good	40+ <b>B</b>	
T24	Semi-Mature <b>False Acacia</b>  Robinia pseudoacacia.	6	4	15	1.5	3.5	3.5	3		Form: Single stemmed and vertical with an unbalanced crown. History: No evidence of significant pruning. Defects: <b>Scattered deadwood to lower crown suppressed by adjacent tree.</b>	No action required.		Low	Low	
											n/a	1.5	Poor	10-20 <b>C</b>	
T25	Semi-Mature <b>Bhutan Pine</b>  Pinus wallichiana.	12	3	39	2	3	5	4		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	Moderate	
											n/a	1.5	Good	40+ <b>B</b>	
T26	Early-Mature <b>London Plane</b>  Platanus x hispanica.	16	2	79	10	11	3.5	9		Form: Multi-stemmed at 4m with a heavily un-balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Moderate	
											n/a	1.5	Good	40+ <b>B</b>	
T27	Semi-Mature <b>Silver Birch</b>  Betula pendula.	8.5	2.5	20	2	2.5	3	2.5		Form: Single stemmed and vertical with a slightly unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Moderate	
											n/a	3	Good	40+ <b>C</b>	
T28	Young <b>Bhutan Pine</b>  Pinus wallichiana.	6	1.5	14	2.5	2.5	2	2		Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		Moderate	Moderate	
											n/a	3	Good	20-40 <b>C</b>	



**Tree Constraints Plan**  
(Existing Layout)



RPAs amended to account for hard surfaces and/or building foundations.

RPAs drawn as circles, before amending to account for hard surfaces and/or building foundations.

Tree Ref.	Species	Height (m)	Root Protection Area	
			Radius (m)	Area (m <sup>2</sup> )
T1	Lombardy Poplar	16	9.0	254
T2	Lombardy Poplar	16	8.9	248
T3	Holly	8	3.6	41
T4	Lime	13	5.0	80
T5	Lime	7	3.8	46
T6	London Plane	17	11.8	434
T7	Lime	8.5	5.5	96
T8	Lime	10	4.3	59
T9	Horse Chestnut	10	4.8	72
T10	Horse Chestnut	16	7.2	163
T11	Horse Chestnut	17	11.4	408
T12	Cherry	5	4.2	55
T13	Horse Chestnut	15	9.6	290
T14	Horse Chestnut	14	9.0	254
T15	Horse Chestnut	17	9.0	254
T16	Horse Chestnut	19	9.0	254
T17	Silver Maple	7	3.1	31
T18	Ash	9	4.3	59
T19	Bhutan Pine	13	6.6	137
T20	Bhutan Pine	13	7.0	152
T21	Silver Birch	8.5	2.4	18
T22	False Acacia	9	4.1	52
T23	Bhutan Pine	16	7.6	180
T24	False Acacia	6	1.8	10
T25	Bhutan Pine	12	4.7	69
T26	London Plane	16	9.5	282
T27	Silver Birch	8.5	2.4	18
T28	Bhutan Pine	6	1.7	9

Drawing No: CCL 10770 / TCP Rev: 2  
 Title: Tree Constraints Plan (Existing Layout)  
 Site: Barnes Hospital SW14 8SU  
 Scale: 1:300 Paper Size: A1



**Tree Retention Categories**  
 Stems & canopies shown

- 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 condition.

**Tree Constraints Plan**

BS 5837 Root Protection Area (radius = 1xstem 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

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

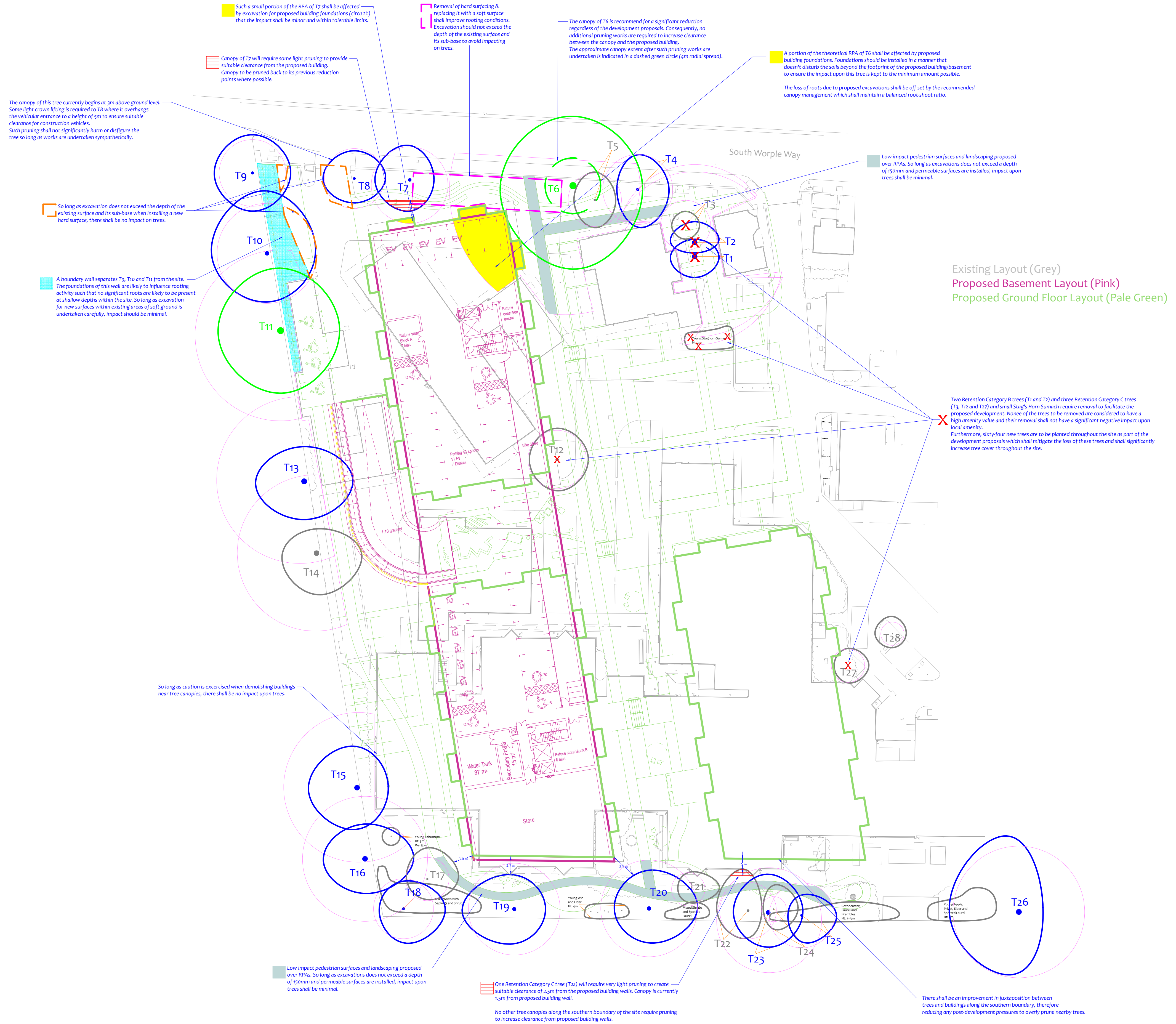
Proposed pruning





# Impact Assessment Plan

(Existing Layout with Proposals Overlay)



Drawing No: CCL 10770 / IAP Rev: 1  
 Title: Impact Assessment Plan (Existing Layout with Proposals Overlay)  
 Site: Barnes Hospital SW14 8SU  
 Scale: 1:300 Paper Size: A1



**Tree Retention Categories**  
 Stems & canopies shown

- Category A tree
- Category B tree
- Category C tree
- Category U tree

- Tree 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.
- Tree of moderate quality with a life expectancy of 30+ 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 condition.

# Impact Assessment Plan

BS 5837 Root Protection Area (radius = 1xstem 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

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  
 Proposed pruning

Tree Ref.	Species	Height (m)	Root Protection Area	
			Radius (m)	Area (m <sup>2</sup> )
T1	Lombardy Poplar	16	9.0	254
T2	Lombardy Poplar	16	6.9	248
T3	Holly	8	3.6	41
T4	Lime	13	5.0	80
T5	Lime	7	3.8	46
T6	London Plane	17	11.8	434
T7	Lime	8.5	5.5	96
T8	Lime	10	4.3	59
T9	Horse Chestnut	10	4.8	72
T10	Horse Chestnut	16	7.2	163
T11	Horse Chestnut	17	11.4	408
T12	Cherry	5	4.2	55
T13	Horse Chestnut	15	9.6	290
T14	Horse Chestnut	14	9.0	254
T15	Horse Chestnut	17	9.0	254
T16	Horse Chestnut	19	9.0	254
T17	Silver Maple	7	3.1	31
T18	Ash	9	4.3	59
T19	Bhutan Pine	13	6.6	137
T20	Bhutan Pine	13	7.0	152
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T26	London Plane	16	9.5	282
T27	Silver Birch	8.5	2.4	18
T28	Bhutan Pine	6	1.7	9



**Timing of Operations**

Activity within the site shall be phased according to the following chronology

Order	Phase	Activity
1st.		Planning conditions relating to trees to be identified and discussed with the Project arborist and site manager.
2nd.		All specified tree removal and pruning to be undertaken (see Header -Tree Works Schedule).
3rd.	Pre-Construction Phase	Install the tree protection barriers (fencing and ground protection boards - see Headers -Tree Protection Barriers and Ground Protection Measures).
4th.		Pre-Commencement site meeting: Tree protection barriers inspected. Additional protection measures to be agreed. Variances to be agreed. Location of underground services to be agreed. Boundary treatments to be agreed. Extents of excavation to be agreed. Scaffold restrictions to be agreed. Scope of future inspections / monitoring to be agreed.
5th.		Arboricultural Method Statement to be revised and approved necessary.
<b>Protection measures confirmed acceptable by the local authority</b>		
6th.	Demolition and Construction Phase	Demolish existing structures and remove existing surfaces where applicable.
7th.		Install new buildings, hard surfaces and services taking into account restricted activities as specified in this Arboricultural Method Statement.
8th.		Site meeting with project arborist. Landscaping restrictions to be agreed. Condition of retained trees to be assessed and mitigation agreed. Ground conditions to be assessed and ground remediation to be agreed.
9th.	Post-Construction Phase	Remove protective barriers (fencing and ground protection measures as applicable).
10th.		Undertake restricted landscaping operations within Root Protection Areas, including (where applicable) boundary treatments, pedestrian surfaces, decking and any proposed tree planting.

**Personnel and Accountability**

This table should be completed at the Pre-Start Meeting or earlier

Position	Name	Contact Phone & email	Roles
Project Manager	TBC at detailed design stage through condition.	Insert Details	Liaising with site manager & project arborist regarding any potential issues relating to trees. Scheduling of meeting, excavations and inspections. Overseeing this monitoring schedule. Instructing the project arborist and arranging access. Liaising with local authority regarding discharge of planning conditions and variances to the Arboricultural Method Statement.
Site Manager	TBC at detailed design stage through condition.	Insert Details	Day to day monitoring of tree protection measures. Fortnightly supply of site photographs showing all tree protection measures. Induction of all contractors. Reporting to the Appointed Arborist of any incidents or potential variations to the agreed tree protection measures.
Project Arborist	Crown Tree Consultancy	08000 14 13 30 0203 797 7449 info@crowntrees.co.uk	Liaising with LPA Tree Officer over all arboricultural matters. Initial inspection and signing off of tree protection barriers including ground protection measures. Monthly site visits and inspections. Oversight of excavation for basement down to 1.2m in Restricted Zones. Reporting to the local authority following site inspections and any variation or incidents.
Local Authority	London Borough of Richmond upon Thames	Insert Details	Receipt of reports from the appointed arborist. Liaising with the appointed arborist to agree suitability of tree protection measures and any variations. Enforcement. Advice and assistance with the discharge of planning conditions relating to trees.
Additional Contact	Insert Details	Insert Details	Insert Details
Additional Contact	Insert Details	Insert Details	Insert Details

**Site Monitoring Schedule**

Inspection	Site Attendees	Comments
<b>Pre-Start Desk-top</b> To occur prior to any works taking place on the site.	N/A.	Project Manager and Site manager to study this Method Statement & contact the Project Arborist to agree all protection measures.
<b>Pre-Start Meeting</b> After tree works completed & tree protection barriers / ground protection measures installed. Prior to any other activity, inc. demolition & soil stripping.	Site manager, project arborist, Tree Officer invited.	Tree protection fencing locations & specification checked. Ground protection measures checked. Contractors to be inducted to all relevant aspects of the Arboricultural Method Statement. Responsibilities checked and acknowledged. Adherence to the Arboricultural Method Statement to be discussed and agreed. Report on findings to be sent to the local authority tree officer (see accompanying reporting template)
<b>Monthly Inspection and Reporting</b> To occur once per calendar month throughout the entirety of the project until the local authority agree that tree protection measures may be removed	Site manager and project arborist	Tree protection fencing locations & specification checked. Ground protection measures checked. Past month, present and future month - activities and adherence to Arboricultural Method Statement discussed and checked. Report on findings to be sent to the local authority tree officer within 5 working days.
<b>Oversee initial stages of installation of foundations in Restricted Activity Zone 1.</b>	Site manager and project arborist.	Two week's notice to be given prior to commencement. Excavation to be as specified in this Method Statement. Roots to be retained or pruned as specified in this Method Statement. Activities to be recorded and photographed. Mitigation measures to be employed specified by the project arborist.
<b>Any other ground disturbance in Restricted Zones &amp; Construction Exclusion Zones</b> including demolition, soil stripping, removal of hard surfaces, excavation for new surfacing, foundations, service trenches etc.	Site manager, project arborist.	Two week's notice to be given prior to commencement. Excavation to be as specified in this Method Statement. Excavations to be recorded and photographed. Mitigation measures to be employed specified by the project arborist.
<b>Post-Construction Meeting</b> Post external construction activity but prior to removal of fencing & landscaping operations.	Site manager, project arborist, Tree Officer invited.	Retained trees inspected. Ground conditions assessed and mitigation measures agreed where appropriate. Further landscaping operations and restrictions to be agreed.

\*Where agreed with the L.A. it may be acceptable to supply photographs of the fencing to avoid the necessity for a site visit.

**General Site Photographs**



**Tree Protection Plan**

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

T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3

**Tree Retention Categories**  
Stems & canopies shown

- Category A tree
- Category B tree
- Category C tree
- Category U tree

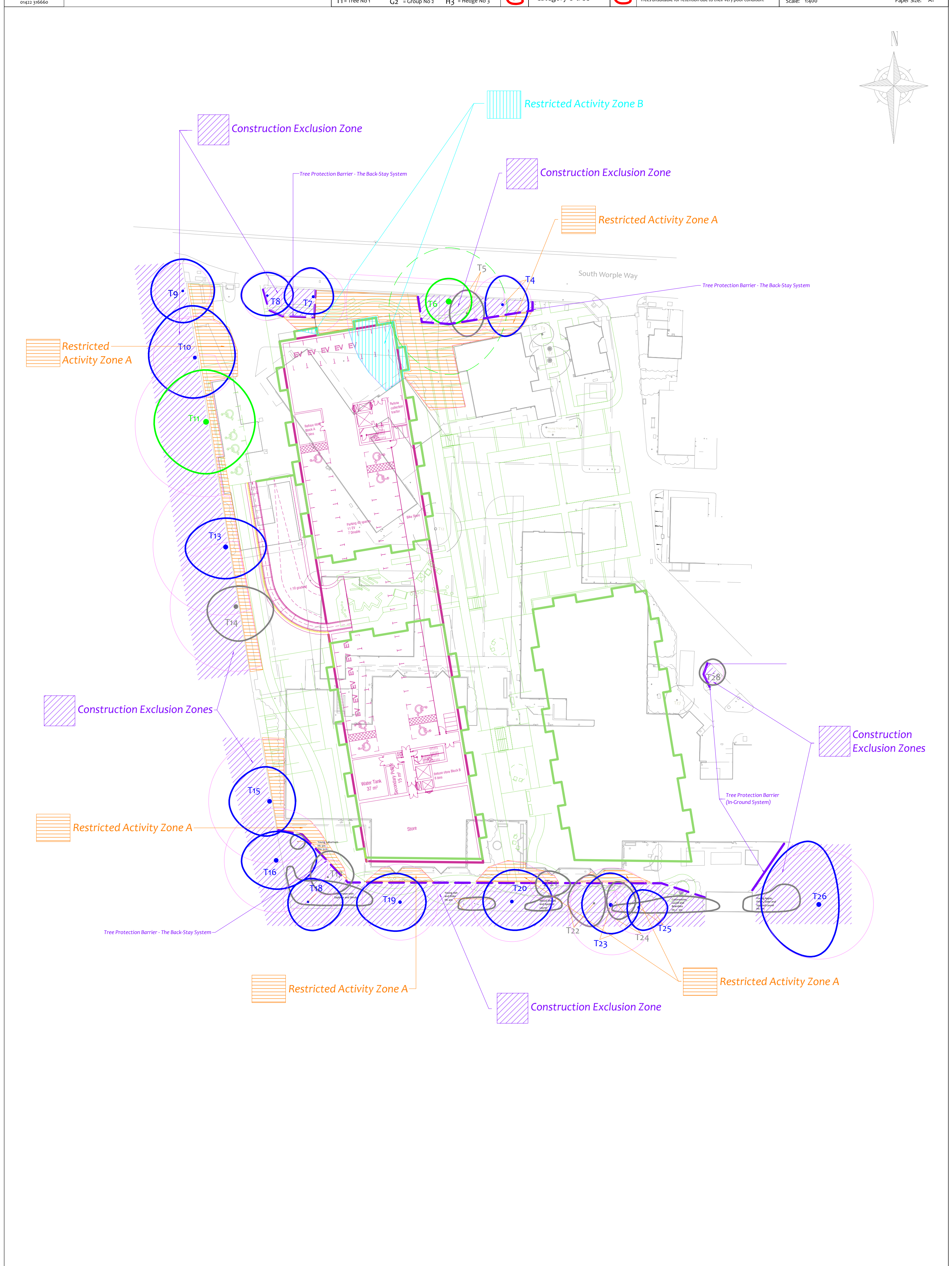
Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.

Trees of moderate quality with a life expectancy of 20+ years. Usually mature 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 form. Individual specimens are most concerned to be a material planning consideration.

Trees unsuitable for retention due to their very poor condition.

Drawing No: CCL 10770 / TPP Rev 1  
Title: Tree Protection Plan (Existing Layout with Proposals Overlaid)  
Site: Barnes Hospital SW14 8SU  
Scale: 1:600 Paper Size: A1



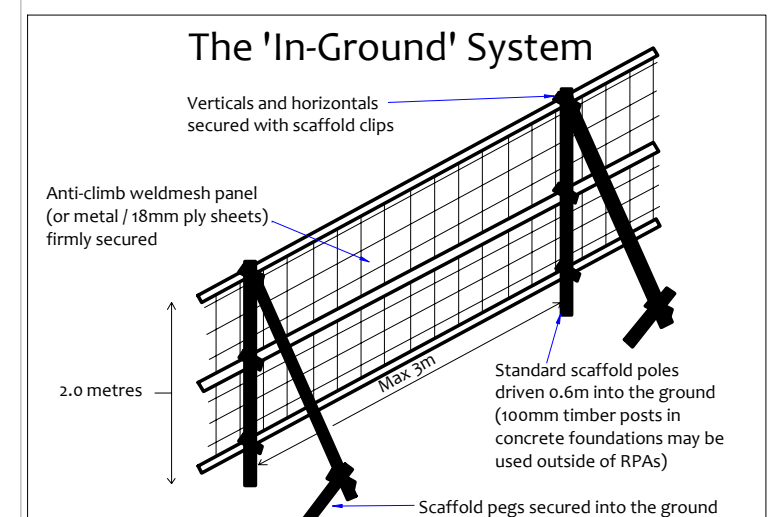
**Tree Protection Barriers**

The purpose of tree protection barriers is to keep construction activity away from Restricted Activity Zones or Construction Exclusion Zones. They should be appropriate to the nature and proximity of activity within the site. The barriers should be erected prior to the commencement of all activity including demolition, soil stripping and delivery of materials and demolition (except where existing structures require demolition to enable the barriers to be installed). Barrier systems are specified below and should be installed according to the legend on the Tree Protection Plan.

**The In-Ground System**

This system may be installed where indicated by a solid purple line on the Tree Protection Plan. It should be robust enough to withstand occasional knocks by plant machinery and, once installed, shall remain in place throughout the entire construction phase.

Vertical scaffold poles are driven into the ground, onto which are affixed horizontal scaffold poles and diagonal bracing struts. Wedmesh panels (or similar - e.g. Heras type fencing panels, or 18mm plywood boards) are secured to this scaffold framework using sturdy clips (e.g. standard scaffold clips). The system is illustrated in the diagram to the right and is based on BS 5837 guidelines.

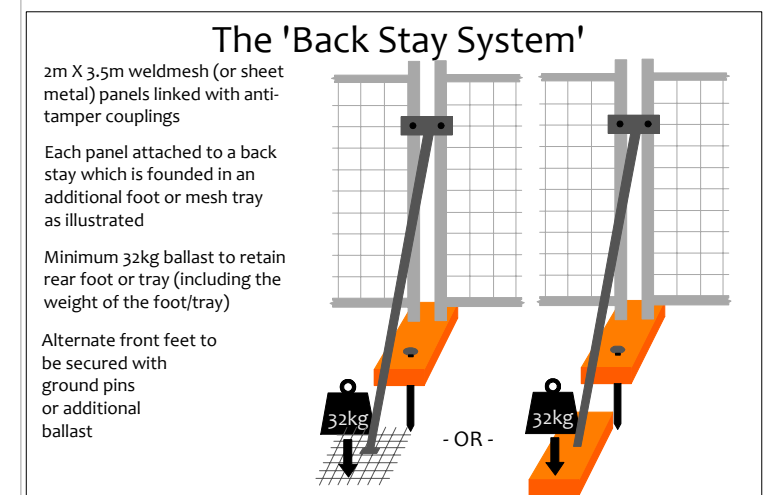


**The Back-Stay System**

This system may be installed where indicated by a solid or dashed purple line on the Tree Protection Plan. It is more practical over existing hard surfaces where the fencing needs to be moved to enable permitted activities within a Restricted Activity Zone. This system should be able to withstand occasional knocks by machinery and should not be relocated except with the consent of the site manager and the approval of the local authority.

Within this system, wedmesh fencing panels (minimum height 2m) are affixed into rubber or concrete feet and clipped together with anti-tamper couplers. Two couplers should be used, spaced at least 1m apart. Alternate panels should be attached to a diagonal back stay connected to an additional foot or bantagate secured with ground pins or additional ballast. Where ground pins are not used, the total weight of the ballast should not be less than 3kg.

Where it is not possible to install diagonal struts (such as very close to a hedge) then the front feet shall be secured using ground pins or ballast.



**Notices**

Suitable weather proof notices should be displayed to identify tree protection zones. They should state the purpose of the fencing and that it should not be moved, or traversed, other than by authorised personnel.

**Restrictions in Specific Zones**

**Restricted Activity Zone A**

Within this zone trees roots are likely to be present where access will be required to facilitate construction. The following restrictions shall apply:

- No vehicles or plant machinery shall park or operate unless a suitable load spreading surface is in place. The load spreading surface shall be installed and maintained as specified under the heading **Ground Protection Measures**. This shall remain in place throughout the entire demolition and construction phase or until any new permanent hard surfacing is installed. Any pedestrian activity other than very occasional shall also require a suitable load spreading surface.
- Removal of existing structures such as walls, steps and hard surfaces (where applicable) shall be undertaken using hand tools or a mechanical excavator operating from outside the Restricted Activity Zone and carefully marshalled by the project arborist.
- No excavation shall occur beneath any existing hard surfacing and its sub-base or beneath the foundations of any structure such as walls, steps or paving.
- Where a new hard surface is proposed over the Root Protection Areas of T1, T2, T9 and T10, a permeable surface and sub-base shall be utilised to enable passage of oxygen and water to the soils beneath and a 3-dimensional collar confinement system shall be incorporated into the sub-base to improve its load bearing capacity.
- Excavation for new pedestrian surfaces shall not exceed a depth of 150mm and shall be undertaken using hand tools.
- No further excavation shall occur in this zone without consulting the project arborist and obtaining approval from the local authority.
- Existing ground levels shall be retained undisturbed or raised by no more than 150mm. Ground levels may only be raised using granular topsoil (not rich in clay) or where new surfacing is proposed.
- No new permanent or temporary structures shall be erected other than those shown on the planning application documents unless approved by the local authority.
- Underground services shall not be installed in this zone without prior consultation with the project arborist and a methodology agreed and approved by the local authority.
- All roots are encountered in excess of 50mm diameter, they shall be retained wherever possible and protected with damp sack during times that they are unearthed. Any roots in excess of 10mm that need to be severed shall be pruned with secateurs.
- Storage of materials and spoil shall be avoided unless it has been agreed with the project arborist that the ground protection measures are adequate to ensure no soil compaction or contamination occurs. All hazardous materials (including non-essential cement products) shall be forbidden.
- No fires shall be permitted.

**Restricted Activity Zone B**

Within this zone it is proposed to excavate for the basement. Either contiguous piling (or sheet piling) shall be installed along the edge of the basement, or an alternative method shall be adopted which does not disturb soils beneath the footings of the basement (e.g. piling). A typical method of piling would be to excavate to a specified depth (e.g. 1m), install shuttering and then cast the concrete basement walls. Then to excavate short sections beneath this wall and cast deeper concrete. Then to excavate in between these deeper sections and lift with concrete. In this manner excavation may continue to any specified depth without disturbing soils beyond the footprint of the build.

The specific method adopted will vary between contractors. However, the following restrictions will apply and must be adhered to:

- No excavation or ground disturbance shall occur beyond the footprint of the basement.
- Where a small excavator is used, it shall operate from within the footprint of the basement.
- The excavator or piling rig shall be marshalled to ensure no contact is made with any tree canopy.
- The project arborist shall oversee the initial stages of excavation or piling.

**Siting of Cabins**

Cabins shall be located outside of Construction Exclusion Zones and Restricted Activity Zones unless agreed otherwise by the project arborist. Where this is being considered, the project arborist shall be consulted and specific tree protection measures agreed. The following general restrictions will apply:

- All services to and from site cabins shall be installed above ground through any Root Protection Areas.
- No excavation shall occur within Root Protection Areas to enable cabins to be installed.
- The cabins shall be bounded on a suitable load spreading surface.

**Fence Posts or Decking Posts**

If permanent fencing or decking is to be installed within Root Protection Areas, the following restrictions shall apply:

- All post holes shall be excavated by hand and kept as narrow as possible (maximum diameter 300mm).
- Exploratory post holes shall be dug before committing to post / panel positions. If any roots in excess of 50mm are encountered they are to remain intact and the post hole shall be relocated slightly. The fencing system must permit such flexibility (i.e. where fixed panel widths are used all post holes must be excavated before committing to the final location).
- Any roots in excess of 10mm which are severed shall be neatly pruned back with secateurs. This will encourage healing and reduce the likelihood of infection.
- Walls shall be avoided over Root Protection Areas unless their foundations may be spanned over roots using a beam system.
- Hedges may be planted within Root Protection Areas using hand tools to minimise excavation.