BS 5837 Arboricultural Report

Impact Assessment & Method Statement

at

Barnes Hospital
South Worple Way
Barnes
SW14 8SU

Dated
25th October 2022

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 29th 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 FDSc (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[1].

2.3. Survey Extent

2.3.1. The area indicated below[2] shows the extent of the site.

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

[2] 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 Residrill 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-

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
Urgent	As soon as possible	None
Very High	Within 1 Month	None
High	Within 3 Months	T10 and T14
Moderate	Within 1 year	T1, T2, T5, T6 and T19
Low	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
0.5	None
1	T9, T10, T11, T13, T14, T15 and T16
1.5	T1, T2, T4, T5, T6, T7, T8, T12, T19, T20, T21, T23, T24, T25 and T26
3	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 9th 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 in 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 http://www.pfaf.org/user/Plant.aspx?LatinName=Fraxinus+excelsior 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 http://www.pfaf.org/user/Plant.aspx?LatinName=Robinia+pseudoacacia 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 http://www.pfaf.org/user/Plant.aspx?LatinName=Ilex+aquifolium 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 http://www.pfaf.org/user/Plant.aspx?LatinName=Aesculus+hippocastanum 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 http://www.pfaf.org/user/Plant.aspx?LatinName=Tilia+x+europaea 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 climes. 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 Innonotus hispidus. Visit http://en.wikipedia.org/wiki/Platanus 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 http://www.pfaf.org/user/Plant.aspx?LatinName=Betula+pendula 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 pink, and the proposed ground floor layout is indicated in pale green. The existing vehicular access from South Worple Way 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	T6, T7, T8, T19, T22 and T23
RPA: Residential Building Foundations	T6 and T7
RPA: Refuse Enclosure	T9 and T11
RPA: New Pedestrian Surface	T4, T5, T6, T7, T8, T17, T19, T20, T21, T22, T23, T25
RPA: Replace Existing Hard Surface	T6, T7, T8 and T11
RPA: Underground Services	None Anticipated – To be confirmed
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. CAVAT Valuation

4.3.1. In line with the local authority's Local Plan (Policy LP 16 – *Trees, Woodlands & Landscape*), a full CAVAT valuation is provided for the trees that require removal to facilitate the proposals. A screenshot of LP 16 is replicated below:

Policy LP 16

Trees, Woodlands and Landscape

A. The Council will require the protection of existing trees and the provision of new trees, shrubs and other vegetation of landscape significance that complement existing, or create new, high quality green areas, which deliver amenity and biodiversity benefits.

B. To ensure development protects, respects, contributes to and enhances trees and landscapes, the Council, when assessing development proposals, will:

Trees and Woodlands

1. resist the loss of trees, including aged or veteran trees, unless the tree is dead, dying or dangerous; or the tree is causing significant damage to adjacent structures; or the tree has little or no amenity value; or felling is for reasons of good arboricultural practice; resist development that would result in the loss or deterioration of irreplaceable habitat such as ancient woodland;
2. resist development which results in the damage or loss of trees that are considered to be of townscape or amenity value; the Council will require that site design or layout ensures a harmonious relationship between trees and their surroundings and will resist development which will be likely to result in pressure to significantly prune or remove trees;
3. require, where practicable, an appropriate replacement for any tree that is felled; a financial contribution to the provision for an off-site tree in line with the monetary value of the existing tree to be felled will be required in line with the 'Capital Asset Value for Amenity Trees' (CAVAT);
4. require new trees to be of a suitable species for the location in terms of height and root spread, taking account of space required for trees to mature; the use of native species is encouraged where appropriate;
5. require that trees are adequately protected throughout the course of development, in accordance with British Standard 5837 (Trees in relation to design, demolition and construction – Recommendations).

The Council may serve Tree Preservation Orders or attach planning conditions to protect trees considered to be of value to the townscape and amenity and which are threatened by development.

Landscape

1. require the retention of important existing landscape features where practicable;
2. require landscape design and materials to be of high quality and compatible with the surrounding landscape and character; and
3. encourage planting, including new trees, shrubs and other significant vegetation where appropriate.

4.3.2. CAVAT provides a basis for managing trees in the UK as public assets and provides a monetary value for a tree(s). In summary, the evaluation takes into account a tree's size, condition, characteristics, life expectancy and the public amenity it affords the local area.

4.3.3. A CAVAT valuation for trees proposed for removal has been calculated. The cumulative total for T1, T2, T3, T12 and T27 is £93,613. The calculation methodology can be viewed overleaf.

Project: 10770 Barnes Hospital
Name of Surveyor: E Hoyle
Date: # 7th March 2022

CAVAT

CALCULATE VALUE OF TREE STOCK

CTI Factor (Please select): 125
Unit Value Factor 15.88

Cumulative Total: £ 93,613

Tree Information		Step 1: Basic Value		Step 2: CTI Value		Step 3: Locational Value		Step 4: Structural Value		Step 5: Functional Value		Step 6: Amenity Value		Step 5: Final Value	FINAL VALUE
Tree No.	Species ID	Stem Diameter (1)	Basic Value	CTI Factor (Please select)	CTI Value	Accessibility Factor (Please select)	Location Value	Structural Factor (Please select)	Structural Value	Functional Factor (Please select)	Functional Value	Amenity Factor (Please select)	Amenity Value	Life Expect. Factor (Please select)	
1	T1 -Lombardy Poplar	75	£ 70,156	125	£ 87,695	75	£ 65,771	100	£ 65,771	100	£ 65,771	-10	£59,194	10 - <20	£32,557
2	T2 - Lombardy Poplar	74	£ 68,297	125	£ 85,372	75	£ 64,029	100	£ 64,029	100	£ 64,029	-10	£57,626	10 - <20	£31,694
3	T3 - Holly	30	£ 11,225	125	£ 14,031	75	£ 10,523	100	£ 10,523	100	£ 10,523	0	£10,523	20 - <40	£8,419
4	T12 - Cherry	42	£ 22,001	125	£ 27,501	75	£ 20,626	100	£ 20,626	100	£ 20,626	0	£20,626	20 - <40	£16,501
5	T27 - Silver Birch	20	£ 4,989	125	£ 6,236	75	£ 4,677	100	£ 4,677	100	£ 4,677	0	£4,677	40 - <80	£4,443

4.3.4. We have also calculated the CAVAT value of T6. T6 is not proposed for removal but a significant canopy reduction is proposed. The CAVAT value for T6 has been calculated before a canopy reduction and after a reduction to assess the tree's monetary value lost due to the proposed pruning.

Tree Information		Step 1: Basic Value		Step 2: CTI Value		Step 3: Locational Value		Step 4: Structural Value		Step 5: Functional Value		Step 6: Amenity Value		Step 5: Final Value	FINAL VALUE
Tree No.	Species ID	Stem Diameter (1)	Basic Value	CTI Factor (Please select)	CTI Value	Accessibility Factor (Please select)	Location Value	Structural Factor (Please select)	Structural Value	Functional Factor (Please select)	Functional Value	Amenity Factor (Please select)	Amenity Value	Life Expect. Factor (Please select)	
1	T6 London Plane (Pre-Pruning)	98	£ 119,782	125	£ 149,728	75	£ 112,296	100	£ 112,296	100	£ 112,296	10	£123,525	20 - <40	£98,820
2	T6 London Plane (Post-Pruning)	98	£ 119,782	125	£ 149,728	75	£ 112,296	100	£ 112,296	70	£ 78,607	10	£86,468	20 - <40	£69,174

4.3.5. The above calculation suggests that the valuation of T6 lost due to the proposed pruning shall be £29,646.

4.4. Mitigation Planting

4.4.1. 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.

4.4.2. Please refer to Exterior Architecture's Landscape GA Plans for further details, drawing ref: 1954-EXA-00-ZZ-DR-L-1000, 1954-EXA-00-ZZ-DR-L-1001 and 1954-EXA-00-ZZ-DR-L-1002.

4.4.3. The proposed tree planting shall significantly offset the CAVAT valuation for the trees to be removed to facilitate the development.

4.5. Impact on Tree Canopies

4.5.1. A canopy reduction of up to 4m is proposed to T6 to provide suitable clearance from the proposed development and to ensure suitable clearance for construction activity. Moreover, a canopy reduction is recommended to T6 regardless of the development proposals.

4.5.2. 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.

4.5.3. T7, T19, T22 and T23 also require minimal canopy pruning on one side to create a clearance of 2.5m from the nearest proposed building.

4.5.4. Such pruning to T7, T8, T19, T22 and T23 shall not significantly harm or disfigure the trees so long as pruning works are undertaken sympathetically (working to BS 3998: 2010 guidelines).

4.5.5. 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.

4.6. Impact on Tree Roots

4.6.1. A boundary wall separates T9, 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.

4.6.2. **Residential Building Foundations:**

4.6.3. 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 small 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. Excavations for building foundations in the RPA of T6 shall be supervised by the project arborist.

4.6.4. 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.

4.6.5. **Refuse Enclosure**

4.6.6. A covered refuse enclosure is proposed over the theoretical Root Protection Areas of T9 and T11. A permeable surface is to be installed in this area, as specified in Section 4.6.9. If any post holes are required within RPAs to support the roof or the refuse enclosure, the excavation shall be undertaken using hand tools only. If any tree roots are encountered, they shall be neatly pruned using clean sharp secateurs. Post holes shall be kept as narrow as possible, not exceeding 300mm in diameter.

4.6.7. **New Surfaces:**

4.6.8. 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.

4.6.9. The Impact Assessment Plan indicates where it is proposed to replace the existing surface over the theoretical Root Protection Areas of T8, T9 and T11. In order to ensure the potential impact is kept to an absolute minimum, a No-Dig construction method is proposed:

- A suitable load spreading surface shall be in place at all times during demolition and construction activities.
- No excavation shall occur beneath any 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 existing surfaces.
- The proposed surface shall be permeable.
- A granular substrate shall be installed and 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.

4.6.10. The new permeable surface shall improve the rooting conditions below existing areas of asphalt.

4.6.11. Where new, pedestrian surfaces are proposed over Root Protection Areas, the surfaces should be installed using a No-Dig construction method and permeable surfaces installed. Only hand tools should be used to lift any existing surfacing of soft ground to ensure the impact upon trees shall be minor.

4.6.12. **Underground Services:**

4.6.13. 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.

4.6.14. The exact location of underground services must be agreed with the local authority, and engineers made aware to keep these outside of Root Protection Areas.

4.6.15. **Changes in Ground Levels:**

4.6.16. 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.

4.6.17. **Soil Compaction:**

4.6.18. 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.

4.6.19. 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.

4.6.20. 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.

4.7. Demolition Activities

4.7.1. 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.

4.7.2. 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.

4.8. Hazardous Materials

4.8.1. 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.

4.9. Cabins and Site Facilities

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

4.9.2. 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.

4.10. Boundary Treatments

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

4.11. Impact of Retained Trees on the Development

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

4.11.2. 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.

4.11.3. 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.

4.12. Arboricultural Method Statement

4.12.1. Please refer to Appendix 6 for the Arboricultural Method Statement and Tree Protection Plan.

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.

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^{+} Indicates borderline C/B, though Category C is deemed to be most appropriate.

B^{-} 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. This 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: Glossary of Tree Data

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

A2.1 General Observations

Numbering System: 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.

Age Categories:

Young	Usually less than 10 years old.
Semi-Mature	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
Early-Mature	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
Mature	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
Veteran	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
Over Mature	As for veteran except management is not considered worthwhile.

Species: Common names and Latin names are given.

Height: Measured from ground level to the top of the crown.

Stem Diameter: 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.

Crown Height: 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.

Tree Diagram: 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.

Crown Spread: Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.

Observations: 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.

Recommendations: Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.

Priority Scale: Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:

Urgent	To be carried out as soon as possible.
Very High	To be carried out within 1 month.
High	To be carried out within 3 months.
Moderate	To be carried out within 1 year.
Low	To be carried out within 3 years.

Inspection Frequency: 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.

Vigour: An indication of growth rate and the tree's ability to cope with stresses:

High	Having above average vigour.
Moderate	Having average vigour.
Low	Having below average vigour.
Very Low	Tree is struggling to survive and may be dying.

Physiological Condition:

Good	Healthy and with no symptoms of significant disease.
Fair	Disease present or vigour is impaired.
Poor	Significant disease present or vigour is extremely low.
Very Poor	Tree is dying.

Structural Condition:

Good	Having no significant structural defects.
Fair	Some defects observed though no high priority works are required.
Poor	Significant defects found. Tree requires monitoring or remedial works.
Very Poor	Major defects which will usually require significant remedial works or tree removal.

Amenity Value:

Very High	Exceptional specimen, observable by a large number of people.
High	Attractive specimen, observable by a significant number of people.
Moderate	One of the above factors is not applicable.
Low	Unattractive specimen or largely hidden from view.

Life Expectancy: The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).

Retention Category: These are explained in detail in Appendix 1.

A2.2 Evaluation of Defects

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

Major	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
Significant	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.
Minor	A defect that is not likely to compromise the tree's structural integrity.

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*

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# 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

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

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

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

Lighting Levels

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

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

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

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

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

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

High Hedges

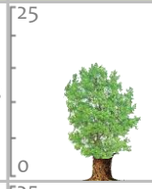
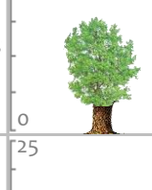
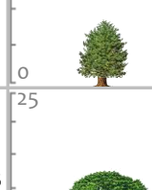
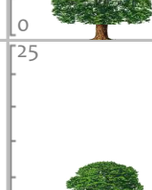
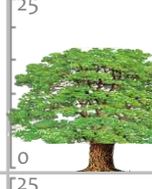
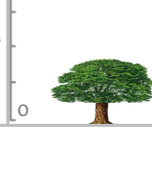
Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

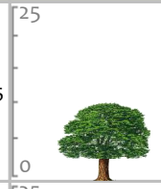
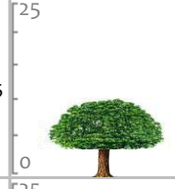
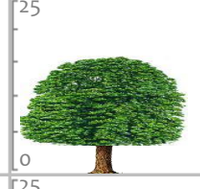
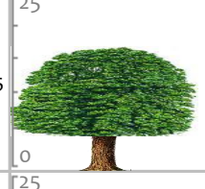
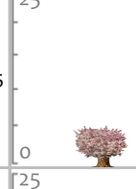
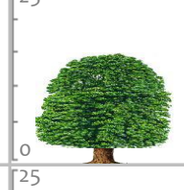
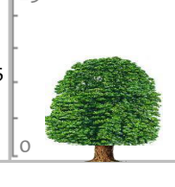
Tree Specific Websites

www.crowntrees.co.uk	Crown Consultants site containing useful information
www.trees.org.uk	Arboricultural Association
www.rfs.co.uk	Royal Forestry Society of England, Wales and N. Ireland
www.treehelp.Info	The Tree Advice Trust
www.woodland-trust.org.uk	The Woodland Trust
www.treecouncil.org.uk	The Tree Council

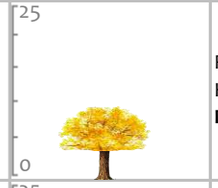
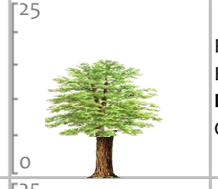
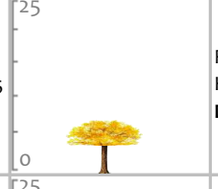
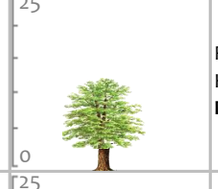
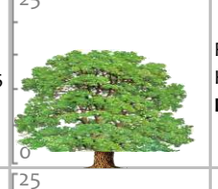
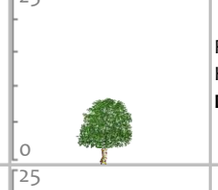
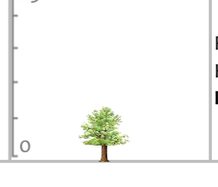
Appendix 6: Tree Data Schedule and Site Plans

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

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
								Priority	Inspect Freq (yrs)		
T1	Early-Mature **Lombardy Poplar** Populus nigra.	16	3	75	N 2.5, W 3.5, E 3.5, S 3		Form: Multi-stemmed at 3m with a slightly unbalanced crown. History: Previously reduced. **Defects: Scattered deadwood throughout and included bark between stem junctions.**	Reduce in height to 10m.	Moderate / 1.5	Moderate Good Fair	Moderate 10-20 **B**
T2	Early-Mature **Lombardy Poplar** Populus nigra.	16	3.5	74	N 3, W 3.5, E 3.5, S 1.5		Form: Multi-stemmed at 3m with a slightly unbalanced crown. History: Previously reduced. **Defects: Significant included bark between stem junctions and dead twigs to lower crown.**	Reduce in height to 10m.	Moderate / 1.5	Moderate Good Fair	Moderate 10-20 **B**
T3	Semi-Mature **Holly** Ilex aquifolium.	8	0	30	N 2, W 2, E 2, S 2		Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a / 3	Moderate Good Good	Moderate 20-40 **C**
T4	Semi-Mature **Lime** Tilia sp.	13	2	42	N 5, W 3, E 4.5, S 5.5		Form: Twin-stemmed at 3m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown reduction. **Defects: Scatterred dead branches throughout.** Other: Epicormic shoots prevented detailed inspection of stem base, Limited inspection, dimensions estimated.	No action required.	n/a / 1.5	Moderate Good Fair	Moderate 20-40 **B -**
T5	Semi-Mature **Lime** Tilia sp.	7	0	32	N 4, W 3, E 3, S 4		Form: Twin-stemmed at 2m with an unbalanced crown. History: Previously reduced. **Defects: Cavities developed at old pruning wounds and deadwood to lower crown.** Other: Vegetation prevented detailed inspection of stem base (Limited inspection, dimensions estimated).	Reduce back to old pruning points.	Moderate / 1.5	Moderate Good Poor	Low 20-40 **C**
T6	Mature **London Plane** Platanus x hispanica.	17	4	98	N 10, W 10.5, E 10, S 12		Form: Twin-stemmed at 4m with a slightly unbalanced crown. History: Lapsed pollard. **Defects: No significant defects observed.**	Reduce to a height of no more than 10m and a radial spreadd of no more than 3-4m.	Moderate / 1.5	Moderate Good Fair	High 20-40 **A -**
T7	Semi-Mature **Lime** Tilia sp.	8.5	3	46	N 5, W 5, E 3.5, S 4.5		Form: Multi-stemmed at 3.5m with a slightly unbalanced crown. History: Previously reduced. **Defects: Minor cavity developed at old pruning wound on stem at 3m above ground level.** Other: Epicormic shoots prevented detailed inspection of base, some dimensions estimated.	No action required.	n/a / 1.5	Moderate Good Fair	Moderate 40+ **B**

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

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
						9 0 9		Priority	Inspect Freq (yrs)		
T15	Mature **Horse Chestnut** Aesculus hippocastanum.	17	2	75	N 6, W 7, E 4.5, S 6		Position: Situated on third party land. Form: Tripple-stemmed at 3m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown reduction. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a / 1	Moderate Good Fair	Moderate 40+ **B**
T16	Mature **Horse Chestnut** Aesculus hippocastanum.	19	1.5	75	N 5, W 6, E 7, S 5		Position: Situated on third party land. Form: Twin-stemmed at 3m with a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a / 1	Moderate Good Fair	Moderate 40+ **B**
T17	Semi-Mature **Silver Maple** Acer saccharinum.	7	3	26	N 4.5, W 3, E 4.5, S 3		Form: Multi-stemmed at 3.5m with a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a / 3	Moderate Fair Good	Low 40+ **C**
T18	Semi-Mature **Ash** Fraxinus excelsior.	9	3	36	N 4, W 3.5, E 6, S 5		Form: Single stemmed with a slight lean and a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a / 3	Moderate Good Good	Moderate 40+ **B**
T19	Early-Mature **Bhutan Pine** Pinus wallichiana.	13	3.5	55	N 5, W 7.5, E 4.5, S 5		Form: Single stemmed and vertical with a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: Torn out branch from upper canopy, scattered deadwood and branch stubs to lower crown.**	Remdial prune.	Moderate / 1.5	Moderate Good Good	Moderate 40+ **B**
T20	Early-Mature **Bhutan Pine** Pinus wallichiana.	13	2	58	N 5.5, W 5, E 7, S 5		Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: Occasional pruning wounds due to crown lifting. **Defects: No significant defects observed.** Other: Ivy prevented detailed inspection of stem.	No action required.	n/a / 1.5	Moderate Good Good	Moderate 40+ **B**
T21	Semi-Mature **Silver Birch** Betula pendula.	8.5	3	20	N 2.5, W 1.5, E 4.5, S 2		Form: Single stemmed with a slight lean and an unbalanced crown. History: No evidence of significant pruning. **Defects: Scattered dead twigs to lower crown.** Other: Ivy prevented detailed inspection of stem.	No action required.	n/a / 1.5	Moderate Good Good	Low 20-40 **C**

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

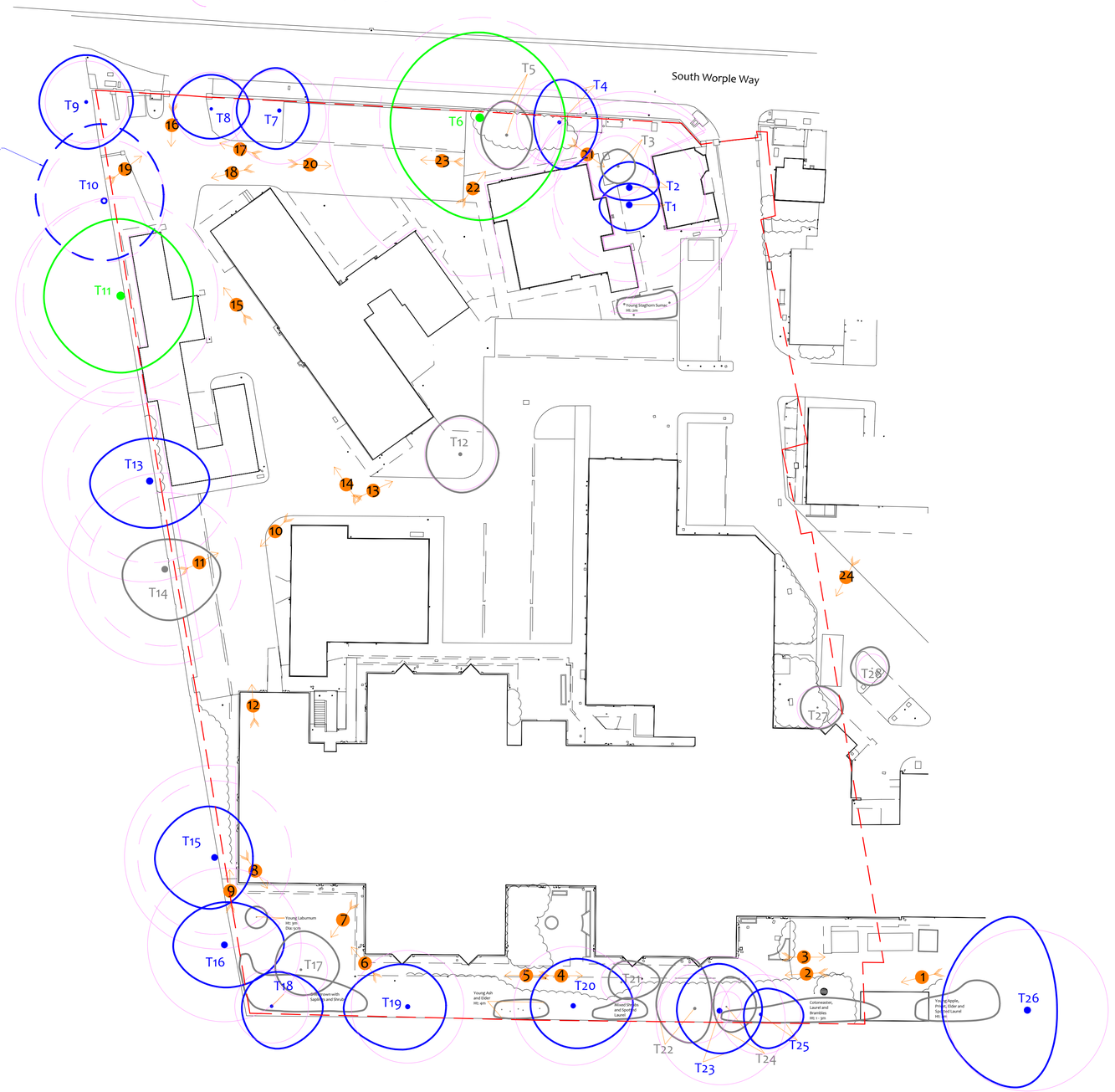
Tree Data Schedule

Reference (T = Group G = Hedge H = Shrub)	Age & Species	Height (m)	Diameter (m) at 1.5m	Crown Spread (m) N	E	S	W	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect (yrs)	Vigour: Physiological Condition	Vigour: Structural Condition	Amenity Value: Life Expectancy (yrs)	Amenity Value: Retention Category
T1	Early-Mature **Lombardy Poplar** Populus nigra.	16	3	75	3.5	3.5	3.5		Form: Multistemmed at 3m with a slightly unbalanced crown. Hickory: Previously reduced. **Defects: Scattered deadwood throughout and included bark between stem junctions.**	Reduce in height to 10m.	1-5	Moderate	Moderate Good Fair	Moderate 10-20	B
T2	Early-Mature **Lombardy Poplar** Populus nigra.	16	3.5	74	3.5	3.5	3.5		Form: Multistemmed at 3m with a slightly unbalanced crown. Hickory: Previously reduced. **Defects: Significant included bark between stem junctions and dead twigs to lower crown.**	Reduce in height to 10m.	1-5	Moderate	Moderate Good Fair	Moderate 10-20	B
T3	Semi-Mature **Holly** Ilex aquifolium.	8	0	39	2	2	2		Form: Single-stemmed and vertical with a balanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a	3	Moderate Good Good	Moderate 20-40	C
T4	Semi-Mature **Lime** Tilia sp.	13	2	47	3	5 5.5	4.5		Form: Twin-stemmed at 3m with a slightly unbalanced crown. Hickory: Occasional pruning wounds due to crown reduction. **Defects: Scattered dead branches throughout.** Other: Epicormic shoots prevented detailed inspection of stem base, Limited inspection, dimensions estimated.	No action required.	n/a	1-5	Moderate Good Fair	Moderate 20-40	B -
T5	Semi-Mature **Lime** Tilia sp.	7	0	31	3	4 3	4		Form: Twin-stemmed at 1m with an unbalanced crown. Hickory: Previously reduced. **Defects: Cavities developed at old pruning wounds and deadwood to lower crown.** Other: Vegetation prevented detailed inspection of stem base (Limited inspection, dimensions estimated).	Reduce back to old pruning points.	Moderate	1-5	Moderate Good Poor	Low 20-40	C
T6	Mature **London Plane** Platanus x hispanica.	17	4	98	5	10 12	10		Form: Twin-stemmed at 4m with a slightly unbalanced crown. Hickory: Topped (pollard). **Defects: No significant defects observed.**	Reduce to a height of no more than 16m and a radial spread of no more than 3-4m.	Moderate	1-5	Moderate Good Fair	High 20-40	A -
T7	Semi-Mature **Lime** Tilia sp.	8.5	3	69	5	5 4.5	5		Form: Multistemmed at 3.5m with a slightly unbalanced crown. Hickory: Previously reduced. **Defects: Minor cavity developed at old pruning wound on stem at 3m above ground level.** Other: Epicormic shoots prevented detailed inspection of base, some dimensions estimated.	No action required.	n/a	1-5	Moderate Good Fair	Moderate 40+	B
T8	Semi-Mature **Lime** Tilia sp.	10	3	39	4.5	4 3.5	4.5		Form: Multistemmed at 3m with a balanced crown. Hickory: Previously reduced. **Defects: Small scattered dead branches throughout.** Other: Epicormic shoots prevented detailed inspection of stem.	No action required.	n/a	1-5	Moderate Good Fair	Moderate 40+	B
T9	Semi-Mature **Horse Chestnut** Aesculus hippocastanum.	10	4	89	5.5	5.5 5.5	5.5		Position: Situated on third party land. Form: Single-stemmed and vertical with a balanced crown. Hickory: Occasional pruning wounds due to crown lifting. **Defects: Cavities developed at old pruning wounds.** Other: Limited inspection, dimensions estimated, Ivy growing up stem.	No action required.	n/a	1	Low Fair Good	Moderate 20-40	B
T10	Early-Mature **Horse Chestnut** Aesculus hippocastanum.	16	3.5	94	8	9 7	7		Position: Situated on third party land. Form: Single-stemmed and vertical with a slightly unbalanced crown. Hickory: Occasional pruning wounds due to crown reduction. **Defects: Significant tear wound to south east with decay developing and ganoderma observed beneath tearwound.** Other: Limited inspection, dimensions estimated.	Decay detection required.	High	1	Moderate Good Fair	High 10-20	B
T11	Mature **Horse Chestnut** Aesculus hippocastanum.	17	5	95	9	9 9	8.5		Position: Situated on third party land. Form: Multistemmed at 3m with a slightly unbalanced crown. Hickory: Occasional pruning wounds due to crown lifting. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a	1	Moderate Good Fair	High 20-40	A
T12	Early-Mature **Cherry** Prunus sp.	5	1	41@ Base	4.5	4.5 4.5	4.5		Form: Multistemmed at 0.5m with a balanced crown. Hickory: No evidence of significant pruning. **Defects: Included bark between stem junctions.**	No action required.	n/a	1-5	Moderate Good Fair	Moderate 20-40	C +
T13	Mature **Horse Chestnut** Aesculus hippocastanum.	15	2	84	7	5 5.5	5		Position: Situated on third party land. Form: Single-stemmed to a height of 3m. Hickory: Occasional pruning wounds due to crown lifting. **Defects: Cavities developed at old pruning wounds.** Other: Limited inspection, dimensions estimated.	No action required.	n/a	1	Moderate Good Fair	High 40+	B
T14	Mature **Horse Chestnut** Aesculus hippocastanum.	14	1.5	75	5	5.5 6	6.5		Position: Situated on third party land. Form: Multistemmed at 3m with a slightly unbalanced crown. Hickory: Multiple pruning wounds due to crown lifting. Occasional pruning wounds due to crown reduction. **Defects: Significant cavities developed at old pruning wounds, showing signs of ganoderma. Deadwood throughout.** Other: Limited inspection, dimensions estimated.	Remedial prune and detailed inspection of cavities.	High	1	Moderate Fair Fair	Moderate <10	C -
T15	Mature **Horse Chestnut** Aesculus hippocastanum.	17	2	75	7	6 4.5	6		Position: Situated on third party land. Form: Triple-stemmed at 1m with a slightly unbalanced crown. Hickory: Occasional pruning wounds due to crown reduction. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a	1	Moderate Good Fair	Moderate 40+	B
T16	Mature **Horse Chestnut** Aesculus hippocastanum.	19	1.5	75	6	5 7	5		Position: Situated on third party land. Form: Twin-stemmed at 1m with a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a	1	Moderate Good Fair	Moderate 40+	B
T17	Semi-Mature **Silver Maple** Acer saccharinum.	7	3	36	3	4.5 3	4.5		Form: Multistemmed at 3.5m with a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a	3	Moderate Fair Good	Low 40+	C
T18	Semi-Mature **Ash** Fraxinus excelsior.	9	3	39	3.5	4 3	4		Form: Single-stemmed with a slight lean and a balanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.** Other: Limited inspection, dimensions estimated.	No action required.	n/a	3	Moderate Good Good	Moderate 40+	B
T19	Early-Mature **Bhutan Pine** Pinus wallichiana.	13	3.5	33	7.5	5 4.5	5		Form: Single-stemmed and vertical with a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: Torn out branch fromcopper canopy, scattered deadwood and branch stubs to lower crown.**	Remedial prune.	Moderate	1-5	Moderate Good Good	Moderate 40+	B
T20	Early-Mature **Bhutan Pine** Pinus wallichiana.	13	2	58	5	5.5 5	7		Form: Single-stemmed with a slight lean and a slightly unbalanced crown. Hickory: Occasional pruning wounds due to crown lifting. **Defects: No significant defects observed.** Other: Ivy prevented detailed inspection of stem.	No action required.	n/a	1-5	Moderate Good Good	Moderate 40+	B
T21	Semi-Mature **Silver Birch** Betula pendula.	8.5	3	39	2.5	4.5 1.5	4.5		Form: Single-stemmed with a slight lean and an unbalanced crown. Hickory: No evidence of significant pruning. **Defects: Cavities developed at old pruning wounds.** Other: Ivy prevented detailed inspection of stem.	No action required.	n/a	1-5	Moderate Good Good	Low 20-40	C
T22	Semi-Mature **False Acacia** Robinia pseudoacacia.	9	4.5	39	4.5	4 3	4		Form: Twin-stemmed at 3m with a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: Scattered dead twigs throughout.**	No action required.	n/a	3	Moderate Good Fair	Moderate 20-40	C +
T23	Semi-Mature **Bhutan Pine** Pinus wallichiana.	16	6	69	5	5 5	5		Form: Twin-stemmed at 3m with a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.** Other: Debris prevented detailed inspection some dimensions estimated.	No action required.	n/a	1-5	Moderate Good Good	High 40+	B
T24	Semi-Mature **False Acacia** Robinia pseudoacacia.	6	4	75	7.5	7.5 7	8.5		Form: Single-stemmed and vertical with an unbalanced crown. Hickory: No evidence of significant pruning. **Defects: Scattered deadwood to lower crown suppressed by adjacent tree.**	No action required.	n/a	1-5	Low Poor Fair	Low 10-20	C
T25	Semi-Mature **Bhutan Pine** Pinus wallichiana.	12	3	39	7.5	7.5 7.5	7.5		Form: Single-stemmed with a slight lean and a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a	1-5	Moderate Good Fair	Moderate 40+	B
T26	Early-Mature **London Plane** Platanus x hispanica.	16	2	79	7.5	7.5 7.5	7.5		Form: Multistemmed at 4m with a heavily un-balanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a	1-5	Moderate Good Fair	Moderate 40+	B
T27	Semi-Mature **Silver Birch** Betula pendula.	8.5	3.5	35	7.5	7.5 7.5	7.5		Form: Single-stemmed and vertical with a slightly unbalanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a	3	Moderate Good Good	Moderate 40+	C
T28	Young **Bhutan Pine** Pinus wallichiana.	6	1.5	14	5.5	7 5	7		Form: Single-stemmed and vertical with a balanced crown. Hickory: No evidence of significant pruning. **Defects: No significant defects observed.**	No action required.	n/a	3	Moderate Good Good	Moderate 20-40	C

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.

We understand T10 has fallen in the 2022 storms.



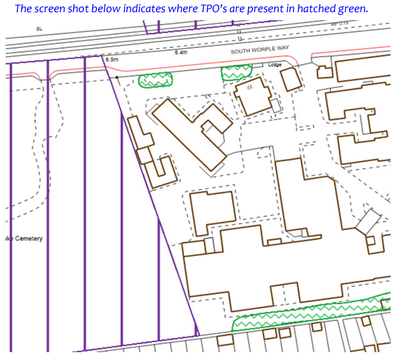
Tree Protection Status:

We were informed by London Borough of Richmond upon Thames that:

- There are tree preservation orders affecting trees within the site.

- Mortlake Cemetery immediately adjacent the western boundary lies within a Conservation Area.

The screen shot below indicates where TPO's are present in hatched green.



Tree Constraints Plan

(Existing Layout)

Tree Ref.	Species	Height (m)	Root Protection Area Radius (m)	m²	Square (m)
T1	Lombardy Poplar	16	9.0	254	16.0
T2	Lombardy Poplar	16	8.9	248	15.7
T3	Holly	8	3.6	41	6.4
T4	Lime	13	5.0	80	8.9
T5	Lime	7	3.8	46	6.8
T6	London Plane	17	11.8	434	20.8
T7	Lime	8.5	5.5	96	9.8
T8	Lime	10	4.3	59	7.7
T9	Horse Chestnut	10	4.8	72	8.5
T10	Horse Chestnut	16	7.2	163	12.8
T11	Horse Chestnut	17	11.4	408	20.2
T12	Cherry	5	4.2	55	7.4
T13	Horse Chestnut	15	9.6	290	17.0
T14	Horse Chestnut	14	9.0	254	16.0
T15	Horse Chestnut	17	9.0	254	16.0
T16	Horse Chestnut	19	9.0	254	16.0
T17	Silver Maple	7	3.1	31	5.5
T18	Ash	9	4.3	59	7.7
T19	Bhutan Pine	13	6.6	137	11.7
T20	Bhutan Pine	13	7.0	152	12.3
T21	Silver Birch	8.5	2.4	18	4.3
T22	False Acacia	9	4.1	52	7.2
T23	Bhutan Pine	16	7.6	180	13.4
T24	False Acacia	6	1.8	10	3.2
T25	Bhutan Pine	12	4.7	69	8.3
T26	London Plane	16	9.5	282	16.8
T27	Silver Birch	8.5	2.4	18	4.3
T28	Bhutan Pine	6	1.7	9	3.0

Drawing No:	CCL 10770 / TCP Rev: 4
Title:	Tree Constraints Plan (Existing Layout)
Site:	Barnes Hospital SW14 8SU
Scale:	1:300 Paper Size: A1

CROWN Arboricultural Consultants 01423 316660

Tree Retention Categories Stems & canopies shown

Category A 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.
Category B tree	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
Category C tree	Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.
Category U tree	Trees unsuitable for retention due to their very poor condition.

Tree Constraints Plan

BS 5837 Root Protection Area (radius = 12xstem diameter)

Root Protection Area needing amendment due to site conditions, e.g. presence of exising road or building.

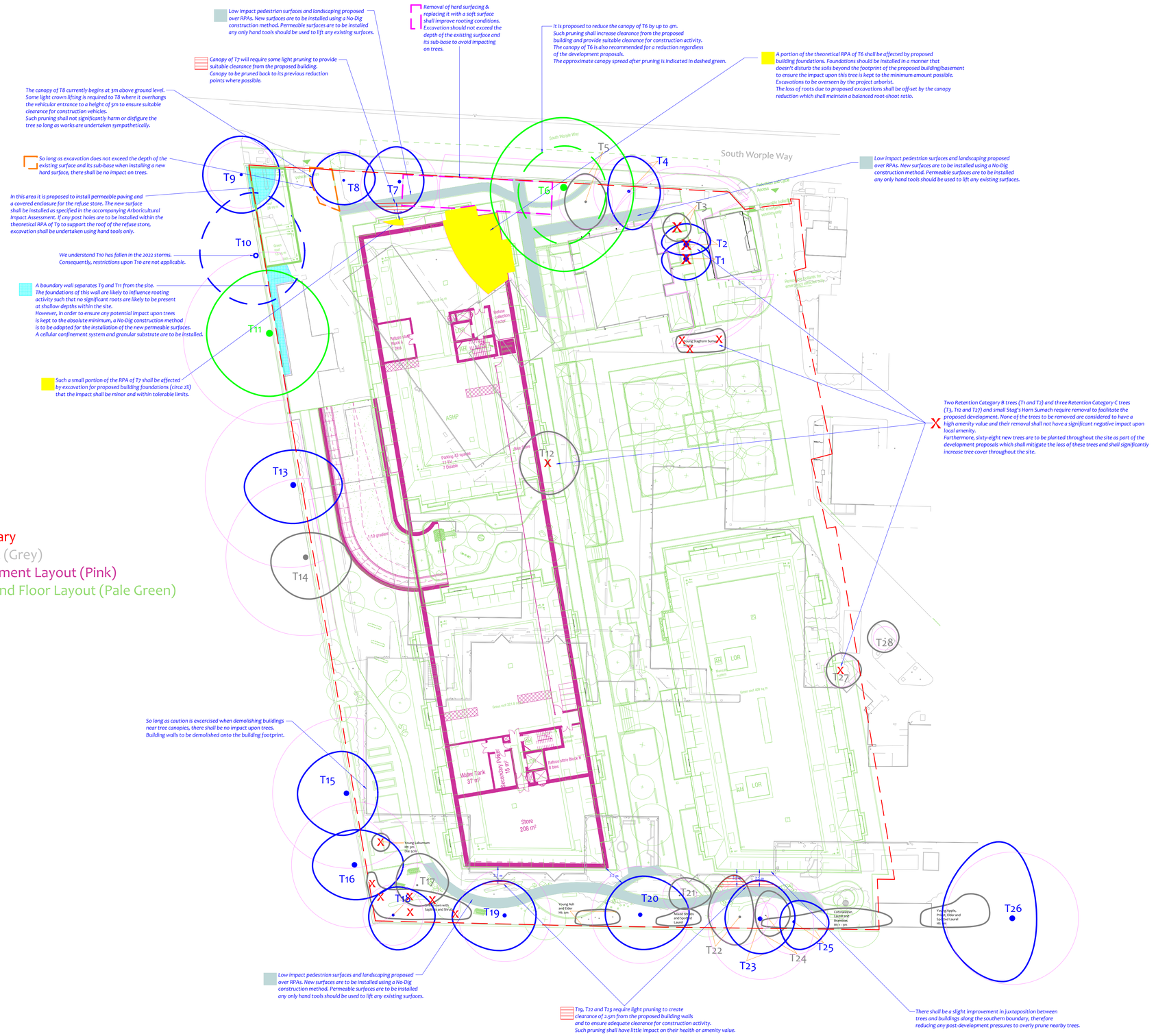
Root Protection Area having been amended to account for for site conditions

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

X Tree to be removed to facilitate the proposal

X Tree to be removed due to its low quality

Proposed pruning



Redline Boundary
Existing Layout (Grey)
Proposed Basement Layout (Pink)
Proposed Ground Floor Layout (Pale Green)

Impact Assessment Plan

(Existing Layout with Proposals Overlaid)

Tree Ref.	Species	Height (m)	Root Protection Area		
			Radius (m)	m²	Square (m)
T1	Lombardy Poplar	16	9.0	254	16.0
T2	Lombardy Poplar	16	8.9	248	15.7
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T4	Lime	13	5.0	80	8.9
T5	Lime	7	3.8	46	6.8
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T7	Lime	8.5	5.5	96	9.8
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T15	Horse Chestnut	17	9.0	254	16.0
T16	Horse Chestnut	19	9.0	254	16.0
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T21	Silver Birch	8.5	2.4	18	4.3
T22	False Acacia	9	4.1	52	7.2
T23	Bhutan Pine	16	7.6	180	13.4
T24	False Acacia	6	1.8	10	3.2
T25	Bhutan Pine	12	4.7	69	8.3
T26	London Plane	16	9.5	282	16.8
T27	Silver Birch	8.5	2.4	18	4.3
T28	Bhutan Pine	6	1.7	9	3.0

Drawing No:	CCL 10770 / IAP Rev: 3
Title:	Impact Assessment Plan (Existing Layout with Proposals Overlaid)
Site:	Barnes Hospital SW14 8SU

CROWN
Arboricultural Consultants
01422 316660

Tree Retention Categories
Stems & canopies shown

- Category A 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.
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Impact Assessment Plan

- BS 5837 Root Protection Area (radius = 12xstem diameter)
- Root Protection Area needing amendment due to site conditions, e.g. presence of exising road or building.
- Root Protection Area having been amended to account for for site conditions

X — Tree to be removed to facilitate the proposal

X — Tree to be removed due to its low quality

Arboricultural Method Statement

CROWN Tree Consultancy 08000 14 13 30

Site: Barnes Hospital, South Worple Way, SW14 8SU

Author: Emma Hoyle, FDSc (Arboriculture), ED (Forestry & Arboriculture), M. Arbor. A

Date: 25 / 10 / 2022 **Revision:** 4 **CCL ref No:** 10770

Client: Star Land Realty UK Ltd

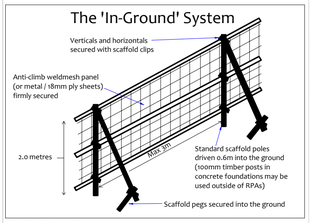
Tree Protection Barriers

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. Weldmesh 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.

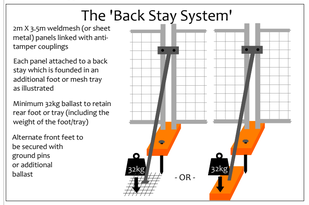


The Back-Stay System

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 or 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, weldmesh 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 baseplate secured with ground pins or additional ballast. Where ground pins are not used, the total weight of the foot/plate plus ballast should total not less than 32kg.

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.

Removal of Tree Protection Barriers

Removal of protective fencing or ground protection measures shall be done after all major construction work is complete and their removal has been approved by the appointed arborist.

Ground Protection Measures

Within Restricted Activity Zones, soils containing roots may be subject to compaction due to general construction activity (including pedestrian activity and use of plant machinery). In order to minimise compaction, it is proposed to ensure that a suitable load-spreading surface is in place at all times.

Any existing hard surfacing may be retained where engineers consider it adequate to spread the load of construction traffic. Otherwise it shall be reinforced or replaced with adequate ground protection measures.

Unless specified otherwise, ground protection shall consist of 24mm OSB boards laid at double thickness and screwed together to prevent slippage. The ground shall first be made even by raking, or by adding a few centimetres of sand or woodchip. Where only pedestrian traffic will occur boards or planks may be supported by a scaffold framework. The scaffold may be founded on poles driven into the ground and/or onto blocks (to raise the scaffold) with additional couplings to make the framework secure.

Where engineers consider OSB boards to be inadequate (e.g. for large plant machinery where the tracks may chew up the timber) sturdier ground protection measures will be installed such as road plates, or 100mm of 7–40mm angular gravel installed in 3D cellular confinement system (e.g. Cellweb TM).

If a piling mat is required, engineer's specifications should be referred to.

The ground protection measures shall be installed and approved before commencement of demolition and construction activity and before the arrival of plant machinery or materials. They shall remain in place until all heavy construction activity is complete or until they are due to be replaced with a new hard surface.

Construction Exclusion Zones

Within Construction Exclusion Zones the following restrictions shall apply:

- Tree Protection Barriers shall be erected and maintained throughout the entire project as indicated on the Tree Protection Plan and under the header -*Tree Protection Barriers*.
- These shall remain in place at all times except when authorised pedestrian paving and landscaping works are being undertaken. At such times, adequate ground protection measures shall be installed, and excavation shall be limited to that required for installing the new surfaces. The project arborist shall be consulted prior to any works being undertaken in these zones.
- No other construction activity or excavation shall occur unless agreed otherwise by the project arborist and local authority.
- No vehicles or plant machinery shall be driven or parked.
- No tree works, other than those specified on this document shall be undertaken.
- No alterations of ground levels or conditions shall occur.
- No chemicals or cement washings permitted.
- No temporary structures shall be installed.
- No spoil shall be stored.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.
- Removal of hard surfaces, structures or turf shall be done using hand operated tools only and supervised by the project arborist.

Tree Works Specification

The following table specifies the tree works which will be required prior to the commencement of construction activity:

Tree Reference	Action Required	Notes
T1, T2, T3, T12, T22 and 2m tall Stag's horn Sumach	Remove.	Stumps of trees within the RPAs of retained trees shall be removed with a stump-grinder NOT a mechanical excavator.
T6	Reduce overall canopy by a maximum of 4m.	Branches to be pruned to a suitable pruning point.
T8	Crown lift to a height of 5m to provide suitable construction vehicle access.	Branches to be pruned back to a secondary branch junction or the branch collar wherever possible. Pruning to be kept to a minimum to achieve the desired clearance of 5m.
T7, T19, T22 and T23	Prune back foliage growing towards the closest building to create a clearance of 2.5m.	Branches to be pruned back to a secondary branch junction or the branch collar wherever possible.

Timing of Operations

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

Order	Phase	Activity
1st.	Pre-Construction Phase	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.		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 inecessary.
		Protection measures confirmed acceptable by the local authority
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

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/or 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 wall, steps or paving.
- **Where a new surface is proposed over the Root Protection Areas of T8, T9 and T11,** a No-Dig construction method is to be adopted. A permeable surface and granular substrate shall be utilised to enable passage of oxygen and water to the soils beneath and a 3-dimensional cellular confinement system shall be incorporated into the sub-base to improve its load bearing capacity
- Where **new pedestrian surfaces** are proposed, a No-Dig construction method is to be adopted and permeable surfaces are to be installed. Any lifting of existing paving shall be undertaken using hand tools.
- If any post holes require installation to support the roof of the refuse store enclosure, excavation shall be undertaken using hand tools only. Any roots encountered shall be neatly severed using clean, sharp secateurs and post holes shall not exceed 300mm diameter.
- 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 area without prior consultation with the project arborist and a methodology agreed and approved by the local authority.
- If roots are encountered in excess of 25mm diameter, they shall be retained wherever possible and protected with damp sacking 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 beyond the footprint of the basement (e.g. pinning). A typical method of pinning 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 the wall and cast deeper 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 and should be confirmed with the local authority prior to commencement. However, the following restrictions shall apply and must be adhered to:

- No excavation or ground disturbance shall occur beyond the footprint of the basement.
- Where an 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/piling.

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General Restrictions - Throughout the Site

Preparatory Works

No demolition, removal of surfaces, or soil stripping shall commence until the protective fencing and ground protection measures are installed to the satisfaction of the local authority.

Fires

No fires shall be permitted beneath any tree canopy or within 5m of any tree stem, branch or foliage. No fires shall be permitted within any Construction Exclusion Zone or Restricted Activity Zone. No fires shall be permitted in the vicinity of any exposed tree roots.

Canopy Protection

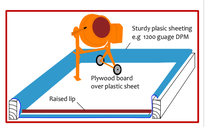
In order to protect tree canopies the following restrictions shall apply throughout the site:

- No machinery in excess of 2m shall pass beneath the canopy of any tree without being carefully marshalled in order to ensure that no branches are damaged.
- If materials require installation or delivery beneath tree canopies, this shall be done without the use of overhead cranes.
- If materials are to be installed or delivered close to tree canopies (but not beneath them) and a crane is required, they shall be carefully marshalled in order to ensure that branches are not accidentally damaged.

Storage of Spoil and Materials

Storage of materials and spoil shall be avoided in any Construction Exclusion Zones and Restricted Activity Zones 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.

Hazardous Materials



Any mixing of cement based materials shall take place outside the Construction Exclusion Zones and Restricted Activity Zones. Where cement is to be mixed at considerable distances from trees and water run-off cannot enter Root Protection Areas, then no further special measures are required. Otherwise, provision shall be made to ensure that the mixing area is contained so that no water run-off enters the Root Protection Area of any trees (see diagram for example). Mixers and barrows shall be cleaned within this area.

All other chemicals hazardous to tree health, including petrol and diesel, shall be stored in suitable containers as specified by current COSHH Regulations, and kept away from Root Protection Areas.

Underground Services

No underground services (including soak-aways) shall be located in any part of the Construction Exclusion Zones or Restricted Activity Zones unless done so in a manner detailed in a specific Method Statement and approved by the local authority.

Site Hoarding

If site hoarding shall be installed over the Root Protection Area of any tree, the following restrictions shall apply:

- Ground levels shall be maintained as existing.
- Post holes shall not exceed 300mm x 300mm.
- No post hole shall be excavated within 1.5m of any tree stem.
- Post holes shall be excavated using hand tools or by a post-hole auger attached to plant machinery sited outside of Root Protection Areas.
- Roots in excess of 25mm shall be retained wherever possible.
- Roots in excess of 10mm shall be pruned with sharp secateurs.
- Pruning shall be minimal and only undertaken where absolutely necessary to facilitate the site hoarding. It shall be undertaken by a reputable tree surgeon working to BS 3998 (2010).

Site hoarding may be installed in place of the specified tree protection measures subject to the approval of the local authority with regard to its location and specification.

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 founded 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 25mm 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.

Site Monitoring Schedule

Inspection	Site Attendees	Comments
Pre- Start Desk-top 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.
Pre-Start Meeting 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)
Monthly Inspection and Reporting 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.
Oversee initial stages of excavation for foundations in Restricted Activity Zone 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.
Any other ground disturbance in Restricted Zones & Construction Exclusion Zones 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.
Post-Construction Meeting 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

CROWN Arboricultural Consultants 01422 316660

BS 5837 Root Protection Area (radius = 12xstem diameter)

Root Protection Area needing amendment due to site conditions, e.g. presence of exising road or building.

Root Protection Area having been amended to account for for site conditions

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

Tree Retention Categories
Stems & canopies shown

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Category C tree	Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.
Category U tree	Trees unsuitable for retention due to their very poor condition.

Drawing No: CCL 10770 / TPP Rev: 4

Title: Tree Protection Plan (Existing Layout with Proposals Overlaid)

Site: Barnes Hospital SW14 8SU

Scale: 1:400 Paper Size: A1