BS5837:2005 Tree Survey Report, incorporating Arboricultural Implications Assessment and Method Statement

In support of an application for a docking station on the footway:

opposite 205 Eversholt Street (adjacent to the Mayford Estate) NW1

Site Ref: 02/610262
Status: FINAL
Date: 04 May 2009

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SUMMARY AND OVERVIEW

Transport for London has been tasked with coordinating the implementation of a comprehensive Cycle Hire Scheme within London. The Cycle Hire Scheme requires the installation of a network of about 400 docking stations in nine central London boroughs. The Cycle Hire Scheme is planned to be operational by May 2010.

This Tree Survey Report relates to the installation of a single docking station on the footway opposite 205 Eversholt Street (adjacent to the Mayford Estate), NW1, and supports the application for full planning permission. It presents the results of an arboricultural survey conducted to BS5837:2005, along with an *Arboricultural Implications Assessment* and an *Arboricultural Method Statement*. The survey was undertaken by Cresswell Associates (a Hyder Consulting Group company) on behalf of Transport for London.

The proposed docking station (hereafter referred to as 'the Site') is located approximately 3.5m from a mature London Plane and within its Root Protection Area. Beyond this tree is another mature London Plane, Full details of this tree these trees are included in the Tree Data Schedule (Appendix 3).

The Tree Implications Table in Section 5.2 sets out the likely implications of different docking station foundation designs on trees adjacent to the development.

The location of the Site, being approximately 3.5m away from the nearest tree and situated radially to this tree means that a relatively small number of roots shall be encountered compared with the portion of the RPA which shall remain untouched. Some significant roots may need to be severed but this is unlikely to have a major detrimental impact on tree health.

The stem of the tree closest to the site shall require additional protection, as specified in Section 6, to prevent damage by construction machinery.

Assuming that the measures outlined in the Arboricultural Method Statement are adopted, it is considered that the proposed docking station would not detrimentally impact on trees within the vicinity of the development.

1 INTRODUCTION

1.1 Background and instructions

Hyder Consulting (UK) Limited have been instructed by Transport for London (TfL) to conduct an Arboricultural Survey at the site of a proposed Cycle Hire Scheme docking station on the footway opposite 205 Eversholt Street (adjacent to the Mayford Estate), NW1, and to produce the findings in a report. The report also includes an *Arboricultural Implications Assessment* (AIA) and an *Arboricultural Method Statement* (AMS).

Surveys have been undertaken with reference to a supplied plan, showing the location and extent of the proposed development (the 'General Arrangement', drawing number: TE596PI0110-GA provided by TfL). Tree positions have been plotted in accordance with this plan. Where site survey has identified additional trees, the locations of these have been plotted on the Tree Constraints Plan (Appendix 4) using measurements taken on site.

1.2 Scope and purpose of the report

This report is designed to accompany a planning application for the installation of a single Cycle Hire Scheme docking station at the Site. Its purpose is to assist and inform the planning process according to guidelines laid out in BS5837:2005 'Trees in relation to construction – recommendations' (BSi, 2005).

Where appropriate, trees located on or adjacent to the Site have been surveyed where either:

(i) the *Root Protection Area* (RPA) of the tree is located within or immediately adjacent to the footprint of the development, or
(ii) young plantings occur immediately adjacent to the Site, which have the potential to affect the proposed docking station as they grow and their root systems develop.

All young plantings have been surveyed, including those with a stem diameter below 75mm.

2 TREE SURVEY METHODOLOGY

2.1 Date of survey

This report is based on a visual inspection carried out from the ground on 24 April 2009.

2.2 Survey methodology

The tree survey included all trees with the potential to be affected by the proposed development, as detailed in Section 1.2. Trees were visually surveyed from ground level using the *Visual Tree Assessment* (VTA) technique developed by Mattheck and Broeler (1994). No climbed inspections or specialist decay detection was undertaken.

In line with the approach recommended in BS5837:2005, the following data was gathered for each tree surveyed:

- Tree number
- Tree species (botanical names follow Stace (1997) for higher plants)
- Age (expressed as an age class category)
- Tree height (in metres)
- Crown height (height of crown clearance above ground in metres)
- Stem diameter (measured at 1.5 metres above ground level)
- Crown spread (measured in north, south, east and west directions)
- Observations on tree position, form, pruning history and any major defects observed
- Recommendations for arboricultural works, along with a priority rating for completion of these works
- Tree physiological and structural condition
- Life expectancy (expressed as one of four categories)
- BS5837 retention category

In addition, a further two categories provide exclusion distances (measured from the centre of the tree stem, as a radius). These are:

- The NJUG Prohibited Zone (NJUG, 2007)
- The Hyder recommended 'no excavation zone'

The Hyder recommended 'no excavation zone' takes into account the size of the tree, any major visible roots or ground-heave close to the stem, and the nature of the proposed development, in order to set a recommended minimum distance (from the centre of the tree stem) to any below-ground excavation.

All trees surveyed have been plotted on the Tree Constraints Plan (Appendix 4) and their data recorded in detail within the Tree Data Schedule (Appendix 3). A total of 2 trees were surveyed in relation to the Site. An explanation of the categories and definitions used in producing the Tree Data Schedule is provided in Appendix 1.

No trees were present on adjacent private land so no desk study was carried out to investigate the presence of any Tree Preservation Orders.

2.3 Limitations

This tree survey has been undertaken with specific reference to the planning submission requirements pertaining to the Cycle Hire Scheme. As such, this report makes no attempt to provide a full safety inspection of the trees surveyed. It should not be seen as a substitute for a Tree Safety Survey or Management Plan, which are specifically designed to minimise risk and liability associated with responsibility for trees. Potentially hazardous trees have been highlighted and appropriate recommendations made only where urgent action is required in the interests of public safety.

Where trees were located on third party land, detailed inspection using the VTA methodology outlined above was not possible. In these instances, measurements of stem diameter and crown spread have been estimated, and the RPA plotted accordingly.

Whilst every effort has been made to detect any major defects in inspected trees, no guarantee can be given as to the safety or otherwise of individual trees. Climatic conditions including storms, drought and temperature-related factors can, and do, cause damage and/or failure in apparently healthy trees.

3 SITE OVERVIEW

The Site is located on the footway opposite 205 Eversholt Street (adjacent to the Mayford Estate), NW1. Two mature London Planes (*Platanus* x *hispanica*) are located in the footway aligned with the Site. The closet being approximately 3.5 from the Site. These represent the only trees surveyed in connection with the proposed development.

4 RESULTS OF TREE SURVEY AND RECOMMENDATIONS

4.1 Tree Data Schedule

The Tree Data Schedule is included as Appendix 3 which displays the information gathered for these trees.

4.2 Tree protection status

It is understood that these trees are not likely to be the subject of Tree Preservation Orders since they are Local Authority owned street trees.

4.3 Tree condition and recommendations

The trees were deemed to be in an acceptable condition and no arboricultural works have been recommended.

5 ARBORICULTURAL IMPLICATIONS ASSESSMENT

5.1 Design proposals

The proposal for the site is to construct a Cycle Hire Scheme docking station, incorporating a terminal and a number of docking points. Both the terminal and the docking points are incorporated into a single area, measuring approximately 14 metres by 2 metres. The location of this area, together with the location of the proposed terminal is shown on the Tree Constraints Plan (Appendix 4).

5.2 Tree Implications Table

The Tree Implications Table shows the potential implications of different construction methodologies on individual trees adjacent to the Site. This has been developed as a result of consultation with the Special Projects design team at TfL. It provides a standardised approach across all Cycle Hire Scheme sites, allowing rapid appraisal of the implications of alternative foundation solutions in the vicinity of existing trees.

Docking Point Design	**T1**	**T2**	**T3**	**T4**
Excavated trench 450mm max. depth	None	Moderate	N/A	N/A
Excavated trench 250mm max. depth	None	Minimal	N/A	N/A
Surface only excavation or bolt-on design.	None	None	N/A	N/A
Foundation for the Terminal*	None	None	N/A	N/A

*Based on an excavation of 450mm x 450mm x 450mm below finished ground level.

Major implications include: (i) impacts of a magnitude which may significantly affect the health and survival of the tree, either in the short- or long-term, or (ii) impacts which may result in significant structural damage to the tree, such that the tree may be rendered unsafe. Example: severance of a major root in close proximity to the stem.

Moderate implications are defined as impacts which may result in impaired vigour in the short-term, but which are unlikely to significantly affect the long-term health and survival of the tree. Example: severance of secondary roots within a restricted area in the RPA.

Minimal implications are defined as impacts from which the tree is likely to easily recover within a short space of time. Example: loss of minor roots at the extreme edge of the RPA, on one side only.

5.3 Summary of Tree Implications

The Tree Constraints Plan (Appendix 4) shows the location of T1 and T2 in relation to the proposed development. The plan indicates that the proposed docking station is located within the RPA of T2. However the distance between the Site and this tree (approximately 3.5m) along with the radial alignment of the Site, means that relatively few significant roots are likely to be encountered when compared with the portion of the RPA which shall remain untouched. No structural roots are likely to be encountered so the stability of the tree shall be unaffected. A short term reduction in vigour may occur within the short term due to trenching operations. However, T2 is likely to make a full recovery within one or two growing seasons with no long term detrimental impact.

5.4 Implications of general construction activity

Tree protection measures are specified throughout Section 6 that will ensure that the impact of general construction activity shall be minimal. It is imperative that all site personnel, including temporary contractors, are made aware of this Arboricultural Method Statement, and the restrictions which apply.

5.5 Implications of tree pruning

No pruning works are required to facilitate the proposed development.

5.6 Implications of ground level changes and surfaces

There shall be minimal impact on rooting conditions from any changes in ground level or surface due to the relatively small portion of RPA that shall be affected.

5.7 Implications of underground services

It is understood that it is proposed to connect to existing services within or adjacent to the Site. If additional trenching is required outside of the Site it should be routed to avoid RPAs of all trees. The exact position of services should be agreed with the local authority, and installation engineers should be made aware of the need to keep trenches outside of RPAs. Where this is not possible arboricultural advice should be sought so that the impact may be assessed prior to trenches being excavated.

5.8 Construction exclusion zones

No construction exclusion zones are specified for T1 due to its distance from the site. Protective fencing is specified around T2 to protect the stem and primary branches. The existing hard surfacing shall be retained over RPAs which shall provide sufficient protection for tree roots.

5.9 Implications of retained trees on the proposals

T1 is a mature tree located approximately 3.5m from the Site, and is therefore unlikely to impact on the proposal as a result of future growth.

6 ARBORICULTURAL METHOD STATEMENT

6.1 Overview

This section of the report details the tree protection measures to be adopted in order to protect the trees that are to be retained. The methodology should be discussed and agreed between the local authority tree officer, TfL, and the building contractor. Any parts of the methodology which are deemed to be inaccurate or unworkable should be highlighted and addressed at an early stage, ideally before construction commences.

6.2 Pre-construction tree works

No pre-construction tree works have been recommended.

6.3 Tree fencing and protective measures

The stem and primary branches of T2 shall require protecting before commencement of any construction activity (including ground preparation) and throughout the development process. A fencing solution shall be required which prevents access to the stems by all construction machinery, materials and personnel. Weldmesh panels or 18mm shuttering ply to a height of 1.8m should be positioned around the tree stems at a distance of no less than 0.75 from the stem centre. Such fencing shall need to be robust enough to withstand occasional knocks from construction machinery. The fencing should be secured to the ground using brackets or ground pins. Excavation to secure the fencing shall not be acceptable.

6.4 Site fencing and site preparation

It may be necessary to fence off the site in order to make it secure and safe. No tree constraints exist in connection with the installation of site fencing, provided that either no-dig fencing is installed, or ground pins are used to secure site fencing to the ground where required.

6.5 Removal of surfaces

No significant arboricultural impact is expected and the removal of existing surfaces within the Site (if required) can proceed without recourse to specific tree protection measures other than those specified in Section 6.8.

6.6 Excavation

No significant arboricultural impact is expected and excavation within the Site can proceed without recourse to specific tree protection measures other than those specified in Section 6.8.

However, since ground excavation may be required within the RPA of T2, this should proceed with caution, looking out for any tree roots which may be located in the area. Should roots below 25mm in diameter be encountered, these should be retained undamaged wherever possible, and protected from desiccation by damp hessian sacking or a similar protective material. Roots below 10mm diameter should be trimmed back neatly in line with the edge of the excavation trench using secateurs. Should any roots

over 25mm diameter be exposed, excavation works should cease immediately and an arboricultural consultant called to the Site for a professional judgement.

6.7 Installation and hazardous materials

Any mixing of cement based materials is to take place outside the RPA. Provision shall be made to ensure that the mixing area is contained so that no water runoff enters the RPAs of any trees. All mixers and barrows shall be cleaned within this dedicated mixing area.

All other chemicals hazardous to tree health, including petrol and diesel are to be stored in suitable containers as specified by COSHH Regulations 2002, and kept away from the RPAs.

6.8 General construction activity

All machinery operative are to be made aware of the location of the trees and the necessity to avoid contact with all branches and stems, in particular T2, which is located closest to the Site.

6.9 Removal of fencing

Fencing shall be removed after all construction activity is completed and without the need to excavate within the RPA of any tree.

6.10 Clerk of Works

A Clerk of Works will be appointed by TfL to oversee the installation of all Cycle Hire Scheme docking stations. Prior to the commencement of any on-site activities, the Clerk of Works will be fully briefed on all potential arboricultural issues by the consultant arboriculturalist. The Clerk of Works will ensure that all activities are conducted in accordance with the Arboricultural Impact Assessment and Arboricultural method Statement.

7 REFERENCES

British Standards Institution (2005) *BS5837:2005 Trees in relation to construction – Recommendations.* BSi, London, UK.

Mattheck, C. and Broeler, H. (1994) *The Body Language of Trees: A Handbook for Failure Analysis*. Research for Amenity Trees No.4. DETR, London, UK.

NJUG (2007) *NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*. Volume 4: Issue 2. The National Joint Utilities Group, London, UK.

Stace, C. (1997) *New Flora of the British Isles* (Second Edition). Cambridge University Press, Cambridge, UK.

8 APPENDICES

Appendix 1: Explanation of Terms

Appendix 2: Authors Qualifications and Experience

Appendix 3: Tree Data Schedule

Appendix 4: Tree Constraints Plan

APPENDIX 1: EXPLANATION OF TERMS

Numbering
Each tree, group of trees or hedgerow is given an individual reference, made up of sequential numbers prefixed by a letter where:

T= Individual Tree, G = Group of trees, W = Woodland block, H = Hedge.

Species
Tree names and other plant names follow Stace (1997) and are provided as Common (English) species names.

Age Class
Trees are assigned to one of five age classes as follows:

Young	Tree in establishment stage, normally up to 10 years old
Semi-mature	Establishing tree with potential for significant growth both in terms of tree height and crown spread.
Early-mature	Established tree, typically having attained at least 70% of likely mature height and crown spread
Mature	Approximate full height and crown spread attained
Over-mature	Extensive decline in physiological functions and/or structural integrity
Veteran	A tree that shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species.

Crown Height
Height of crown clearance above adjacent ground level in metres. Where this varies around the canopy, the height closest to the Site is recorded.

Stem Diameter
Measured in centimetres at 1.5m above ground level (Diameter at Breast Height [DBH]). On multi-stemmed trees this measurement is taken immediately above the root flare of the tree.

Crown Spread
Radial crown spread measured in four compass directions (north, south east, and west) using magnetic north.

Notes
This section provides details, where relevant, pertaining to the tree's position, form, pruning history and an account of any significant defects observed. Any access restrictions are also noted here.

Recommendations
These are normally based upon remedial action to address any observed major defects. These may be recommended for tree safety reasons, or for reasons of good arboricultural practice and tree management.

Priority Scale
A priority is assigned to any works recommended in the preceding section as follows:

Urgent	Works should be carried out immediately, within 1 week maximum
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 4 years

Inspection Frequency
An interval of 6 months, 12 months, 18 months or 3 years has been allocated before the next inspection is due. Seasonal considerations should also be factored in to these guidelines for re-inspection. In summer, tree foliage colour and condition is readily observable. In winter, clear vision into the upper crown junctions may be obtained in those specimens where dense foliage obscures this view during the summer. An autumn inspection should be conducted in cases where fungal infection is suspected, when the fruiting bodies of many fungal species are more likely to be observed.

Physiological Condition

Good	Healthy tree with no symptoms of significant disease
Fair	Tree with early signs of disease, small defects, decreased life expectancy, or evidence of less than average vigour for the species
Poor	Significant disease present, limited life expectancy, or with very low vigour for the species and evidence of physiological stress
Very Poor	Tree is in advanced stages of physiological failure and is dying

Structural Condition

Good	No significant structural defects observed
Fair	Some structural defects observed but these do not necessitate remedial action at present
Poor	Significant defects observed resulting in a tree which is likely to require either monitoring or remedial action
Very Poor	Major defects which compromise the safety of the tree. Remedial works or tree removal are likely to be required in the majority of target locations

Life Expectancy or Estimated Remaining Contribution (ERC)
The estimated number of years before the tree may require removal is expressed as one of the following categories: (i) <10 years; (ii) 10-20 years; (iii) 20-40 years; (iv) 40+ years.

BS5837 Retention Category
Each tree, group of trees or hedge is assigned to a retention category where:

A	Trees of high quality and value, retention is highly desirable
B	Trees of moderate quality and value where retention is desirable
C	Trees of low quality and value, or young trees with a stem diameter <150mm. Category C trees may be retained, replaced or in the case of younger trees, relocated
R	Trees unsuitable for retention or trees which should be removed

Further clarity is supplied by the addition of plus (+) and minus (-) categories where appropriate.

APPENDIX 2: AUTHOR'S QUALIFICATIONS AND EXPERIENCE

Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

Construction

Between 1983 and 1990 Ivan worked within the construction industry and received training in a broad range of practical building skills and general construction principles. In 1989 Ivan obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales in 1990. Ivan returned to work within the construction industry and expanded his understanding of construction principals.

Arboriculture

In 1996 Ivan obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then trained as an Arboricultural Consultant 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.

Ivan is now the Director and Principal Consultant of Crown Consultants Ltd.

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

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.

He obtained a foundation degree in arboriculture at the University of Lancashire, which he passed with distinction.

He is a member of the Consulting Arborist Society and is listed within their areas of professional expertise for QTRA and as an expert witness.

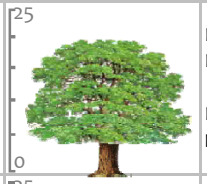
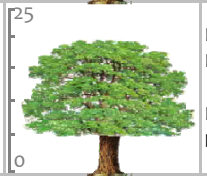
Ivan is a professional member of the Arboricultural Association and the International Society of Arboriculture.

He is a licensed Quantified Tree Risk Assessment user.

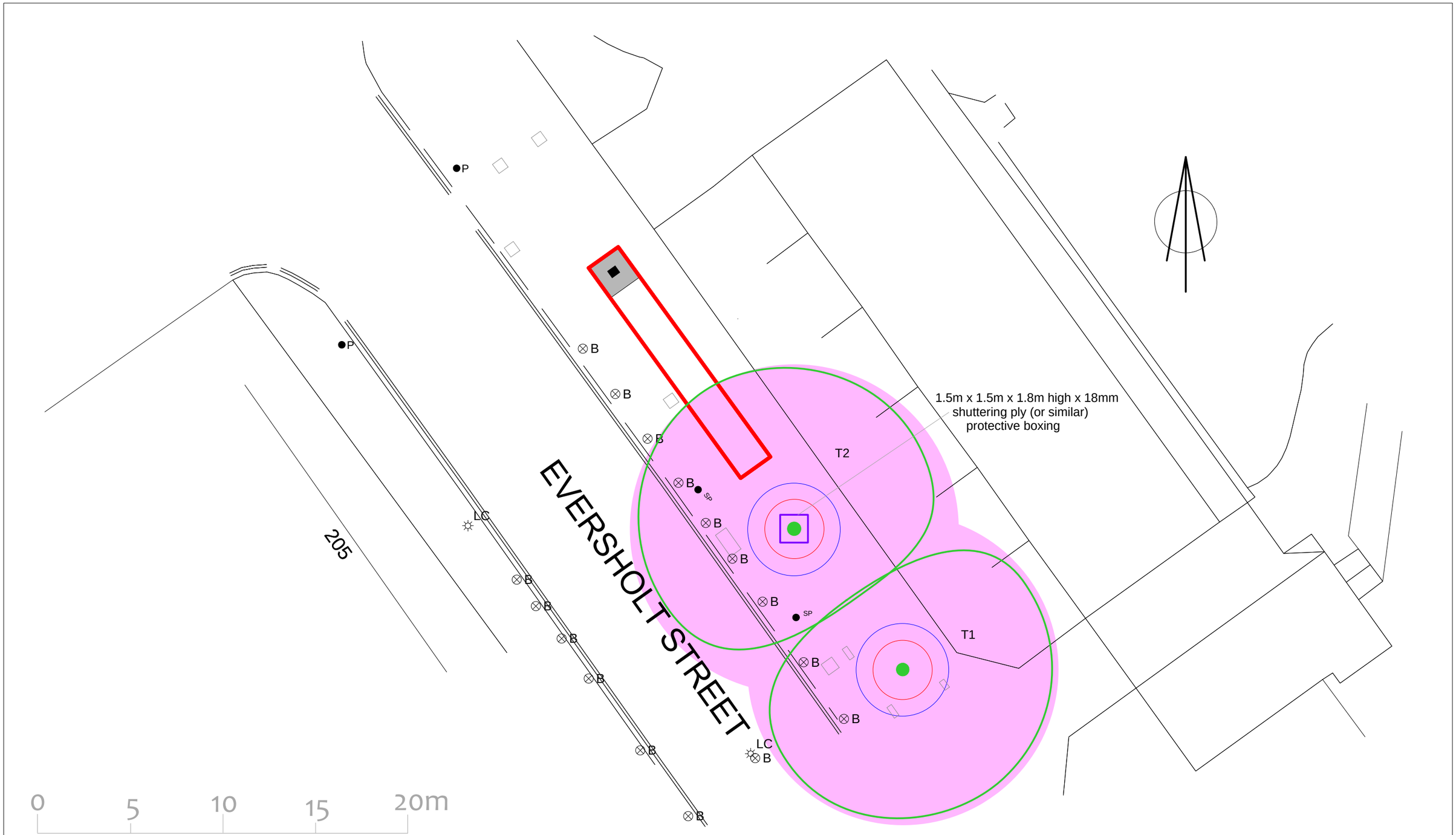
Ivan has undertaken extensive professional expert witness training and is registered as a Sweet and Maxwell Checked Expert Witness 2008.

APPENDIX 3: TREE DATA SCHEDULE

Tree Data Schedule: 02-610262 Eversholt Street

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: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category	NJUG Prohibited Radius (m)	Recommended 'No Excavation' Zone (m)
T1	Mature **London Plane** Platanus x hispanica	20	5	70	N 5 / W 8 / E 8 / S 8		Position: Street tree (in paving). Form: Twin-stemmed at 3m with a well-developed crown, good branch junctions throughout. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required. n/a	3	High Good Good	Very High 40+ **A**	1.6	2.5
T2	Mature **London Plane** Platanus x hispanica	20	6	74	N 9 / W 8 / E 8 / S 5		Position: Street tree (in paving). Form: Multi-stemmed at 6m with a well-developed crown, good branch junctions throughout. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required. n/a	3	High Good Good	Very High 40+ **A**	1.6	2.5

APPENDIX 4: TREE CONSTRAINTS PLAN



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- PRELIMINARY -
NOT TO BE USED FOR CONSTRUCTION

Scale:	1/200	Client:	Transport for London
Paper Size:	A3	Project:	Cycle Hire Scheme
Author:	I Button	TFL Ref:	02/610262
Checked by:	D Gordon-Lee	Date:	11.05.2009

Site

Eversholt Street

Title

TREE CONSTRAINTS PLAN

Key

- NJUG Prohibited Zone
- Hyder Recommended No Excavation Zone
- T1 Stem of tree number 1

BS 5837 Retention Categories

- Stem of category A tree
- Stem of category B tree
- Stem of category C tree
- Stem of category R tree
- Root Protection Area
- Canopy extent of Category A tree
- Canopy extent of Category B tree
- Canopy extent of Category C tree
- Canopy extent of Category R tree