Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR:

The Waterhouse

Millfield Lane

London N6 6HT

INSTRUCTING PARTY:

Mr and Mrs Lewis,

c/o: UK & European,

Woodstock Studios,

13 Woodstock Street,

London W1C 2AG

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: UKE/WHS/AIA/01

Date: 26th June 2017

PART 1: MAIN TEXT

PART 2 - APPENDICES

PART 3 - PLANS

Caveats

This report is primarily an arboricultural report. Whilst comments relating to matters involving built structures or soil data may appear, any opinion thus expressed should be viewed as qualified, and confirmation from an appropriately qualified professional sought. Such points are usually clearly identified within the body of the report. It is not a full safety survey or subsidence risk assessment survey. These services can be provided but a further fee would be payable. Where matters of tree condition with a safety implication are noted during a survey they will of course appear in the report.

A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.

Tree works recommendations are found in the Appendices to this report. It is assumed, unless otherwise stated ("ASAP" or "Option to") that all husbandry recommendations will be carried out within 6 months of the report's first issue. Clearly, works required to facilitate development will not be required if the application is shelved or refused. However, necessary husbandry work should not be shelved with the application and should be brought to the attention of the person responsible, by the applicant, if different. Under the Occupiers Liability Act of 1957, the owner (or his agent) of a tree is charged with the due care of protecting persons and property from foreseeable damage and injury.' He is responsible for damage and/or nuisance arising from all parts of the tree, including roots and branches, regardless of the property on which they occur. He also has a duty under The Health and Safety at Work Act 1974 to provide a safe place of work, during construction. Tree works should only be carried out with local authority consent, where applicable.

Inherent in a tree survey is assessment of the risk associated with trees close to people and their property. Most human activities involve a degree of risk, such risks being commonly accepted if the associated benefits are perceived to be commensurate.

Risks associated with trees tend to increase with the age of the trees concerned, but so do many of the benefits. It will be appreciated, and deemed to be accepted by the Instructing Party, that the formulation of recommendations for all management of trees will be guided by the cost-benefit analysis (in terms of amenity), of tree work that would remove all risk of tree related damage.

Prior to the commencement of any tree works, an ecological assessment of specific trees may be required to ascertain whether protected species (e.g. bats, badgers and invertebrates etc.) may be affected.

1.0 SUMMARY

Client / Agent:	Mr & Mrs Leonard Lewis	**Case Ref:**	UKE/WHS/AIA/01
Local Authority:	LB Camden	**Date:**	26/06/2017
Site Address: The Waterhouse, Millfield Lane, London, N6 6HT			
Proposal: Erection of a single storey side extension and a part single, part 2-storey first floor extension & extension of existing outbuilding			

Report Checklist	**Y/N**		**Y/N**
Arboricultural constraints on site	Y	Trees removal proposed	Y
Tree Survey	Y	Topographical Survey	Y
BS5837 Report	Y	Conservation Area	Y
Tree Preservation Orders	N/k		
Tree Protection Plan:	N/a		
Tree Constraints Plan:	Y		
Arboricultural Impact Assessment:	Y		

Site Layout					
Site Visit	Y	Date: 06/06/17		Access Full/Partial/None	F
Trees on Site			Y	Off-site Trees	Y
Trees affected by development			Y	O/s trees affected by development	Y
Tree replacement proposed:			Y	On or off-site trees indirectly affected by development	N

Trees with the potential to be affected

Felling of category C T1, G10a, T12, T20, T31 and T35 assessed as being of low impact – replacement planting proposed as mitigation.

Very low impact to T11 from proposed side extension to be mitigated by the use of low-invasive foundations.

Medium / low impacts respectively to T15 & T17 from demolition and rebuilding of outbuilding – pull-down demolition and low-invasive foundations proposed as mitigation.

New hard surfaces within the RPAs of T5, T11, T13, T18 & T30 will be mitigated through the use of no-dig construction methodology and porous finished surface.

Comments

Recommended works for trees regardless of development, but also pertinent to maintaining a safe work site.

Recommendations

1	Proposal will mean the loss of important trees (TPO/CA)	N
2	Proposal has sufficient amelioration for tree loss	Y
3	Proposals provide adequate tree protection measures	Y
4	Proposal will mean retained trees are too close to buildings	N
5	Specialist demolition / construction techniques required	Y
6	The Proposal will result in significant root damage to retained trees	N
7	Further investigation of tree condition recommended	Y

RPA= Root Protection Area
TPP= Tree Protection Plan
AMS= Arboricultural Method Statement
AIA = Arboricultural Implication Assessment
BS5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'

2. INTRODUCTION

2.1 Terms of Reference

2.1.1 LANDMARK TREES were asked by Mr & Mrs Leonard Lewis, C/o UK and European, to provide a survey and an arboricultural impact assessment of proposals for the site: The Waterhouse, Millfield Lane, London, N6 6HT. The report is to accompany a planning application.

2.1.2 The proposals are for the erection of a single storey side extension and a part single, part 2-storey first floor extension and for the extension of an existing outbuilding. This report will assess the impact on the trees and their constraints, identified in our survey. It is important to note that the arboricultural constraints in conjunction with extensive dialogue with LB Camden have informed the evolution of this scheme.

2.1.3 I am a Registered Consultant and Fellow of the Arboricultural Association and a Chartered Forester, with a Masters Degree in Arboriculture and 20 years experience of the landscape industry - including the Forestry Commission and Agricultural Development and Advisory Service. I am a UK Registered Expert Witness, trained in single joint expert witness duties. I am also Chairman of the UK & I Regional Plant Appraisal Committee, inaugurated to promote international standards of valuation in arboriculture.

2.2 Drawings Supplied

2.2.1 The drawings supplied by the client and relied upon by Landmark Trees in the formulation of our survey plans are:

Existing site survey: 633(SK)001 (A) Existing Site Plan

Proposals: 17007_TWH_-Sheet – 0-001 – Site Plan-Floor Plan – 001 Proposed

2.3 Scope of Survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, I surveyed the trees on site on 6th June 2017, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837:2012]. As per paragraph 4.4.1.1 of the standard, the tree survey was undertaken by an arboriculturist to *record information about the trees on or adjacent to the site*, and in this case included a further partial survey of the lane. Residents have asked that we extend the survey to cover the entire section of Milflield Lane from the junction with Fitzroy Park to the site. This additional work is being commissioned and will be provided in due course to inform the construction site access proposals.

2.3.2 Our survey of the trees, the soils and any other factors, is of a preliminary nature. The trees were SURVEYED on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The Body Language of Trees, DoE booklet Research for Amenity Trees No. 4, 1994). LT have not taken any samples for analysis and the trees were not climbed, but inspected from ground level.

2.3.3 A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.

2.3.4 The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

2.4 Survey Data & Report Layout

2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix 1 to this report. General husbandry recommendations are distinguished at Appendix 3 from the minimum requirements to facilitate development / form part of the planning application at Appendix 4. The former may still be relevant to providing a safe site of work, of course. Similarly, if for whatever reason the development does not go ahead, our recommendations in Appendix 3 would still apply.

2.4.2 A site plan identifying the surveyed trees, based on the Instructing Party's drawings / topographical survey is provided in Part 3 of this report.

2.4.3 This plan also serves as the Tree Constraints Plan with the theoretical Recommended Protection Areas (RPA's), tree canopies and shade constraints, (from BS5837: 2012) overlain onto it. These constraints are then overlain in turn onto the Instructing Party's proposals to create a second Arboricultural Impact Assessment Plan in Part 3. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site Description

Photograph 1: The Waterhouse, Millfield Lane, London N6 6HT (Source: Google Maps)

3.1.1 The site is a spacious detached residential property of contemporary design that stands on the eastern side of Millfield Lane between that road and Fitzroy Park on the eastern edge of Hampstead Heath. The property stands within gardens largely laid down to grass to front and rear. The most significant tree on site is a prominent oak that stands near the front (western) boundary of the property and the crown of this tree is contiguous with boundary trees, which themselves form part of the wooded edge on the eastern banks of Kenwood Ladies Pond. The adjoining network of gardens and woodland provides an exceptional degree of tranquility and greenery. The site slopes markedly from east to west.

3.1.2 In terms of the British Geological Survey, the site overlies the London Clay Formation (see indicated location on Fig.1 plan extract below). The associated soils are generally, highly shrinkable clay; e.g. slowly permeable seasonally waterlogged fine loam over clay. Such highly plastic soils are prone to movement: subsidence and heave. The actual distribution of the soil series are not as clearly defined on the ground as on plan and there may be anomalies in the actual composition of clay, silt and sand content.

3.1.3 Clay soils are prone to compaction during development with damage to soil structure potentially having a serious impact on tree health. The design of foundations near problematic tree species will also need to take into consideration subsidence risk. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

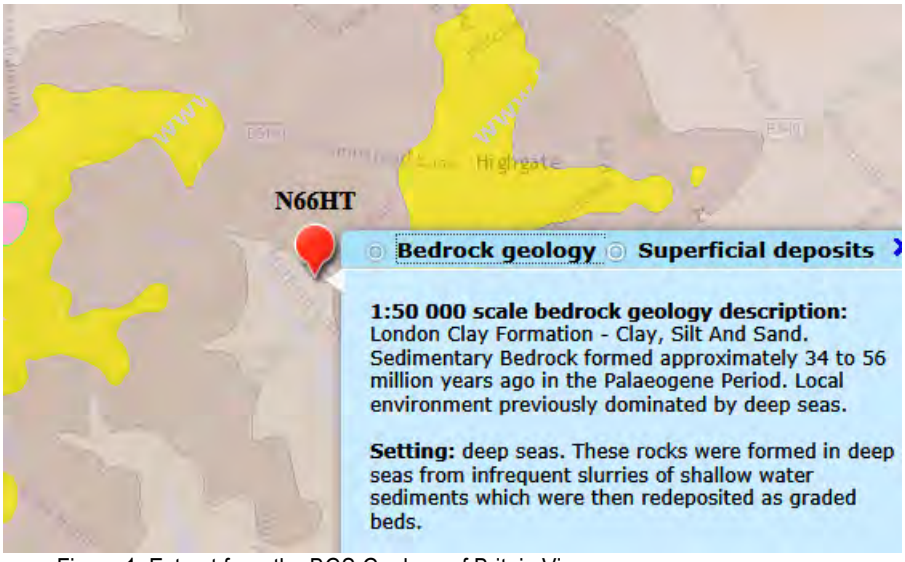


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject Trees

3.2.1	There are 36 trees or groups surveyed on or around the site, of which 3 are A category *(High Quality), 5 are B category *(Moderate Quality), 27 are C category *(Low Quality) and 1 is U category *(Unsuitable for Retention).
3.2.2	The tree species found on site comprise black mulberry, common ash, horse chestnut, common hawthorn, English oak, weeping willow, eucalyptus, weeping birch, Portuguese laurel, sycamore, apple, silver birch, hornbeam, common beach, magnolia, Himalayan birch, white willow, flowering cherry, common walnut and goat willow.
3.2.3	In terms of age demographics there is a preponderance of early mature and mature trees, with a few semi-mature and young trees in addition to a post-mature tree in the population.

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report. Results of further investigations are provided at Appendix 2.
3.2.5	There are recommended works for on- and off-site trees. These are listed in Appendix 3.

3.3 Planning Status

3.3.1	We are not aware of the existence of any Tree Preservation Orders, but understand the site stands within the Highgate Conservation Area, which will affect the subject trees: it is a criminal offence to prune, damage or fell such trees without permission from the local authority.
3.3.2	Relevant local planning policies comprise Policy 7.21 of the London Plan 2016 and Policies A3, D1 and D2 of the Camden Local Plan (2016).

4.0 DEVELOPMENT CONSTRAINTS

4.1 Primary Constraints

4.1.1 BS5837: 2012 gives Recommended Protection Areas (RPA's) for any given tree size. The individual RPA's are calculated in the Tree Schedule in Appendix 1 to this report, or rather the notional radius of that RPA, based on a circular protection zone. The prescribed radius is 12-x stem diameter at 1.5m above ground level, except where composite formulae are used in the case of multi-stemmed trees.

4.1.2 Circular RPA's are appropriate for individual specimen trees grown freely, but where there is ground disturbance, the morphology of the RPA can be modified to an alternative polygon, as shown in the diagram below (Figure 2). Alternatively, one need principally remember that RPA's are area-based and not linear – notional rather than fixed entities.

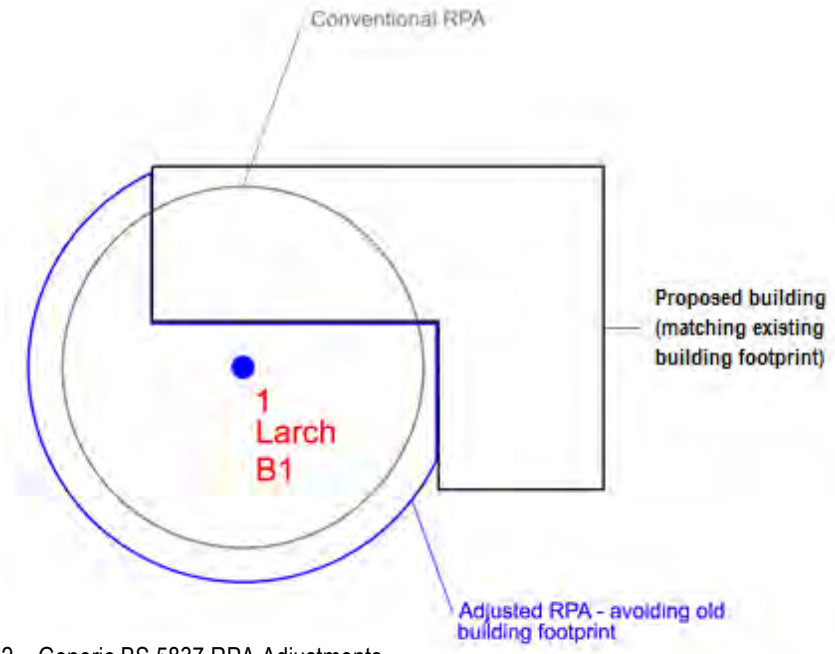


Figure 2 – Generic BS 5837 RPA Adjustments

4.1.3 In BS5837, paragraph 4.6.2 states that RPA's should reflect the morphology and disposition of the roots; where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.

4.1.4 **No *a priroi* modifications have been made in this instance, though site investigations suggest trees are on the one hand, not rooting below the drive (LT 2013-16 trial pits), but on the other, are rooting c.200mm below Millfield Lane (C.O.L radar study)**.

4.1.5 The quality of trees will also be a consideration: U Category trees are discounted from the planning process in view of their limited service life. Again, Category-C trees would not normally constrain development individually, unless they provide some external screening function.

4.1.6 At paragraph 5.1.1. BS5837: 2012 notes that "Care should be exercised over misplaced tree preservation; attempts to retain too many or unsuitable trees on a site are liable to result in excessive pressure on the trees during demolition or construction work, or post-completion demands on their removal."

4.1.7 In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees would comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting would be appropriate.

4.1.8 In this instance, the high and moderate quality trees present have the potential to pose significant constraints to development although it should be noted that these constraints are significantly tempered by the smaller construction footprint of this scheme which has been designed to take account of these constraints.

4.1.9 We note that previous planning feedback considered T5 to provide greater constraint than normally indicated within BS5837, due to its affirmed veteran status. Clearly, the label covers a broad spectrum of trees from the potentially interesting to truly ancient, primarily defined through the work of Neville Fay (Defining Age and Surveying Veteran and Ancient Trees 2007). Notwithstanding the tree's definitive placement within this spectrum, the design team has taken on board the concerns and sought not only to reduce impacts, but also improve long term management. A fuller tree condition survey was instructed (Appendix 2) and management recommendations issued in discussion with City of London (COL) Tree Officers. Moreover, the team is working with COL to improve the lot of veteran trees in general along Millfield Lane.

4.2 Secondary Constraints

4.2.1 The second type of constraint produced by trees that are to be retained is that the proximity of the proposed development to the trees should not threaten their future with ever increasing demands for tree surgery or felling to remove nuisance shading (Figure 3), honeydew deposition or perceived risk of harm.

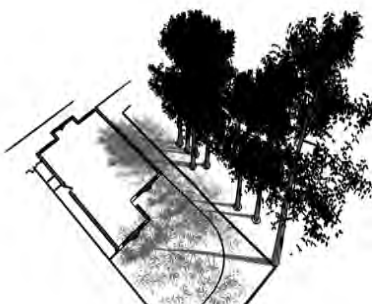


Figure 3 –
Generic Shading Constraints

4.2.2 The shading constraints are crudely determined from BS5837 by drawing an arc from northwest to east of the stem base at a distance equal to the height of the tree, as shown in the diagram opposite. Shade is less of a constraint on non-residential developments, particularly where rooms are only ever temporarily occupied.

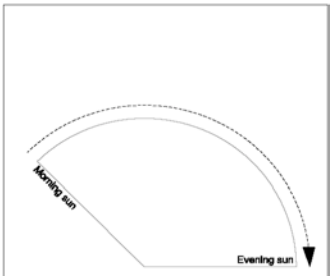


Figure 4 – Shading Arc

4.2.3 This arc (see Figure 4) represents the effects that a tree will have on layout through shade, based on shadow patterns of 1x tree height for a period May to Sept inclusive 10.00-18.00 hrs daily.

4.2.4 Assuming that they will be retained, the orientation of the on- and off-site trees will ensure that shading constraints, leaf deposition and honey-dew are likely to be as they are today. The significance of these constraints will vary depending on the location and proximity to the proposed re-development.

Note: Sections 5 & 6 will now assess the impacts upon constraints identified in Section 4. Table 1 in Section 5 presents the impacts in tabular form (drawing upon survey data presented in Appendices 1 & 2). Impacts are presented in terms of whole tree removal and the effect on the landscape or partial encroachment (% of RPA) and its effect on individual tree health. Section 6 discusses the table data, elaborating upon the impacts' significance and mitigation.

5.0

Table 1: Arboricultural Impact Assessment

(Impacts assessed prior to mitigation and rated with reference to Matheny & Clark (1998))

Hide irrelevant | Show All Trees

Ref: KSR_WHS_AIM

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
C	1	Mulberry, Black	Felled to Facilitate Development	0.5 m^2 .99 %	Early Mature	Normal	N/A	N/A	Low	New planting / landscaping
A	5	Oak, English	Path Construction within RPA	34.4 m^2 4.36 %	Post-Mature	Normal	Moderate	Very Low	N/A	No-dig construction
C	10a	Laurel, Portugese	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Very Low	New planting / landscaping
C/u	11	Sycamore	Building Construction within RPA Patio Construction within RPA	2.3 m^2 1.75 %	Early Mature	Poor	Moderate	Very Low	N/A	Low-invasive foundation design No-dig construction
C	12	Apple, Cultivated	Felled to Facilitate Development	m^2 N/A %	Mature	Normal	N/A	N/A	Very Low	New planting / landscaping
C	13	Hawthorn, Common	Patio Construction within RPA	1.1 m^2 1.98 %	Mature	Moderate	Good	Very Low	N/A	No-dig construction
B	15	Birch, Silver	Demolition and Rebuilding of Outbuilding within RPA Note: 18.8m2 of impact occurs within ex. footprint	23.7 m^2 25.87 %	Mature	Moderate	Poor	Medium	N/A	Low-invasive foundation design

5.0

Table 1: Arboricultural Impact Assessment

(Impacts assessed prior to mitigation and rated with reference to Matheny & Clark (1998))

Hide irrelevant | Show All Trees

Ref: KSR_WHS_AIM

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
C	17	Hornbeam	Demolition and Rebuilding of Outbuilding within RPA Note: 11.1m2 of impact occurs within ex. footprint	27.4 m^2 14.79 %	Mature	Moderate	Moderate	Low	N/A	Low-invasive foundation design
B	18	Beech, Common	Patio Construction within RPA	9.9 m^2 12.4 %	Early Mature	Normal	Poor	Low	N/A	No-dig construction
C	20	Magnolia (M. X soulangiana)	Felled to Facilitate Development	m^2 N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting / landscaping
B	30	Mulberry, Black	Patio Construction within RPA	5.8 m^2 2 %	Early Mature	Normal	Moderate	Very Low	N/A	No-dig construction
C	31	Willow, Goat	Felled to Facilitate Construction Access	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting / landscaping
C	35	Hawthorn, Common	Felled to Facilitate Construction Access	m^2 N/A %	Early Mature	Moderate	N/A	N/A	Low	New planting / landscaping

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The current proposals have evolved in the light of planning comments (current and historic) on trees as material constraints on development, both in terms of the new dwelling itself and also the wider construction access; the scale of these proposals have been reduced accordingly.

6.1.2 Their principal primary impact comprises the removal of T1, G10a, T12, T20, T31 and T35. The loss of these low-quality, mostly interior site trees is rated as a low impact, subject to the adoption of the proposed mitigation of replacement planting.

6.1.3 Impacts to retained trees are significantly reduced from the previous scheme, and comprise the construction of the side extension within the theoretical RPA of T11, the demolition and replacement of the outbuilding within the RPA of T17 and T19 and the installation of hard surfacing within the RPAs of T5, T11, T13, T18 and T30. It will be noted that the only impact to the post-mature / veteran oak T5 is now the installation of new hard surfacing.

6.1.4 The proposed side extension encroaches within the theoretical RPA of T11 by approximately 1.8% by area, assessed as being of very low impact to the tree. Low-invasive foundations (i.e. discontinuous footings with suspended beam(s) / raft between) will be employed, therefore affecting a fractional net area of excavation, relative to the gross footprint / RPA encroachment. Flexibility of footing placement (relative to root location) will be built into the design, with the pit locations trial-excavated by hand under supervision. Subject to these measures, the overall impact to the tree is likely to be negligible to the tree.

6.1.5 Similar mitigation will be employed for the proposed replacement outbuilding whose footprint encroaches within the RPAs of T15 and T17 by 26% and 15% respectively, assessed as being of medium / low impact. Such an approach will reduce these impacts to low / very low levels.

6.1.6 The provision of the new hard surfacing within the RPAs of T5, T11, T13, T18 and T30 is assessed as being of very low / low impact to the affected trees and can be mitigated through the use of a no-dig construction method. The adoption of such mitigation will reduce the impacts to negligible levels.

6.1.7 The significantly smaller scale of design means that potential impacts from the installation of services are concomitantly reduced. Provided that any services within the RPA of a retained tree are installed in line with the provisions of NJUG Vol.4 and BS5837: 2012, they will not affect the sustainability of the affected tree(s).

6.1.8 Similarly, concerns over site access impacts on Milfield Lane trees are essentially addressed by the scaling down of the project (see 6.3.4), but will be considered more fully in our Method Statement, following the issue of the Construction Management Plan.

6.1.9 The replanting scheme will offer considerable enhancement and replace low quality trees. Replacement trees will have the advantage of being specifically selected for the proposed site, healthy and fit-for-purpose. Naturally regenerated trees and saplings tend to be of pioneer / opportunist species (ash and sycamore) which can cause problems for infrastructure, springing up in unsuitable locations. Design can provide for a diverse range of native and ornamental species that will compliment rather than conflict with the proposals, so providing a more sustainable long-term resource for the future.

6.1.10 The principal of RPA encroachment is established within BS5837:2012 and supported by the source document, National Joint Utilities Guidelines 10 / Vol. 4 1995 / 2010. NJUG introduced the x12 diameter *Precautionary Zone* for supervised working and *Prohibited Zone* at a universal 1m from the base of the tree. RPA's are frequently confused with the NJUG Prohibited Zone, when they clearly correlate with the NJUG Precautionary Zone.

6.1.11 An RPA encroachment of <20% of RPA may be considered as low impact, given the permissive references to 20% RPA relocation and impermeable paving within BS5837:2012 and other published references to healthy trees tolerating up to 30-50% root severance (Coder, Helliwell and Watson in CEH 2006). The trees in question are healthy specimens of species with a good resistance to development impacts, and quite capable of tolerating these low impacts.

6.1.12 "**In practice 50% of roots can sometimes be removed with little problem**, provided there are vigorous roots elsewhere. Inevitably, this degree of root loss will temporarily slow canopy growth and even lead to some dieback" (Thomas 2000). LT do not recommend annexing such high proportions of the root system; rather that within the context of the published science, planning should not be unduly concerned by impacts that are well below the subcritical threshold – *tree health is not at stake.*

6.1.13 BS5837 recommends (at 5.3.a) that if operations within the RPA are proposed, the project arboriculturist should demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA. On the basis of Thomas et al, above, it is possible to demonstrate that the tree can remain viable, and on the basis that the tree will be rooting no less freely in the garden / lawn / border /pavement than within the proposed footprint, with the RPA encroachment compensated elsewhere on contiguous land. The guide also recommends (at 5.3.b) the arboriculturist propose a series of mitigation measures (to improve the soil environment that is used by the tree for growth). These are provided at 6.3 below.

6.2 Rating of Secondary Impacts

6.2.1 There will always be marginal secondary impacts of honeydew / litter deposition and partial shade on this site, regardless of development. The status quo is unlikely to change with further development, which is the salient point for planning to consider. Thus, the secondary impacts of development are minimal.

6.3 Mitigation of Impacts

6.3.1 All plant and vehicles engaged in demolition works should either operate outside the RPA, or should run on a temporary surface designed to protect the underlying soil structure. The demolition of the outbuilding should proceed inwards in a "pull down" fashion. Hard surfacing can be lifted with caution by a skilled machine operator again working away from the tree.

6.3.2 The building encroachments will require the use of specialised foundation techniques, such as mini-piling or pad and raised beam. The foundation pits within the RPA should be trial-excavated by hand using a double-headed spade ("shove-holer") or similar to minimise breadth of hole required for inspection.

6.3.3 The paving encroachments will require a no-dig construction technique, e.g. using a cellular confinement system with no fines aggregate for the sub-base. The degree of encroachment means that a permeable paving surface (e.g. gravel or block paving) is required. The finished section is likely to be 150mm above grade, depending on final specification, which will need to be factored into the overall finished site levels. A cellular confinement system with a temporary hard surface (e.g. road stone) can be used for site access / storage during construction and the surface material replaced on completion of construction.

6.3.4 Potential impacts to trees along Millfield Lane can be mitigated through the provision of a similar, cellular confinement system along this route. The concept has been discussed with COL who would like to incorporate such a proposal into a more permanent refurbishment of the lane. COL's study found no roots in the top 200mm of road section, allowing for the placement of a suitable web and wearing course within existing levels without disruption to pedestrians. The finish would be of a similar composition to the existing one: hoggin + stone. Adoption of these measures by the applicant would effectively expedite COL's own wishes for the maintenance of the lane and protection of veteran trees beside it. The work may be combined with further soil air injection treatment, subject to site investigations. However, it is not yet known to what extent these works are necessary to facilitate development, if the lane will accommodate the light traffic currently envisioned.

6.3.5	Nuisance deposition can be further mitigated with routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering (see Figure 5 below).
6.3.6	The shading impacts can be mitigated by building design, with the provision of dual aspect windows and choice of room layout. Some minor crown reduction may be necessary, but not such as to impose a burden of frequent, repetitive management.
6.3.7	The landscape impact of tree losses can be offset by the landscape proposals, ideally involving new planting of ornamental varieties of native species, and where appropriate with columnar or compact form. A selection of tree species cultivars for urban sites is provided in Appendix 4.

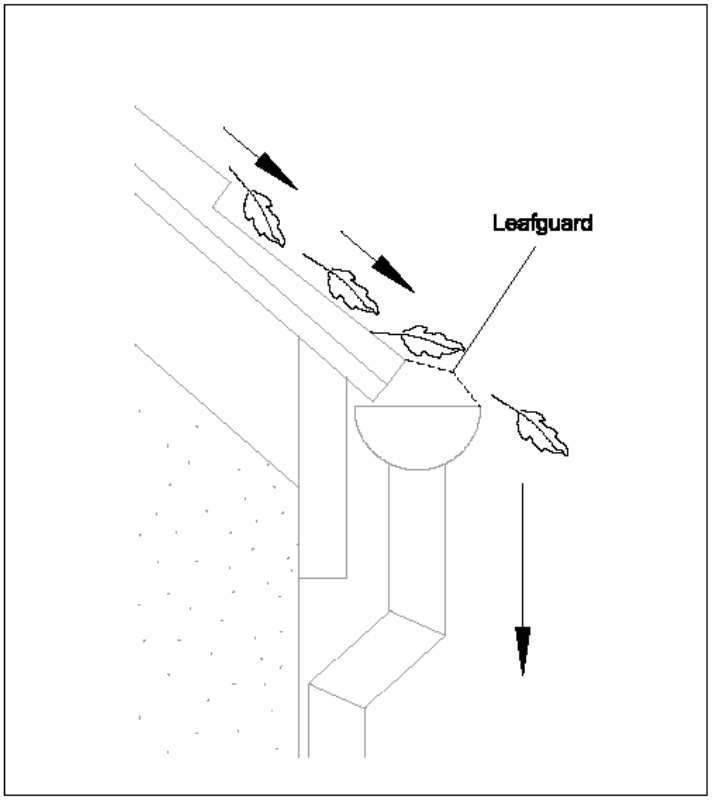


Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

7.0 CONCLUSION

7.1 The potential impacts of development are all relatively low in terms of both quality of trees removed and also RPA encroachments of trees retained. However, further detail is required (and forthcoming) on construction site access and lane surface treatment to resolve potential impacts therein. These issues will be resolved in an addendum tree report / method statement when the applicant's strategy has been determined. However, the indications are good: light vehicles moving at very slow speeds are unlikely to pose significant threats to trees.

7.2 The full potential of the impacts can thus be largely mitigated through design and precautionary measures. These measures will be elaborated in an Arboricultural Method Statement in support of the application (Outline AMS) and / or the discharge of planning conditions (Full AMS).

7.3 The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health (including T5 veteran oak) and capable of sustaining these reduced impacts.

7.4 The trees that are recommended for felling are of little individual significance, such that their loss will not affect the visual character of the area.

7.5 Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape thereby complying with Policy 7.21 of the London Plan 2016 and Policies A3, D1 and D2 of the Camden Local Plan (2016). Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Tree works recommendations in Appendix 3 are not part of the current application, but requirements of general maintenance that will need to be applied for (subject to para. 3.3 of this report and any other relevant constraints in planning or leasehold) by the client separately. Consent for the current planning application does not impart any consent for the Appendix 3 maintenance works. Please note, though, the owner and / or manager of a property have a duty to maintain a safe site of work and to protect occupiers of the surrounding land / members of the public from tree hazards. Works recommended in this report should be enacted in a timely fashion by the relevant party regardless of the progress of the development.

8.1.2 Recommendations for works required to facilitate development are found in Appendix 4 and a selection of tree species / cultivars for variable sites provided in Appendix 4. Any tree removals recommended within this report should only be carried out with local authority consent.

8.1.3 Excavation and construction impacts within the RPA's of trees identified in Table 1 above, will need to be controlled by method statements specifying mitigation methods suggested in para 6.3 above and by consultant supervision as necessary. These method statements will be provided in support of this application.

8.1.4 Replace felled trees T1, G10a, T12, T20, T31 and T35 with native ornamental 14-16 cm girth nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:

- BS8545: 2014 Code of Practice for Trees from Nursery to Landscape
- BS 3936:1980 Nursery Stock;
- BS 4043:1966 Transplanting Semi-Mature Trees; and
- BS 5236:1975 Cultivation and Planting of Trees in the Advanced Nursery Stock Category.
- All replacement stock should be planted and maintained as detailed in BS 4428:1989 (Section 7): Recommendations for General Landscape Operations.

8.2 General Recommendations for Sites Being Developed with Trees

8.2.1 Any trees which are in close proximity to the proposed development should be protected with a Tree Protection Barrier (TPB). Protective barrier fencing should be installed immediately following the completion of the tree works, remaining in situ for the entire duration of the development unless otherwise agreed in writing by the Council. It should be appropriate for the intensity and proximity of the development, usually comprising steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2012). The position of the TPB can be shown on plan as part of the discharge of conditions, once the layout is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and be removed only upon full completion of works.

8.2.2 A TPB may no longer be required during soft landscaping work but a full arboricultural assessment must be performed prior to the undertaking of any excavations within the RPA of a tree. This will inform a decision about the requirement of protection measures. It is important that all TPBs have permanent, weatherproof notices denying access to the RPA.

8.2.3 The use of heavy plant machinery for building demolition, removal of imported materials and grading of surfaces should take place in one operation. The necessary machinery should be located above the existing grade level and work away from any retained trees. This will ensure that any spoil is removed from the RPAs. It is vital that the original soil level is not lowered as this is likely to cause damage to the shallow root systems.

8.2.4 Any pruning works must be in accordance with British Standard 3998:2010 Tree work [BS3998].

8.2.5 Where sections of hard surfacing are proposed in close proximity to trees, it is recommended that "No-Dig" surfacing be employed in accordance with BS5837:2012 and 'The Principles of Arboricultural Practice: Note 1, Driveways Close to Trees, AAIS 1996 [APN1]'.

8.2.6 If the RPA of a tree is encroached by underground service routes then BS5837:2012 and NJUG VOLUME 4 provisions should be employed. If it is deemed necessary, further arboricultural advice must be sought.

8.2.7 Numerous site activities are potentially damaging to trees e.g. parking, material storage, the use of plant machinery and all other sources of soil compaction. In operating plant, particular care is required to ensure that the operational arcs of excavation and lifting machinery, including their loads, do not physically damage trees when in use.

8.2.8 To enable the successful integration of the proposal with the retained trees, the following points will need to be taken into account:

1) Plan of underground services.
2) Schedule of tree protection measures, including the management of harmful substances.
3) Method statements for constructional variations regarding tree proximity (e.g. foundations, surfacing and scaffolding).
4) Site logistics plan to include storage, plant parking/stationing and materials handling.
5) Tree works: felling, required pruning and new planting. All works must be carried out by a competent arborist in accordance with BS3998.
6) Site supervision: the Site Agent must be nominated to be responsible for all arboricultural matters on site. This person must:
   - be present on site for the majority of the time;
   - be aware of the arboricultural responsibilities;
   - have the authority to stop work that is causing, or may cause harm to any tree;
   - ensure all site operatives are aware of their responsibilities to the trees on site and the consequences of a failure to observe these responsibilities;
   - make immediate contact with the local authority and/or a retained arboriculturalist in the event of any tree related problems occurring.

8.2.9 These points can be resolved and approved through consultation with the planning authority via their Arboricultural Officer.

8.2.10 The sequence of works should be as follows:

i) initial tree works: felling, stump grinding and pruning for working clearances;
ii) installation of TPB for demolition & construction;
iii) installation of underground services;
iv) installation of ground protection;
v) main construction;
vi) removal of TPB;
vii) soft landscaping.

9.0 REFERENCES

- Barlow JF & Harrison G. 1999. Shade By Trees, Arboricultural Practice Note 5, AAIS, Farnham, Surrey.
- British Standards Institute. 2012. Trees in Relation to Design, Demolition and Construction - Recommendations BS 5837: 2012 HMSO, London.
- Centre for Ecology & Hydrology. 2006. Tree Roots in the Built Environment, HMSO, London.
- Helliwell R (1980) Provision for New Trees; Landscape Design; July/August issue
- International Society of Arboriculture (ISA). 1994. The Landscape Below Ground. ISA, Champaign, Ilinois. USA.
- Lonsdale D 1999. Research for Amenity Trees No.7: Principles of Tree Hazard Assessment and Management, HMSO, London.
- Matheny, N; Clark, J. R.1998. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. ISA, Champaign, Ilinois. USA.
- Mattheck C. & Breloer H. 1994. Research for Amenity Trees No.2: The Body Language of Trees, HMSO, London.
- Thomas P, 2000. Trees: Their Natural History, Cambridge University Press, Cambridge.
- Trowbridge J & Bassuk N (2004) Trees in the Urban Landscape: Site Assessment, Design, and Installation; J Wiley & Sons inc. NJ USA

Landmark Trees

PART 2 – APPENDICES

APPENDIX 1

TREE SCHEDULE

Botanical Tree Names

Apple	: Malus sp	Hornbeam, Common	: Carpinus betulus
Ash, Common	: Fraxinus excelsior	Laurel, Portuguese	: Prunus lusitanica
Beech, Common	: Fagus sylvatica	Magnolia, Saucer	: Magnolia × soulangeana
Birch, Himalayan	: Betula utilis	Mulberry, Black	: Morus nigra
Birch, Silver	: Betula pendula	Oak, English	: Quercus robur
Birch, Weeping	: Betula pendula Youngii	Sycamore	: Acer pseudoplatanus
Cherry, flowering	: Prunus spp	Walnut, English	: Juglans regia
Chestnut, Horse	: Aesculus hippocastanum	Willow, Goat	: Salix caprea
Eucalyptus	: Eucalyptus spp	Willow, White	: Salix alba
Hawthorn, Common	: Crataegus monogyna	Willow, Weeping	: Salix × sepulcralis

Notes for Guidance:

1. Height describes the approximate height of the tree measured in metres from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is expressed as an average of NSEW aspect if symmetrical.
3. Ground Clearance is the height in metres of crown clearance above adjacent ground level.
4. Stem Diameter (Dm) is the diameter of the stem measured in millimetres at 1.5m from ground level for single stemmed trees. BS 5837:2012 formula (Section 4.6) used to calculate diameter of multi-stemmed trees. Stem Diameter may be estimated where access is restricted and denoted by '#'.
5. Protection Multiplier is 12 and is the number used to calculate the tree's protection radius and area
6. Protection Radius is a radial distance measured from the trunk centre.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat refers to (British Standard 5837:2012 section 4.5) and refers to tree/group quality and value; 'A' – High, 'B' - Moderate, 'C' - Low, 'U' - Unsuitable for retention. The following colouring has been used on the site plans:
    - High Quality (A) (Green),
    - Moderate Quality (B) (Blue),
    - Low Quality (C) (Grey),
    - Unsuitable for Retention (U) (Red)
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

Landmark Trees

Site: The Water House

Date: 6 /6/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: KSR_WHS_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	Mulberry, Black	8	5233	2.0	334	Early Mature	4.0	Normal	Fair	C	2	20-40	Decay in trunk Poor form; trunk initialially runs along ground - appears to be twin stemmed but isn't
2	Ash, Common	16	7534	4.0	331	Early Mature	4.0	Normal	Good	C	1,2	20+	Ivy clad Suppressed by nearby tree
3	Chestnut, Horse	13	4644	2.5	364	Early Mature	4.4	Normal	Good	C	2	20+	Leaf/shoot disorders
4	Hawthorn, Common	6	1222	2.5	300	Mature	3.6	Dead	Fair	U			Ivy smothered Dead
5	Oak, English	20	9	1.0	1320	Post-Mature	15.8	Normal	Poor	A	3	>40	Decay in trunk and at trunk base (see PICUS report) Good vigour and overall response to wounds / decay Slightly suppressed to T3 chestnut to SW. Freshly exposed to SW by loss of lane tree (mature chestnut opposite).
6	Hawthorn, Common	7	2	2.5	280	Mature	3.4	Normal	Fair	C	2	10+	Ivy smothered

Landmark Trees

Site: The Water House

Date: 6 /6/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: KSR_WHS_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
7	Willow, Weeping	10	3353	4.0	320	Early Mature	3.8	Normal	Good	C	1,2	20+	
8	Eucalyptus	20	2343	8.0	367	Early Mature	4.4	Moderate	Fair	C	2	20+	Dying back (unilateral) Low taper multi-stem growth Ivy covered stems over neighbours appear dead. Outgrown site
9	Eucalyptus	20	7354	2.5	657	Early Mature	7.9	Normal	Fair	C	2	20+	Low taper multi-stem growth As per T8, unsympathetic species choice; outgrown site
10	Birch, Weeping	2.5	3233	1.0	140	Early Mature	1.7	Normal	Good	C	1	20+	Garden ornamental cv Youngii
10a	Laurel, Portugese	8	1111	0.0	212	Early Mature	2.5	Normal	Good	C	2	10+	Screen separating front from rear garden
11	Sycamore	16	6	2.0	539	Early Mature	6.5	Poor	Fair	C/u	2	10+	Multistem habit Dying back (uniform): marked decline since 2016 Adajacent willows next door also appear sparse

Landmark Trees

Site: The Water House

Date: 6 /6/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: KSR_WHS_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
12	Apple, Cultivated	8	4534	2.5	390	Mature	4.7	Normal	Fair	C	1	10+	Decay in trunk
13	Hawthorn, Common	9	3	2.0	350	Mature	4.2	Moderate	Fair	C	2	10+	Ivy smothered A sparser than normal canopy
14	Ash, Common	14	2242	2.0	240	Semi-mature	2.9	Normal	Fair	C	1	20+	Swept stem
15	Birch, Silver	19	5755	4.0	450	Mature	5.4	Moderate	Fair	B	1	20+	Drought-stressed Minor-bleeds and cracks Ivy obscures base
17	Hornbeam	17	8877	3.0	640	Mature	7.7	Moderate	Fair	C	2	10+	Honey fungus toadstools around S base A sparser than normal canopy Increasing deadwood (to 50mm) through crown since last survey
18	Beech, Common	13	5824	3.0	420	Early Mature	5.0	Normal	Fair	B	2	20+	Eccentric form: Low vigour top compared to lower growth 2 long low laterals south, out competing leader. Remote survey.

Landmark Trees

Site: The Water House

Date: 6 /6/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: KSR_WHS_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
20	Magnolia (M. X soulangiana)	5	1.5	2.5	133	Semi-mature	1.6	Normal	Good	C	1	20+	Garden ornamental
G21	Birch, Himalayan	7	2	2.5	90	Young	1.1	Normal	Good	C	1,2	20+	6 in irregular row. Northernmost member dead & to be felled (S Fell)
24	Willow, White	14	6	2.0	500	Mature	6.0	Moderate	Fair	C	2	10+	Multi stem Dying back (uniform): marked decline since 2016 RS
G25	Willow, White (x 2-3)	6	3	2.0	300	Semi-mature	3.6	Moderate	Fair	C	2	10+	Multi stem Dying back (uniform): marked decline since 2016 Remote Survey (RS)
G26	Cherry, Flowering (x 2-3)	4	1.5	2.0	100	Semi-mature	1.2	Poor	Fair	C	2	10+	A sparser than normal canopy Dying back (lower branches) RS
27	Walnut, Common	15	6	2.0	600	Mature	7.2	Normal	Good	B	2	>40	Remote survey (RS)

Landmark Trees

Site: The Water House

Date: 6 /6/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: KSR_WHS_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
28	Cherry, Flowering	6	3	2.0	150	Semi-mature	1.8	Normal	Good	C	2	20+	RS
29	Walnut, Common	9	3	4.0	150	Semi-mature	1.8	Normal	Good	C	2	>40	RS
30	Mulberry, Black	14	4557	2.0	800	Early Mature	9.6	Normal	Fair	B	1	>40	Unsympathetic past management: topped @10m w. decay in heads Storm damage: large breakout wound in lower crown south. RS
31	Willow, Goat	7	2	3.0	150	Young	1.8	Normal	Fair	C	2	20+	Erratic growth habit
G32	Chestnut, Horse	20	8	5.0	600	Mature	7.2	Normal	Fair	A	2	>40	RS
G33 a	Ash	20	8	5.0	500	Mature	6.0	Normal	Fair	A	3	>40	Occasional twig growth <5m RS. 6 x ash of 500mm to SE of G32

Landmark Trees

Site: The Water House

Date: 6 /6/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: KSR_WHS_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
G33 b	Oak	20	8	5.0	800	Mature	9.6	Normal	Fair	A	3	>40	Occasional twig growth <5m RS. 3 x oaks
34	Sycamore	20	5	3.0	600	Mature	7.2	Normal	Fair	B	2	>40	RS
35	Hawthorn, Common	6	2122	2.0	234	Early Mature	2.8	Moderate	Fair	C	2	10+	Ivy clad Dying back (unilateral) 80mm stem dead
36	Hawthorn, Common	5	3122	3.0	250	Early Mature	3.0	Moderate	Fair	C	2	10+	Ivy smothered Dying back (unilateral)

APPENDIX 2

TREE CONDITION FURTHER INVESTIGATION FINDINGS

Landmark Trees

FURTHER INVESTIGATION REPORT:

The Waterhouse

Millfield Lane

London N6 6HT

REPORT PREPARED FOR:

Mr and Mrs Lewis,

c/o: UK & European,

Woodstock Studios,

13 Woodstock Street,

London W1C 2AG

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: UKE/WHS/PCS/01a

Date: 26th June 2017

The statements in this Report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this Report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change, or pruning or other works unspecified in the Report are carried out to, or affecting, the subject tree(s), whichever is the sooner.

Limitations of Use and Copyright:

The content and format of this Report are for the exclusive use of the client. It may not be sold, lent, hired out or divulged to any third party not directly involved in the subject matter without our written consent.

Site Details

Site Address: The Waterhouse, Millfield Lane, London, N6 6HT

Client / Agent: Mr & Mrs Leonard Lewis, C/o UK and European

Surveyor: Kim Dear

Date of Inspection: 9th June 2017

Instruction

Carry out Picus Tomograph Decay detection on the main stem of T5, an oak tree standing in the garden of The Waterhouse, Millfield Lane, London, N6 6HT and a Resistograph investigation of decay in the main stem of T17, a hornbeam at the same address.

Picus Sonic Tomography

The Picus Sonic Tomograph is made by a German company called Argus-Electronic-Gmbh. It is a specialised electronic instrument which can 'look' internally into a branch or tree trunk and display a computer generated image of its condition. It achieves this by measuring the speed that sound travels through the wood in a number of different positions and directions. Sound travels fastest through solid wood. Decayed wood will slow its path. By measuring the speed that sound takes to pass through a tree, an idea of its condition can be obtained.

The PICUS Sonic Tomograph consists of 8 to 14 sonic sensors. These sensors are spaced out evenly around the circumference of the trunk. They detect stress waves induced by manual impact propagated through the wood. Time-of-sound-transmissions are used to generate two-dimensional pictures that document decay and cavities.

The sounds are generated manually by tapping on a number of metal nails with a hammer. Special sensors fixed around the stem read the interval the sound takes to travel through the wood. Once all nails have been tapped, and recordings taken, the computer software works out a visual image that requires professional assessment to assess decay.

Resistograph Tests

The Resistograph is a Drilling instrument that probes the tree with a micro drill with a 3mm tip and a 1.5mm x 400mm shaft; this can penetrate to a depth of 40cm. As the probe advances it measures the resistance encountered. Good healthy wood gives a high reading and poor dysfunctional wood or cavity gives a lower reading. This is depicted on a computer generated trace for analysis.

The instrument used was the IML Resistograph PD400 which has significantly greater sensitivity than earlier models. There are 5 different speed settings and the data is recorded electronically. The readings show the measured resistance as a black line and the feed rate of the needle as a blue colour. Previous models only measured the resistance to the drill bit; friction around this could result in falsely high readings. By measuring the feed rate as well as resistance encountered, a much more nuanced assessment of decay present can be made.

T5 Details

Species: English oak

Diameter: 1320mm

Height: 20m

Photograph 1: T5

Observations

This tree is situated in the south part of the garden, 8 metres from the boundary. The tree has a large open cavity at 1.5 metres to the south (shown in Photograph 2 below), with further cavities at ground level, 4 metres and 6 metres. The crown appears in good health, with some minor deadwood throughout. There are currently no indications of fungal brackets.

Photograph 2: Cavity at 1.5m height

Results

1 PICUS tomograph was undertaken at 100cm above ground level, the results of which can be seen overleaf. The tomograph shows an area of decay with a cavity shown in blue, advanced decay coloured pink/purple and the incipient or early decay coloured green.

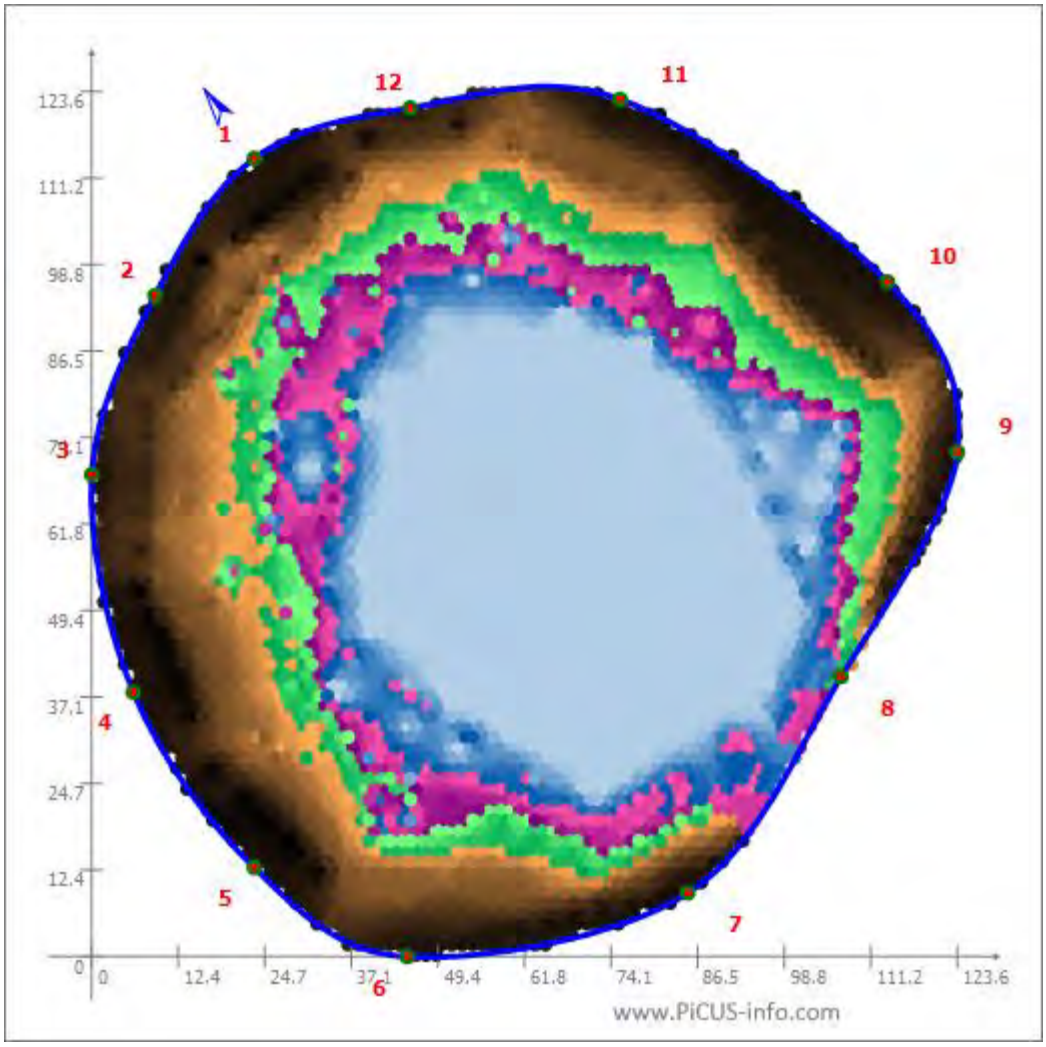


Figure 1: Tomograph taken at 100cm above ground level

Recommendations

Reduce height and spread of crown by an average of 2.5m; re-inspect in 2 years.

T17 Details

Species: Common hornbeam

Diameter: 640mm

Height: 17m

Photograph 3: T17

Observations

This tree is on the northern side of the property, with the boundary fence 30 cm from the main stem. There is a garden room/ outhouse 4 metres to the north east. There is deadwood throughout the crown. Although not currently visible, fungal brackets of *Armillaria mellea* have been reported at the base.

Results

Direction	Height	Results
East	10cm	0-1.2cm bark; 1.2-24.4cm sound wood; 24-27cm decay, 27cm- cavity
North	10cm	0-1.4cm bark; 1.4-21.3cm sound wood; 21.3-24cm barrier zone, 24cm – decay
South	10cm	0-1.4cm bark, 1.4-32.4cm sound wood

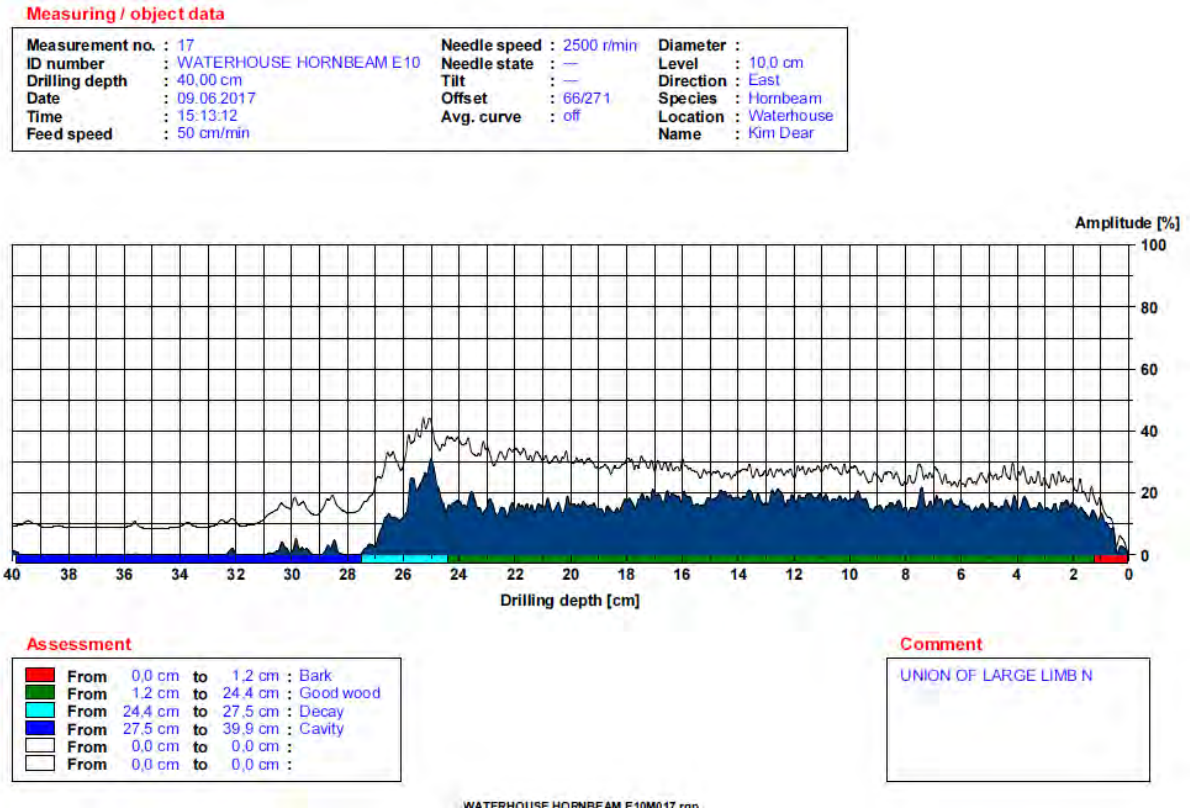


Figure 2: East Resistograph trace

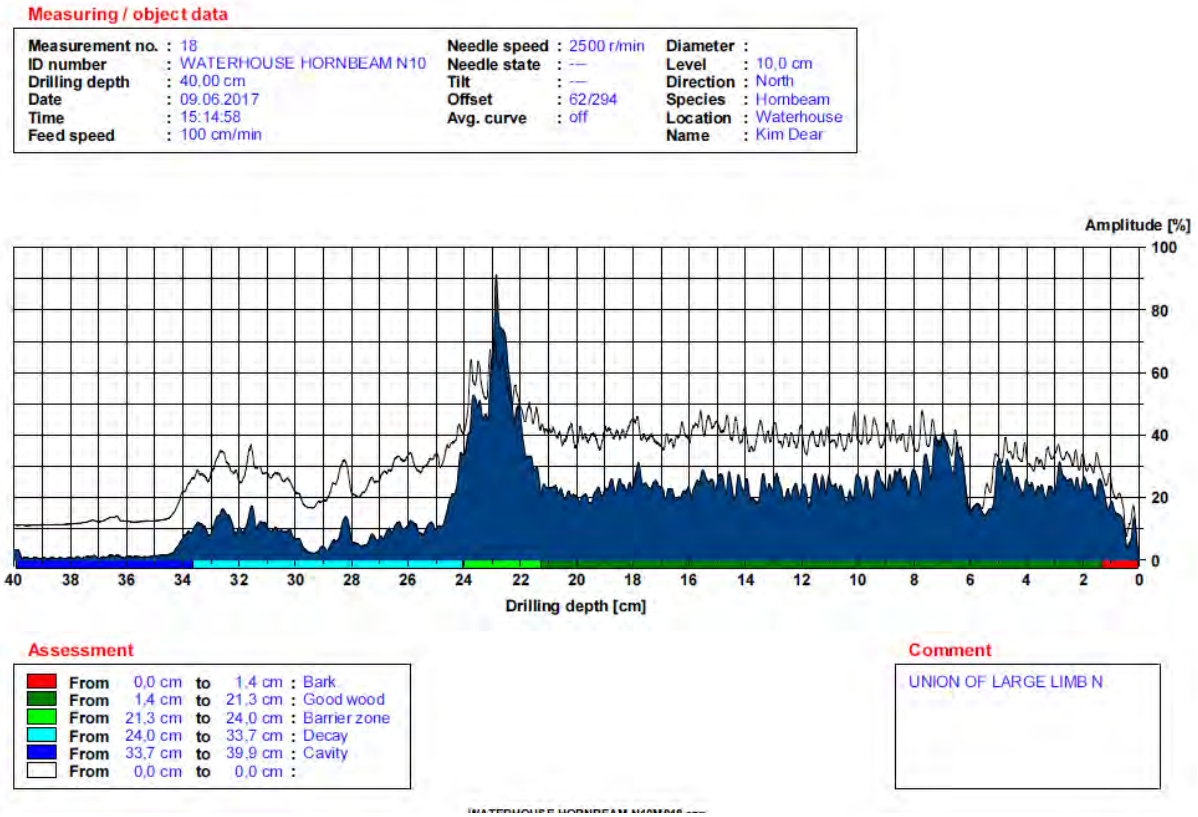


Figure 3: North Resistograph trace

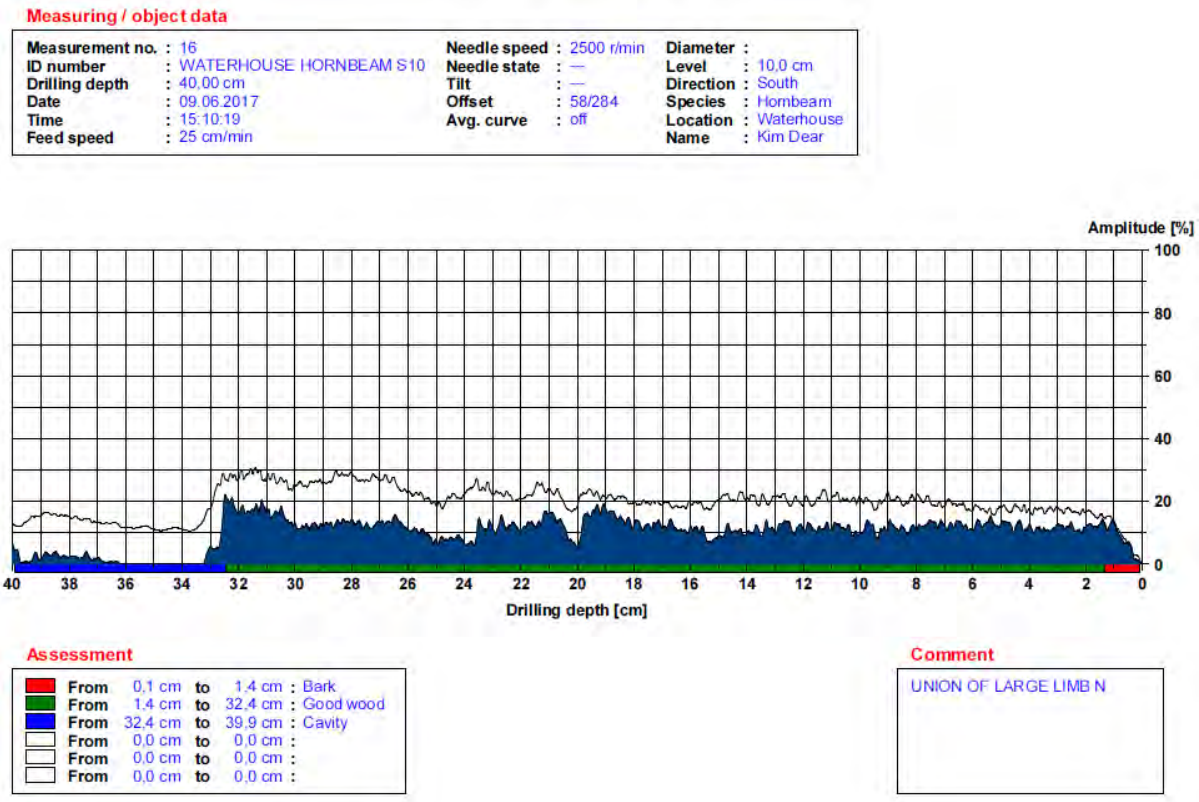


Figure 4: South Resistograph trace

Conclusions

The Resistograph tests were conducted at a downward angle of approximately 15 degrees to enable the identification of any decay within the root crown. They show sound wood to at least 24cm but decay / cavity beyond that depth.

Recommendations

Remove deadwood and then carry out minor (around 1m) crown reduction to correspond. Monitor ongoing condition on an annual basis.

APPENDIX 3

RECOMMENDED TREE WORKS

Notes for Guidance:

Husbandry 1 - Urgent (ASAP), 2 - Standard (within 6 months), 3 - Non-urgent (2-3 years)

CB - Cut Back to boundary/clear from structure.
CL# - Crown Lift to given height in meters.
CT#% - Crown Thinning by identified %.
CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs)*.
CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
DWD - Remove deadwood.
Fell - Fell to ground level.
FInv - Further Investigation (generally with decay detection equipment).
Pol - Pollard or re-pollard.
Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where the Owner/Instructing Party retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

*Not generally specified following BS3998:2010

Landmark Trees

Site: The Water House
Date: 6 /6/17

Surveyor(s): Adam Hollis
Ref: KSR_WHS_AIM

Appendix 2

Recommended Tree Works

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
4	Hawthorn, Common	U	6	2.5	1222	Fell	Ivy smothered Dead Recommended husbandry 2
5	Oak, English	A	20	1.0	9	CR 2.5m Review pruning T3 back off canopy in 2018	Decay in trunk and at trunk base (see PICUS report) Good vigour and overall response to wounds / decay Slightly suppressed to T3 chestnut to SW. Freshly exposed to SW by loss of lane tree (mature chestnut opposite). Recommended husbandry 2
6	Hawthorn, Common	C	7	2.5	2	Mon Monitor ongoing condition Review felling option at landscape phase / completion	Ivy smothered Recommended husbandry 3
8	Eucalyptus	C	20	8.0	2343	DWD Monitor ongoing condition Review felling option at landscape phase	Dying back (unilateral) Low taper multi-stem growth Ivy covered stems over neighbours appear dead. Outgrown site Recommended husbandry 2
9	Eucalyptus	C	20	2.5	7354	Mon Monitor ongoing condition Review felling option at landscape phase	Low taper multi-stem growth As per T8, unsympathetic species choice; outgrown site Recommended husbandry 3
11	Sycamore	C/u	16	2.0	6	DWD Mon	Multistem habit Dying back (uniform): marked decline since 2016 Adajacent willows next door also appear sparse Recommended husbandry 2
15	Birch, Silver	B	19	4.0	5755	Mon	Drought-stressed Minor-bleeds and cracks Ivy obscures base Recommended husbandry 3

Landmark Trees

Site: The Water House
Date: 6 /6/17

Surveyor(s): Adam Hollis
Ref: KSR_WHS_AIM

Appendix 2

Recommended Tree Works

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
17	Hornbeam	C	17	3.0	8877	DWD CR1m Mon Resistograph shows column of decay in centre	Honey fungus toadstools around S base A sparser than normal canopy Increasing deadwood (to 50mm) through crown since last survey Recommended husbandry 2
30	Mulberry, Black	B	14	2.0	4557	Finv * check accuracy of measurment	Unsympathetic past management: topped @10m w. decay in heads Storm damage: large breakout wound in lower crown south. RS Measurement in doubt

APPENDIX 4

RECOMMENDED TREE WORKS TO FACILITATE DEVELOPMENT (See Table 1)

Notes for Guidance:

RP - Pre-emptive root pruning of foundation encroachments under arboricultural supervision.
CB - Cut Back to boundary/clear from structure.
CL# - Crown Lift to given height in meters.
CT#% - Crown Thinning by identified %.
CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs)*.
CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
DWD - Remove deadwood.
Fell - Fell to ground level.
FInv - Further Investigation (generally with decay detection equipment).
Pol - Pollard or re-pollard.
Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where the Owner/Instructing Party retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

*Not generally specified following BS3998:2010

Landmark Trees

Site: The Water House
Date: 6 /6/17

Surveyor(s): Adam Hollis
Ref: KSR_WHS_AIM

Appendix 3

Recommended Tree Works To Facilitate Development

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works		Comments/ Reasons
1	Mulberry, Black	C	8	2.0	5233	Fell		Decay in trunk Poor form; trunk initialially runs along ground - appears to be twin stemmed but isn't To facilitate development
10a	Laurel, Portugese	C	8	0.0	1111	Fell		Screen separating front from rear garden To facilitate development
12	Apple, Cultivated	C	8	2.5	4534	Fell		Decay in trunk To facilitate development
15	Birch, Silver	B	19	4.0	5755	CL	5m	Drought-stressed Minor-bleeds and cracks Ivy obscures base To facilitate development
20	Magnolia (M. X soulangiana)	C	5	2.5	1.5	Fell		Garden ornamental To facilitate development
31	Willow, Goat	C	7	3.0	2	Fell		Erratic growth habit To facilitate construction access

Landmark Trees

Site: The Water House
Date: 6 /6/17

Surveyor(s): Adam Hollis
Ref: KSR_WHS_AIM

Appendix 3

Recommended Tree Works To Facilitate Development

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
35	Hawthorn, Common	C	6	2.0	2122	Fell	Ivy clad Dying back (unilateral) 80mm stem dead To facilitate development

APPENDIX 5

TREE SELECTION FOR URBAN LOCATIONS

Table A4.1: Small Ornamental Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Hawthorn	Crataegus monogyna	Stricta
Cockspur	Crataegus prunifolia	Splendens
Cherry	Prunus x hillieri	Spire
Bird cherry	Prunus padus	Albertii
Rowan / Mountain ash	Sorbus aucuparia	Cardinal Royal
Swedish whitebeam	Sorbus intermedia	Brouwers
B. whitebeam	Sorbus x thuringiaca	Fastigiata

Table A4.2: Medium Specimen Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Chinese red bark birch	Betula albosinensis	Fascination
Mongolian lime	Tilia mongolica	
Hornbeam	Carpinus betulus	Fastigiata Frans Fountaine
Turkish hazel	Corylus colurna	
Maidenhair tree	Gingko biloba	
Pride of India	Koelreuteria paniculata	Fastigiata
European larch	Larix decidua	Sheerwater Seedling
Tulip tree	Liriodendron tulipfera	Fastigiata

Table A4.3: Larger Specimen Tree Species

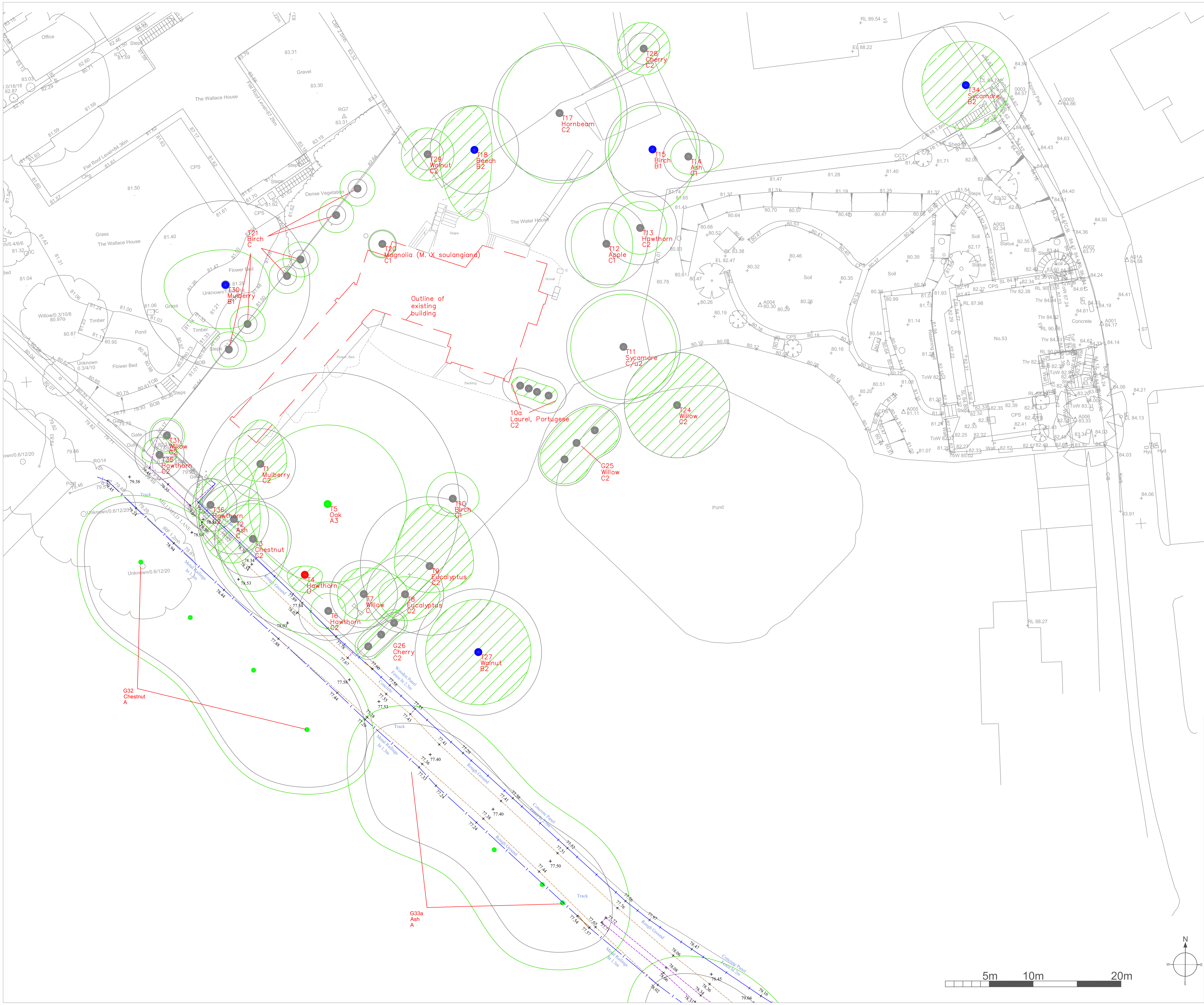
Common Name	Species	(Columnar Form for discrete usage)
English oak	Quercus robur	f. Koster
American elm	Ulmus americana Princeton	
Cedar of Lebanon	Cedrus libani	

Landmark Trees

PART 3 – PLANS

PLAN 1

TREE CONSTRAINTS PLAN



NOTE:

This survey is of a preliminary nature. The trees were inspected from the ground only on the basis of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.

Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base).

Landmark Trees

20 Broadwick Street, London, W1F 8HT
Tel: 0207 851 4544 Mobile: 07812 989928
e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: The Waterhouse	1:200@ A1
Drawing Title: Tree Constraints Plan	June 2017

Key:

- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention
- Tree Position Approximate (not shown on original survey)

Category / Root Protection Area / Crown Spread / Tree Number / Species / Category

PLAN 2

ARBORICULTURAL IMPACT ASSESSMENT PLAN

NOTE:

This survey is of a preliminary nature. The trees were inspected from the ground only on the basis of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.

Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base).

Landmark Trees

20 Broadwick Street, London, W1F 8HT
Tel: 0207 851 4544 Mobile: 07812 989928
e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: The Waterhouse	1:200@ A1
Drawing Title: Arboricultural Impacts Assessment	June 2017

Key:

- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention

Category, Crown Spread, Root Protection Area, Tree Number, Species, Category (T3 Birch B2)

Tree Position Approximate (not shown on original survey)

Note: There are minor variations between tree locations in existing and proposed plans, due to plan sources (O/s v. GPS etc.). Our plans strive to ensure accuracy of placement relative to each base.