



Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

6 Nutley Terrace,
London
NW3 5BX

REPORT PREPARED FOR:

Mrs Shamim Shafi
6 Nutley Terrace,
London
NW3 5BX

REPORT PREPARED BY

Adam Hollis
MSc ARB MICFor FARbor A MRICS C Env

Ref: KSR/6NTT/AIA/02

Date: 9th April 2015

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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 client, 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.

Tree Constraints & Protection Overview

Client:	Mrs Shamim Shafi	Case Ref:	KSR/6NTT/AIA/02
Local Authority:	LB Camden	Date:	09/04/15
Site Address: 6 Nutley Terrace, London, NW3 5BX			
Proposal: Replacement of single dwelling with a multi-unit dwelling with basement			
Report Checklist	Y/N		Y/N
Arboricultural constraints on site	Y	Trees removal proposed	N
Tree Survey	Y	Topographical Survey	Y
BS5837 Report	Y	Conservation Area	Y
Tree Preservation Orders	N/k		
Tree Protection Plan:	N/a	(Include in future method statement)	
Tree Constraints Plan:	Y		
Arboricultural Impact Assessment:	Y		
Site Layout			
Site Visit	Y	Date: 26/11/14	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			
<p>Front garden: T1 & 2 limes: minimal impacts from built development: impacts from removal of existing/new landscaping very low/low.</p> <p>Rear garden: Building construction within outer 2m of T7 sycamore canopy requires remedial tree surgery. T7 is low quality, self-sown boundary tree.</p> <p>Significant potential impacts from landscaping scheme – mitigation available to reduce impacts to low rating.</p>			
Comments			
Impacts rate low and are supportable, subject to mitigation. New trees planted to front and rear.			
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		N

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'

Arboricultural Impact Assessment Report: 6 Nutley Terrace, London, NW3 5BX

Prepared for: Mrs Shamim Shafi 6 Nutley Terrace, London, NW3 5BX

Prepared by: Adam Hollis of Landmark Trees, 20 Broadwick Street, London W1F 8HT

1. SUMMARY

- 1.1 This report comprises an arboricultural impact assessment of the proposals for 6 Nutley Terrace, London, NW3 5BX, reviewing any conflicts between the proposals and material tree constraints identified in our survey.
- 1.2 There are 6 trees surveyed on or around the site, of which 4 are 'B' category *(Moderate Quality) and 2 'C' category *(Low Quality). There is also an outstanding conservation area requirement to plant three new trees in the garden, in replacement for two hazard trees removed in 2011 and one removed in 2014. Moderate quality trees and above are considered significant material constraints on development. However the low quality trees will comprise a constraint in aggregate, in terms of the conservation area. In this instance, no such collective impact is proposed. Final agreement of planting location for the 3 replacement trees may also be a constraint on the site.
- 1.3 The principal primary impacts in the current proposals relate to the proposed landscaping, rather than the built proposals. The build proposals will have a negligible encroachment to the category B tree, T1, and the off-site sycamore, T7. Further remedial works to T7 will also be required to cut back the over-hanging branches by 2m, which is rated as a low impact to a low quality, self-sown boundary tree. The removal of the existing landscaping and shed within the RPA of T7 will also require mitigation, with any works within the RPA undertaken by hand.
- 1.4 The proposed landscaping, particularly in the rear garden, has the potential to impact significantly on the retained category B trees, T4 and T6, in addition to the category C trees, T5 and T7. It is therefore recommended that any landscaping works involving excavations within RPA, including the category B trees in the front garden (T1 and T2), are undertaken with arboricultural supervision. The limits of excavation within RPA should be undertaken manually; any roots encountered will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist. As the excavations relate to the proposed landscaping works only, there should be greater flexibility to amend the proposals to avoid areas of significant rooting. Where possible, any new hard landscaping within the RPA should utilise no-dig construction techniques. Subject to these mitigation measures, the theoretical impacts to the retained trees will be low. No lasting injury is anticipated.
- 1.4 Minor secondary impacts would arise from the juxtaposition with T7 sycamore's canopy. Following the initial, remedial tree surgery (lateral reduction as noted above), a degree of cyclical pruning will be required to maintain practical clearance. However, T7 is a low quality, self-sown, (shared) boundary tree, already growing too close to the existing house. The requirement for cyclical pruning as the tree matures already applies, regardless of development, which merely brings forward the requirement. It would certainly not hurt (the conservation area) to approach the neighbour with a view to negotiating replacement planting on or off site.
- 1.5 Replacement tree planting (for prior hazard tree removals) is recommended at the front (NE entrance) and rear of the site (southern boundary). There will be no net loss of amenity from their removal and replacement.
- 1.6 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 low.
- 1.7 The site has potential for development without impacting significantly on the wider tree population or local landscape. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

* British Standards Institute: Trees in relation to design, demolition and construction BS 5837: 2012 HMSO, London

2. INTRODUCTION

2.1 Terms of Reference

- 2.1.1 LANDMARK TREES were asked by Mrs Shamim Shafi, c/o KSR Architects to provide a survey and an arboricultural impact assessment of proposals for the site: 6 Nutley Terrace, London, NW3 5BX. The report is to accompany a planning application.
- 2.1.2 The proposals are for the replacement of the existing single dwelling with a multi-unit dwelling with basement. This report will assess the impact on the trees and their constraints, identified in our survey. Although the proposals were known at the time of the survey, Landmark Trees endeavour to survey each site blind, working from a topographical survey, wherever possible, with the constraints plan informing their evolution.
- 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 25 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 and 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: 6 Nutley Terrace
- Proposals: NUT2_R15-Sheet - 100 - PROPO

2.3 Scope of Survey

- 2.3.1 As Landmark Trees' (LT) arboricultural consultant, Vince Cainey surveyed the trees on site on 26th November 2014, 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].
- 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.
- 2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Appendix 5.
- 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 client's proposals to create an Arboricultural Impact Assessment Plan in Appendix 6. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site Description



Photograph 1: 6 Nutley Terrace, London, NW3 5BX

- 3.1.1 The site is a residential house in Camden with south-facing garden to the rear. The adjoining network of rear gardens provides a good degree of tranquility and greenery. There is a notable presence of mature tree cover in the locality.
- 3.1.2 The site is relatively level around the house, but the garden slopes significantly to the rear with some existing terracing.
- 3.1.3 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.
- 3.1.4 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.

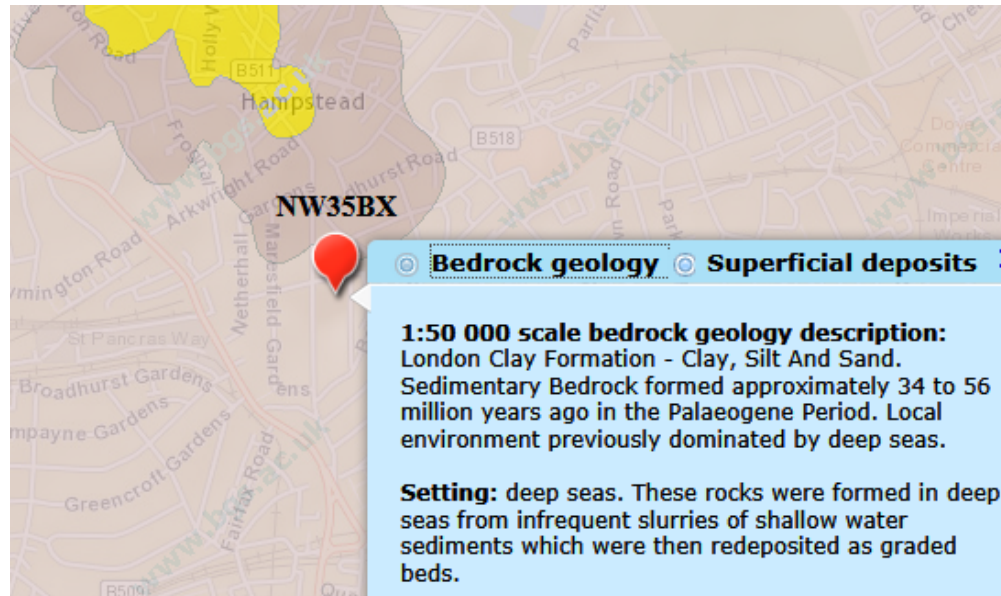


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject Trees

- 3.2.1 Of the 6 surveyed trees 4 are B category (Moderate Quality) and 2 are C category (Low Quality) and 1 is U category. There is also an outstanding conservation area requirement to plant three new trees in the garden in replacement for two hazard trees removed in 2011 and one removed in 2014.
- 3.2.2 In terms of age demographics there is a preponderance of mature forest trees on the site with few younger, garden ornamental replacement trees in the population.
- 3.2.3 The tree species found on site comprise common lime, cultivated apple, London plane, sycamore and turkey oak.

- 3.2.4 Full details of the surveyed trees can be found in Appendix 1 of this report.

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 a 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.

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. **No modifications have been made in this instance (please see overleaf).**

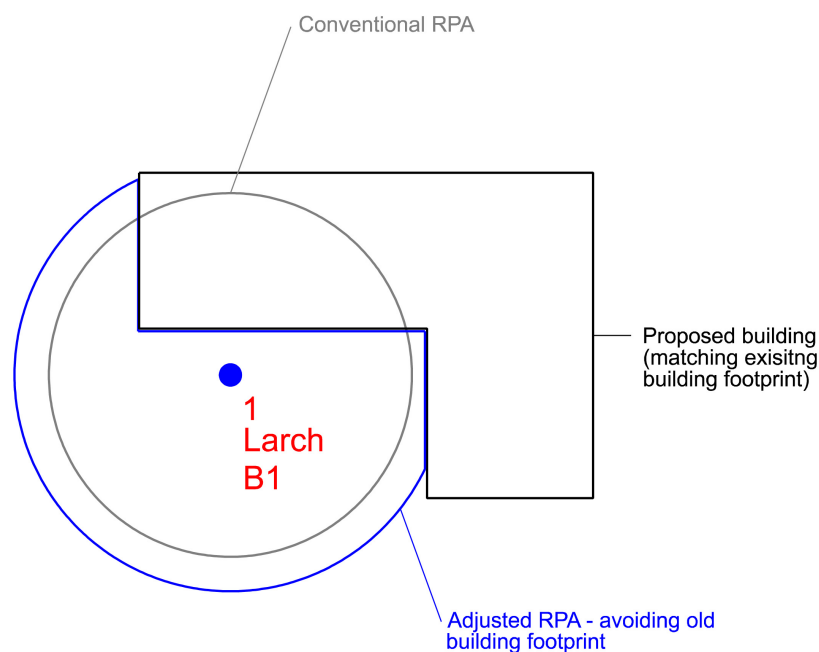


Figure 2 – Generic BS 5837 RPA Adjustments

- 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. Not infrequently, LT are requested by LPA Tree Officers to modify the RPA's to reflect their assumptions that e.g. a road will have drastically limited root growth.

- 4.1.4 Such assumptions cannot be proved without prior site investigations / trial pits. Where it is not always possible to conduct site investigations (e.g. below busy roads), we can always look to the published science. There seems little support for the popular myth that roads and services will curb root growth: research for the International Society of Arboriculture by Kopinga J (ISA 1994), found that “a constant high moisture content of the soil directly underneath the pavement surface can be considered as a major soil factor in attracting the trees’ roots to develop there.” By contrast, grass in lawns may actively antagonise tree roots with natural pathogens. Similarly, Professor F Miller (ISA 1994) found that service trenches at > 3m distances from trees had minimal impact on growth or crown shape.
- 4.1.5 A key misunderstanding, even among professionals, is that we conflate the RPA with the actual root system: RPA's are *prima facie* a notion / convention / treaty and almost entirely theoretical, but readily calculable. Conversely roots are a "known unknown," spatial entity that we predict at our folly. Yet, many are quick to do so.
- 4.1.6 LT favour the neutrality of a circular RPA, because in a difference of opinion, the tree officer will always have the prerogative to dictate the final modification of shape. With the best will in the world, the free allowance of modifications will tend to lead to inequitable outcomes, prejudicing the applicant and the practice is in our view, best avoided. The neutral circle dispenses with this inequity.
- 4.1.7 Ultimately, the point of the circular RPA is to illustrate areas of concern. The purpose of this report is to consider areas of concern (not to modify them to suit our argument or findings). Therefore, no modifications are made here to the RPA's, regardless of roads etc.
- 4.1.8 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.
- 4.1.9 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.”

- 4.1.10 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.
- 4.1.11 In this instance, the principle constraints are the category B trees to the front and rear of the property. The scheme should also consider the need for 3 replacement trees for those felled on the grounds of sound husbandry.

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.

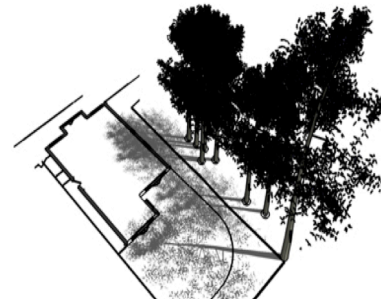


Figure 3 –
Generic Shading Constraints

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.

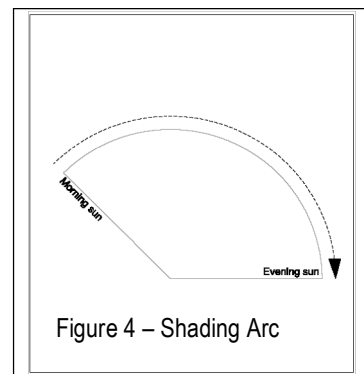


Figure 4 – Shading Arc

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 The principal secondary constraint would be shading on to the site from trees along the south and west boundaries. Shading will always be a factor on this evergreen site, but no more than exists today.

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.

Table 1: Arboricultural Impact Assessment

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

Ref: KSR/6NTT/AIA

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
B	1	Lime, Common	Lightwell: less than 1m2 (majority existing building) Removal of existing/new Landscaping within RPA (21.4m2/36%)	22.4 m ² 37.68 %	Early Mature	Normal	Moderate	Very Low	N/A	Not required for building. 1m2 removed from RPA Manual working / Arboricultural supervision
B	2	Lime, Common	Removal of existing/new Landscaping within RPA	37.4 m ² 44.02 %	Mature	Normal	Moderate	Low	N/A	Manual working / Arboricultural supervision No-dig construction for replacement surfaces
B	4	Plane, London	New Landscaping within RPA	20 m ² 31.43 %	Early Mature	Normal	Good	Medium (low subject to mitigation)	N/A	Manual working / Arboricultural supervision within RPA No-dig construction where possible
C	5	Apple, Cultivated	New Landscaping within RPA	9 m ² 54.15 %	Early Mature	Moderate	Moderate	Medium (low subject to mitigation)	N/A	Manual working / Arboricultural supervision within RPA No-dig construction where possible
B	6	Oak, Turkey	New Landscaping within RPA	33.6 m ² 42.78 %	Early Mature	Normal	Moderate/ good	Medium (low subject to mitigation)	N/A	Manual working / Arboricultural supervision within RPA No-dig construction where possible
C	7	Sycamore	Building Construction within outer 2m of Canopy Removal of existing landscaping & shed/new landscaping within RPA	19 m ² 32.7 %	Early Mature	Normal	Good	Medium (low subject to mitigation)	N/A	Remedial tree surgery (see Rec. Works) Manual working / Arb supervision within RPA

6.0 DISCUSSION

6.1 Rating of Primary Impacts

- 6.1.1 The principal primary impacts in the current proposals relate to the proposed landscaping, rather than the built proposals. The build proposals will have a negligible encroachment to the category B tree, T1, and the off-site sycamore, T7. Further remedial works to T7 will also be required to cut back the over-hanging branches by 2m, which is rated as a low impact to a low quality, self-sown boundary tree. The removal of the existing landscaping and shed within the RPA of T7 will also require mitigation, with any works within the RPA undertaken by hand.
- 6.1.2 The proposed landscaping, particularly in the rear garden, has the potential to impact significantly on the retained category B trees, T4 and T6, in addition to the category C trees, T5 and T7. It is therefore recommended that any landscaping works involving excavations within RPA, including the category B trees in the front garden (T1 and T2), are undertaken with arboricultural supervision. The limits of excavation within RPA should be undertaken manually; any roots encountered will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist. As the excavations relate to the proposed landscaping works only, there should be greater flexibility to amend the proposals to avoid areas of significant rooting. Where possible, any new hard landscaping within the RPA should utilise no-dig construction techniques. Subject to these mitigation measures, the theoretical impacts to the retained trees will be low. No lasting injury is anticipated.
- 6.1.3 Replacement tree planting (for prior hazard tree removals) is recommended at the front (NE entrance) and rear of the site (southern boundary). There will be no net loss of amenity from their removal and replacement.

- 6.1.4 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.
- 6.1.5 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.

6.1.6 **“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*.

6.2 Rating of Secondary Impacts

6.2.1 Minor secondary impacts would arise from the juxtaposition with T7 sycamore’s canopy. Following the initial, remedial tree surgery (lateral reduction as noted above), a degree of cyclical pruning will be required to maintain practical clearance. However, T7 is a low quality, self-sown, (shared) boundary tree, already growing too close to the existing house. The requirement for cyclical pruning as the tree matures already applies, regardless of development, which merely brings forward the requirement. It would certainly not hurt (the conservation area) to approach the neighbour with a view to negotiating replacement planting on or off site.

6.2.2 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 low.

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 building 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 limits of excavation within RPAs for both built proposals and landscaping will be undertaken manually; any roots encountered will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.

- 6.3.3 The driveway encroachment/new landscaping will require a no-dig construction technique, either using a cellular confinement system with no fines aggregate for the sub-base or simply building upon the existing sub-base without disturbing the ground below. Choice of construction method will initially depend upon root penetration within the existing sub-grade. The key principle is not to excavate in the presence of roots and to provide a porous surface to promote healthy soil water relations for future root growth. A further consideration in the use of a more expensive cellular confinement system or similar, may be the claimed reduction in risk of possible future slab / surface displacement by roots of trees growing in paved areas.
- 6.3.4 The immediate canopy encroachment can be avoided with remedial surgery to T7 (see Appendix 2).
- 6.3.5 Nuisance deposition can be mitigated with regular crown cleaning and filtration traps on the guttering (see Figure 5 below). Alternatively, elements of green roof construction might be considered, where applicable.
- 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 that have occurred on the grounds of sound husbandry will be offset by the landscape proposals.

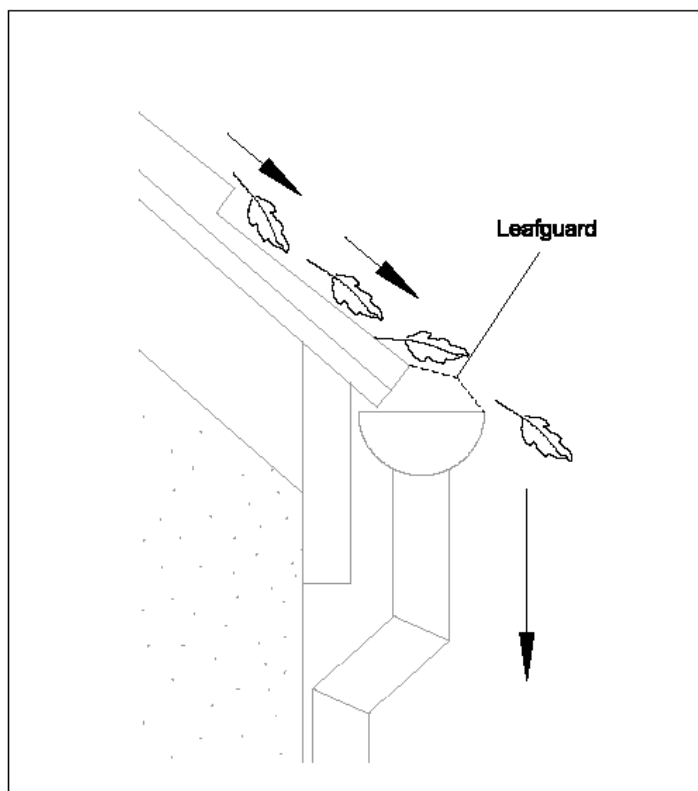


Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

7.0 CONCLUSION

- 7.1 The potential impacts of development are very low in terms of the RPA encroachments of trees retained and the tree works required. The theoretically significant impacts from the landscaping in the rear garden can be mitigated.
- 7.2 Overall, the full potential of the impacts can be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions.
- 7.3 The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts.
- 7.4 Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

- 8.1.1 The tree works recommendations to facilitate development are provided in Appendix 2.
- 8.1.2 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 can be provided as part of the discharge of conditions.

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 lay out 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 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: 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

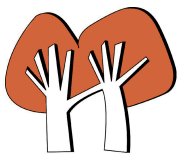
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APPENDIX 1

TREE SCHEDULE

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: 6 Nutley Terrace

Date: 26 November 2014

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis/Vince Cainey

Ref: KSR/6NTT/AIA

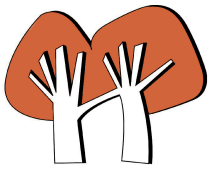
Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	Lime, Common	13.3	3223	4.0	435	Early Mature	4.4	Normal	Fair	B	2	20-40	Pollarded Near entrance to property with wall 50cm to north and perimeter fence 10cm west
2	Lime, Common	12	3223	4.0	520	Mature	5.2	Normal	Fair	B	2	20-40	Pollarded Boundary wall 10cm north.
4	Plane, London	17	3453	4.0	450	Early Mature	4.5	Normal	Fair	B	2	>40	Next to eastern boundary wall.
5	Apple, Cultivated	4	3313	1.0	230	Early Mature	2.3	Moderate	Fair	C	2	20-40	
6	Oak, Turkey	18	4435	5.0	500	Early Mature	5.0	Normal	Fair	B	2	>40	Leans to west.
7	Sycamore	16	6556	4.0	430	Early Mature	4.3	Normal	Fair	C	2	>40	Remote survey only (O/s tree) Co-dominant stems

APPENDIX 2

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 clients 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.



Site: 6 Nutley Terrace

Date: 26 November 2014

Surveyor(s): Adam Hollis/Vince Cainey

Ref: KSR/6NTT/AIA

Appendix 2

Recommended Tree Works

Landmark Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
7	Sycamore	C	16	4.0	6556	CB3m Clear canopy of build	Remote survey only (O/s tree) Co-dominant stems Recommended to permit development

APPENDIX 3

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) or immediately above the root flare for multi-stemmed trees.

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Site: 6 Nutley Terrace
 Drawing Title: Tree Constraints Plan
 1-200@A2
 August 2011

Key:

● High Quality	Category A	○ Crown Spread
● Moderate Quality	Category B	○ Root Protection Area
● Low Quality	Category C	○ Tree Number
● Poor Quality	Category R	○ Species
		○ Category
		○ Tree Position Approximate (not shown on original survey)

APPENDIX 4

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) or immediately above the root flare for multi-stemmed trees.

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Landmark Trees
 Site: 6 Nutley Terrace
 Drawing Title: Arboricultural Impacts Assessment
 1-200@A2
 April 2015

Key:

- Category A High Quality
 - Category B Moderate Quality
 - Category C Low Quality
 - Category R Poor Quality
- Category Crown Spread
 Root Protection Area
 Tree Number
 Species
 Category
 Tree Position Approximate (not shown on original survey)