Arboricultural Survey & Report

Implication Assessment & Method Statement in Support of Development

BS5837:2012 Trees in Relation to Design, demolition and construction – Recommendations

CLIENT:	Shakib & Co
SITE REF:	69 Redington Road, London, NW3 7RP
MWA REF:	NW270215.01DW
MWA CONSULTANT:	David Williams M.Arbor.A
REPORT DATE:	10.03.2015

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1.0 Introduction

1.1 We are instructed by Shakib & Co to undertake a tree survey in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction- Recommendations'. The report is to support a Planning Application relating to the development at 69 Redington Road, NW3 7RP.

1.2 The proposed development consists of the construction of a two storey basement construction predominantly occupying underground space directly below the existing footprint of the dwelling. The following plans and documents have been supplied by the client:

- Block plan lay outs at floor level
- Sections of various elevations

1.3 The site survey was undertaken on the 4th March 2015 and the following report is based upon the findings of that visit and the conditions found on that day.

1.4 We have been provided with plans (see 1.2 above) of the proposed development.

1.5 Tree position was triangulated using a minimum of three reference points.

1.6 **Components of Report**

This report comprises the following elements:

- Baseline tree survey of trees that may be impacted by proposals
- Arboricultural Implication Assessment (AIA)
- Arboricultural Method Statement (AMS)
- Tree Protection Plan (TPP)

1.7 **Technical Synopsis**

We have previously reported in connection with an earlier basement scheme at the subject address in 2012 where the proposed basement projected out from the rear elevation. The current scheme predominantly occupies space below the existing footprint and this helps limit the impact on higher quality trees to the far rear.

1.7.1 The group and individual trees are outside of the reach of any direct threats although fencing is prescribed to ensure an exclusion zone is maintained. The impact on T5 can be limited by the enforcement of protective fencing and temporary ground protection. The development involves some sheet piling beyond the rear elevation of the dwelling below the patio area and this has now been completed with restoration works scheduled upon completion of the remaining structural works.

2.0 Scope & Objectives

2.1 This report has been commissioned by Shakib & Co and the scope of the report reflects his instructions.

2.2 The scope of this report is limited to an appraisal of the existing trees on (and/or adjoining) the site and identification of the implications of development on retained trees.

2.3 The brief is to appraise the trees in relation to the proposed development of the site in accordance with British Standard 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.

2.4 To prepare clear recommendations supported by relevant plans and data in order to facilitate consideration of the Arboricultural implications by the Local Planning Authority.

2.5 To consider the development proposals, identify areas where there are arboricultural issues and to recommend possible solutions.

2.6 To consider additional information supplied, to identify arboricultural issues arising from this information and to recommend possible solutions.

2.7 This report is not a Tree Risk Management Report or a Hazard Analysis Report and its use as such is invalid.

2.8 The trees have been assessed from ground level only. Assessment of condition is based on a visual tree assessment (VTA). No detailed inspection of the upper crown has been carried out. No decay detection equipment (destructive or non-destructive) has been used to further assess the condition of the trees, which is beyond the scope of the survey. Any dangerous trees requiring further assessment on safety grounds will be identified.

2.9 Due to the changing nature of trees and other site circumstances this report and any recommendations made are limited to a 5-year period. Any alteration to the application site or any development proposals could change the current circumstances and may invalidate this report and any recommendations made. Should this be the case this report will require revision to reflect the development Proposals.

2.10 Trees are dynamic structures that can never be guaranteed 100% safe; even those in good condition can suffer damage under average conditions. Regular inspections can help to identify potential problems before they become acute.

2.11 A lack of recommended work does not imply that a tree is safe and likewise it should not be implied that a tree will be made safe following the completion of any recommended work.

2.12 Tree dimensions were measured using a combination of a Trupulse 200 Laser Range Finder, a Leica Disto Laser Rangefinder and a Richter Diameter tape. All instruments were used in accordance with appropriate user guides.

2.13 No soil samples were taken and no soils analysis was undertaken.

2.14 Any legal description or information given to MWA Arboriculture Ltd is believed to be accurate.

2.15 Where solutions to arboricultural problems are specified which require the usage of a third party product e.g. no dig roadway construction. No liability is assumed for the performance or suitability of the product and specialist advice as to the suitability or installation of the product should be sought from the manufacturer or other specialist.

2.16 No responsibility is assumed by MWA Arboriculture Ltd for legal matters that may arise from this report, and the consultant shall not be required to give testimony or to attend court unless additional contractual arrangements are made.

2.17 Any alteration or deletion from this report shall invalidate it as a whole.

3.0 Site Description

3.1 The subject property comprises a large detached dwelling occupying a downhill sloping plot in a long-established Hampstead suburb.

4.0 Development Proposal

4.1 The proposed development consists of the construction of a two storey basement construction.

5.0 Tree Survey

5.1 The survey of the trees was carried out on the 4th March 2015. Tree data is recorded in Table 1 with locations indicated on plans attached to this report. A total of 2 individual trees were assessed as part of the Survey.

5.2 Overview of category **A** trees recorded during our survey:

Tree ID	Species	Cat	Details
None	-	-	-

5.3 Overview of category **B** trees recorded during our survey:

Tree ID	Species	Cat	Details
T4	Oak	B	Mature tree off-site to the NW
T5	Oak	B	Mature tree close to southern boundary
TG1	Mixed species	C	Strong mixed species group

5.4 Overview of category **C** trees recorded during our survey:

Tree ID	Species	Cat	Details
T1	Laurel	C	On-site tree of modest dimensions
T2	Robinia	C	Off-site tree with limited long-term contribution
T3	WR Cedar	C	Mature conifer
T6	Holly	C	On-site tree of modest dimensions
T7	Lime	C	Semi-mature tree with growth potential
T8	Cypress	C	Mature conifer
T9	Prunus	C	Low value ornamental tree
T10	Apple	C	Low value ornamental tree

5.5 Overview of category **U** trees recorded during our survey:

Tree ID	Species	Cat	Details
None	-	-	-

Table 1 – Tree Survey Schedule

Tree No.	Species	Ht (m)	Dia. @ 1.5m (mm)	No of stems	CS N (m)	CS E (m)	CS S (m)	CS W (m)	ER CY	Crown Ht	Age Class	Description & Recommendations	RPA (Radial)	BS Cat
T1	Laurel	4	250	M/S	0.5	0.5	1.7	1.5	20	1.0	M	A small mature evergreen tree/shrub	RPA: 3.0	C1
T2	Robinia	16	500	1	4	4	6	6	10-20	5.0	M	Mature tree located beyond the south-western boundary. This tree has a limited potential for further growth.	RPA: 6.0	C1
T3	Western Red Cedar	16	400	1	2	3	3	2	20-40	3.0	M	A mature conifer with remaining potential contribution to the site	RPA: 4.8	C1
T4	Oak	18	1000	1	8	8	12	10	40+	5.0	M	A mature tree located within the rear garden of a neighbouring property. This tree is ivy covered and has a limited potential for further growth.	RPA: 12.0	B1
T5	Oak	16	730	1	4	5	7	7	40+	5.0	M	A mature tree growing to the southern boundary of the property. This tree has been heavily reduced and has a limited potential for further growth.	RPA: 8.7	B1
T6	Holly	7	440	1	2	3	3	3	40+	2.0	M	A mature evergreen tree located close to the southern boundary of the site. This tree has recently been reduced height	RPA: 5.2	C1
T7	Lime	12	320	1	4	3	4	4	20+	2.0	SM	High growth potential but possible not sustainable due to location and surrounding features	RPA: 3.8	C1

Table 1 – Continued

Tree No.	Species	Ht (m)	Dia. @ 1.5m (mm)	No of stems	CS N (m)	CS E (m)	CS S (m)	CS W (m)	ER CY	Crown Ht	Age Class	Description & Recommendations	RPA (Radial)	BS Cat
T8	Lawson Cypress	7	180	1	1	1	1.5	1.5	20	2.0	M	A mature conifer located in the front garden	RPA: 2.1	C1
T9	Prunus	5	260	1	2	2	2	2	10-20	2.0	EM	A low value ornamental tree.	RPA: 3.1	C1
T10	Apple	3	210	1	2	2	2		10-20	2.0	EM	A low value ornamental tree.	RPA: 2.5	C1
TG1	Cypress x 4 Silver Birch x 1	7.0+	300av	M/S	-	-			20+	2.0	EM	Valuable group offering screening and landscape values	RPA: Spot value	B2

6.0 Arboricultural Impact Assessment

6.1 BS5837 (2012) requires that the root protection area is calculated for each of the retained trees on the development. The root protection area is the minimum area in m^2 which should be left undisturbed around each retained tree. The standard calculated RPA's and the protection zone radii are detailed in the Tree Survey Schedule (Table 1) above.

6.2 For single stem trees, the RPA has been calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods below has been used.

6.3 For trees with multiple stems the following rules apply.
a) For trees with two to five stems, the combined stem diameter has been calculated as follows:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

b) For trees with more than five stems, the combined stem diameter is calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

6.4 The RPA for each tree is plotted as a circle centred on the base of the stem.

6.5 The calculated RPA for each tree has been capped to 707 m^2.

6.6 Where pre-existing site conditions or other factors suggest that rooting has occurred asymmetrically, a polygon of equivalent area has been produced.

6.7 Where modifications to the shape of the RPA have been specified they reflect a soundly based arboricultural assessment of likely root distribution. Any deviation in the RPA from the original circular plot takes account of the following factors whilst still providing adequate protection for the root system:

a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus);
b) topography and drainage;
c) the soil type and structure;
d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.'

6.8 The proposed development does impede on the root protection areas of trees on site; however, effective mitigation measures can limit the impact of development in terms of the long-term function of the trees root system and the condition of the substratum which the tree occupies with its feeding roots.

6.9 Threat from direct damage can be addressed through the installation of a physical barrier in the form of heras panels secured using a double clip system. Heras panels should surround T5 and across the rear garden to protect trees growing on-site to the rear (see TPP).

6.10 The area outside the fencing offering a barrier around T5 but within the RPA should be subject to ground protection to limit compaction. This applies to pedestrian movements as well as heavier plant and machinery.

6.11 Ground protection should take the form of 18mm ply boards overlaid onto a compressible layer such as wood chippings.

6.12 Irrespective of our view that the impact will be limited, in order to safeguard the tree we advise that any excavation undertaken within the RPA is supervised by a competent arboriculturist and that any root pruning which way be necessary is undertaken in accordance with NJUG10.

7.0 Potential incursions in to the RPA (Root Protection Area)

7.1 The proposed development will involve incursions into the RPA as detailed above and also potentially for access during the construction phase. Where it has been defined during the design stage, and shown on the tree protection plan, that vehicular or pedestrian access for the construction operation is required within the root protection area (RPA), the possible effects of construction activity will be addressed by a combination of barriers and ground protection. The position of the barrier is shown within the RPA at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the RPA will be protected with ground protection.

7.2 Storage of materials, the site compound and welfare facilities should be set-up using a location outside the RPA within the driveway/turning area to the front.

8.0 Arboricultural Method Statement (preliminary) – Demolition / Removal of existing surfaces

8.1 Where it is intended to undertake demolition or construction operations within the root protection area, precautions should be taken to maintain the condition and health of the root system and in particular to:

a) prevent physical damage to the roots during demolition or construction (such as by soil compaction or severing);

b) make provision for water and oxygen to reach the roots;

c) allow for the future growth of the root system;

d) preserve the soil structure at a suitable bulk density for root growth and function (in particular for soils of a high fines content).

8.2 Throughout the process of demolition or construction, including piling (see 11.6.3), the soil structure within the root protection area should be protected. The methods of protecting trees from damage during all phases of demolition and construction work will be specified in section 9.0 and conform to the specifications laid down in the Standard.

8.3 All plant and vehicles engaged in demolition works will either operate outside the RPA, or will run on a temporary surface designed to protect the underlying soil structure. Where such ground protection is required, it will be installed prior to commencement of operations.

8.4 Should the level of dust build-up on trees become significant, the advice of an arboriculturist will be sought. If considered appropriate by the attending arboriculturist the affected trees will be hosed down immediately.

8.5 Where an existing hard surface is scheduled for removal, care will be taken not to disturb tree roots that may be present beneath it. Hand held tools or appropriate hand-held pneumatic driven machinery will be used to remove the existing surface. Tree roots exposed by such operations will be treated in accordance with details in 8.6.

8.6 Any excavations which have to be undertaken within the root protection area will be carried out carefully using air-spade technology, avoiding damage to the protective bark covering larger roots. Roots, whilst exposed, will be wrapped in dry, clean hessian sacking to prevent desiccation and to protect from rapid temperature changes. Those roots smaller than 25mm in diameter may be pruned back, preferably to a side branch; using a proprietary cutting tool such as secateurs or a handsaw. Roots larger than 25mm in diameter will only be severed following consultation with an arboriculturist, as they may be essential to the tree's health and stability. Prior to backfilling, any hessian wrapping will be removed and retained roots should be surrounded with sharp sand (builders' sand will not be used because of its high salt content which is toxic to tree roots), or other loose granular fill, before soil or other material is replaced. This material will be free of contaminants and other foreign objects potentially injurious to tree roots.

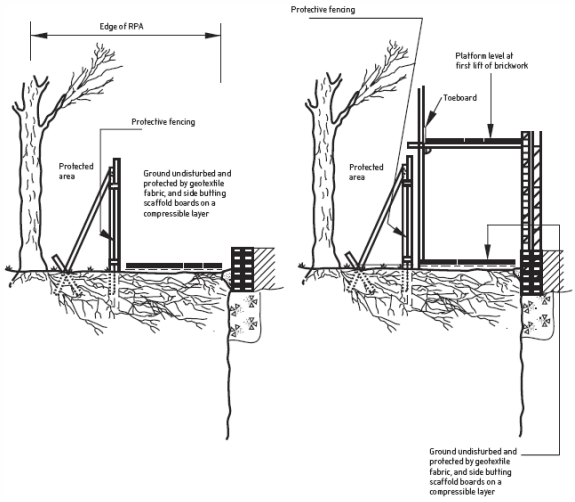
8.7 Arboricultural Method Statement – Ground Protection

8.8 Where it has been defined during the design stage, and shown on the tree protection plan, that vehicular or pedestrian access for the construction operation is required within the root protection area (RPA), the possible effects of construction activity will be addressed by a combination of barriers and ground protection. The position of the barrier is shown within the RPA at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the RPA will be protected with ground protection.

8.9 For light plant (less than 2.5 tonnes) movements within the RPA the installation of ground protection in the form of a single thickness of 18mm thick ply boards laid in top of a 100mm thick layer of compressible material which is this case should be wood-chippings. Pedestrian only movements (internal) can be limited to the use of 18mm ply boards only.

8.10 Arboricultural Method Statement (preliminary) - Scaffolding in the RPA

8.11 Scaffolding which is to be erected within the RPA shall be done in accordance with the Standard as detailed below.



8.12 Arboricultural Method Statement (preliminary) - Installation of Services (Underground and above ground services)

8.13 Trenching for the installation of underground services severs any roots present and may change the local soil hydrology in a way that adversely affects the health of the tree. For this reason particular care should be taken in the routeing and methods of installation of all underground services.

8.14 At all times where services are to pass within the RPA, detailed plans showing the proposed routeing should be drawn up in conjunction with an arboriculturist. Such plans should also show the levels and access space needed for installing the services and be accompanied by arboricultural method statements (AMS).

8.15 Additional precautions outside the exclusion zone

8.16 Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices should be erected on the barrier with words such as: “Construction exclusion zone — Keep out”.

8.17 Planning of site operations should take sufficient account of wide loads, tall loads and plant with booms, jibs and counterweights (including drilling rigs), in order that they can operate without coming into contact with retained trees.

8.18 Such contact can result in serious damage to the trees and might make their safe retention impossible. Consequently, any transit or traverse of plant in proximity to trees should be conducted under the supervision of a banks man, to ensure that adequate clearance from trees is maintained at all times. Access facilitation pruning should be undertaken where necessary to maintain this clearance. NOTE In some instances, local planning authority consent for pruning might be required.

8.19 Fires on sites should be avoided if possible. Where they are unavoidable, they should not be lit in a position where heat could affect foliage or branches. The potential size of a fire and the wind direction should be taken into account when determining its location and it should be attended at all times until safe enough to leave. NOTE Local environmental health authorities might have specific restrictions.

8.20 Any materials whose accidental spillage would cause damage to a tree should be stored and handled well away from the outer edge of its RPA. It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees.

8.21 Arboricultural Method Statement (preliminary) - Tree Protection

8.22 The exclusion zones as defined in this report will be protected with fencing. The site is open and we do not believe that protection of the entire site is necessary. We have indicated on the Tree Protection plan (Plan 003) where we believe *Heras style fencing* should be installed. In other areas the trees are protected by existing fencing defining field boundaries and in our opinion this will be sufficient to protect the trees on site. Where additional fencing has been specified the fencing is to be strong enough to resist impacts and suitable to the degree of construction activity on the site and to be in accordance with that specified within BS5837:2012.

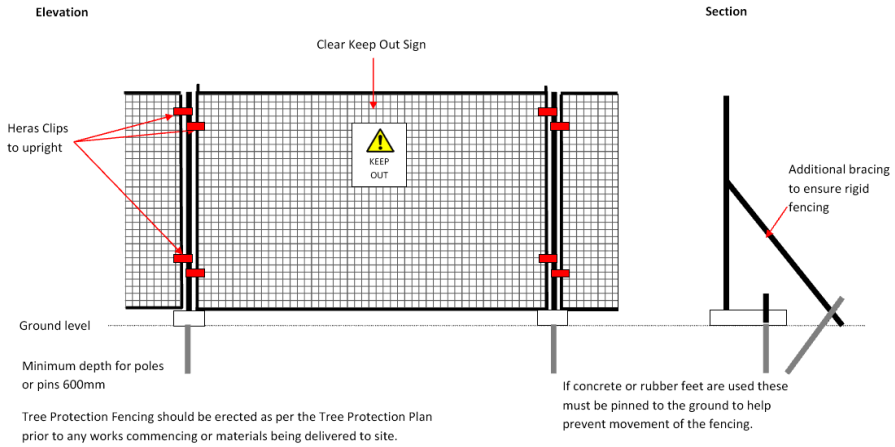
8.23 Where hard surfacing exists within the RPA and where it is to remain, protective barriers will be erected at the edge of the hard surface and the space may be utilised for operational purposes.

8.24 All fencing will be in place prior to any other development work (with the exception of necessary tree works) commencing on site. Such fencing will therefore be erected before any materials or machinery is brought onto site. Once erected the fences will not be moved or altered in any way without prior consultation with the Local Planning Authority other than for operations detailed in this report. If the fencing is damaged in any way it will be re-instated to its original condition before construction work can re-commence Notices will be erected on the fencing stating 'Protected Area – No Operations within Fenced Area'. Protective fences shall be maintained in situ until all equipment, machinery and surplus materials have been removed from the site. Nothing will be stored or placed in any area fenced in accordance with this condition and the ground levels within those areas shall not be altered, nor shall any excavation be made other than those detailed in this report, without the written consent of the Local Planning Authority.

8.25 The total exclusion zones are marked on the accompanying drawing. British Standard 5837:2012 indicates the recommended areas for the Root Protection Areas (RPA) which should be enforced with protective fencing. Specifications within BS5837:2012 inform our recommendations for both the fencing type as detailed below in figure 2 and the location of this fencing which given the works within the RPA is located at the point where works within the RPA stop.

8.26 All protective fencing (except where specified above) is to be constructed in accordance with BS:5837 (2012) – specification reproduced below:

Tree Protection Fencing Specification



9.0 Conclusion and recommendations

9.1 There are trees within the site which fall within the constraints of BS5837 (2012).

9.2 In total, 10no individual trees and 1no tree group were recorded all of which can be successfully retained along with their contribution to the character and appearance of the locality.

9.3 The impact of the proposed development has been assessed and in our professional opinion provided that the works take place in accordance with the method statements specified in this report the works should not be significantly detrimental to the retained trees.

9.4 All technical issues relating to arboriculture should be addressed to MWA Arboriculture Ltd in the first instance. MWA Arboriculture Ltd will liaise between the Local Planning Authority and any interested parties.

9.5 It is suggested that the development proceeds in accordance with the above recommendations with the use of condition(s) to ensure the appropriate supervision of arboricultural matters through until practical completion.