Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

24 Redington Gardens

London

NW3 7RX

REPORT PREPARED FOR:

24 Redington Gardens LLP

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London

W1U 2RU

REPORT PREPARED BY

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MSc ARB MICFor FArbor A MRICS C Env

Ref: DMFK/24RG/AIA/01

Date: 13th October 2015

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 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:	24 Redington Gardens LLP	**Case Ref:**	DMFK/24RG/AIA/01
Local Authority:	LB Camden	**Date:**	13/11/15
Site Address: 24 Redington Gardens, London NW3 7RX			
Proposal: Replacement 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: 07/09/15		Access Full/Partial/None	F/P
Trees on Site			Y	Off-site Trees	Y
Trees affected by development			Y	O/s trees affected by development	Y
Tree replacement proposed:			N	On or off-site trees indirectly affected by development	N

Trees with the potential to be affected

Felling of 2 category C trees (T11 and T13) rated as a low impact.

Trial pit evidence and a meeting with the Tree Officer Nick Bell have informed the current proposals. The theoretical impacts should be considered in the light of the existing development and trial pits. Subject to proposed mitigation, the impacts are rated low.

Comments

Recommended works for 3 trees regardless of development, including the felling of category U tree T9.

Recommendations

1	Proposal will mean the loss of important trees (TPO/CA)	N
2	Proposal has sufficient amelioration for tree loss	N/a
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'

1. SUMMARY

1.1 This report comprises an arboricultural impact assessment of the proposals for 24 Redington Gardens, London NW3 7RX, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 There are 13 trees surveyed on or around the site, of which 2 are category B category *(Moderate Quality), 10 are C category *(Low Quality) and 1 is U category *(Unsuitable for Retention). 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. In this instance, no such collective impact is proposed.

1.3 The principal primary impact of the scheme comprises the felling of two category C trees T11 and T13. The loss of these trees is rated as a low impact, with no significant effect on the local conservation area (both internal site trees of low public visibility). Suitable replacement planting can be provided on site as mitigation for these losses.

1.4 In terms of the impact on the retained trees, two trial pits were excavated by Ruskins Trees and Landscapes on the 26th October 2015 (see Section 4 below). The findings of the trial pit were discussed on site with the Tree Officer Nick Bell on 21/10/15, where it was agreed that the root in TP2 was from the category C, silver birch T2, which should be protected to retain the tree. TP1 was agreed to be free of constraint from off-site trees.

1.5 In the light of the trial pits and discussions with the Tree Officer, the basement element of the proposals has been pulled back. The theoretical impacts of the proposals are rated as medium; however the mitigation proposed, particularly the longer term benefits to the trees from the removal of existing surfaces and replacement with porous surfaces, will ensure the impacts are low. The overall impact to the off-site trees T3 and T4 is rated very low, following the trial pit evidence in Trial Pit 1 and the fact that the distribution of an RPA below the existing building is in principle, unjustified: notwithstanding a reduced probability of rooting below significant structures, the principle of protecting and promoting root colonisation below vulnerable building foundations conflicts with other responsibilities of / liabilities for the Council.

1.6 Minimal pruning will be required to the over-hanging branches of T3 and possibly T4 to facilitate construction and maintain convenient canopy clearance. The proposed elevations are only slightly more demanding in terms of canopy clearance than the current elevations, with a future requirement to maintain canopy clearance from T4.

1.7 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.

1.8 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 24 Redington Gardens LLP to provide a survey and an arboricultural impact assessment of proposals for the site: 24 Redington Gardens, London NW3 7RX. The report is to accompany a planning application.

2.1.2 The proposals are to create a new build detached house to replace the existing 1950's house on the site. The house comprises circa 539 sqm gross internal area, with 5 bedrooms. Accommodation is arranged over basement, lower ground, upper ground, first and second floors. The design for the proposal at number 24 Redington Gardens is based on an approved scheme that was designed at number 25 and 26 Redington Gardens. This scheme obtained planning permission on 24th September 2015 (2015/3200/P).

2.1.3 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.

2.1.4 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: ground floor plan_existing-A1 *

Proposals: ground floor plan_proposed & lower ground floor plan_proposed

*In the absence of a full topographical survey, tree positions may be approximate only.

2.3 Scope of Survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, Vince Cainey surveyed the trees on site on 7th September 2015, 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. General husbandry recommendations are distinguished at Appendix 2 from the minimum requirements to facilitate development / form part of the planning application at Appendix 3. 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 2 would still apply.

2.4.2 A site plan identifying the surveyed trees, based on the client'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 client'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: 24 Redington Gardens, London NW3 7RX

3.1.1	This property is located in the Frognal & Fitzjohns Ward roughly equidistant between Finchley Road, to the west, and Heath Street, to the east. It comprises a detached
3.1.2	The site levels vary with the existing hard landscaping.
3.1.3	In terms of the British Geological Survey, the site overlies the Claygate Member / Beds (see dark area on plan extract overleaf). As the youngest part of the London Clay, they form a transition between the clay and the sandier Bagshot Beds above (shown in yellow). Unlike the Bagshot Beds, more typical of Hampstead Heath, 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.
3.1.4	The actual limits of soil series are not as clearly defined on the ground as on plan and there may be anomalies between them. Further advice from the relevant experts on the specific soil properties can be sought as necessary.
3.1.5	Clay soils are prone to compaction during development. Damage to soil structure can have a serious impact on tree health. Design of foundations near problematic tree species will also need to take into consideration subsidence risk.

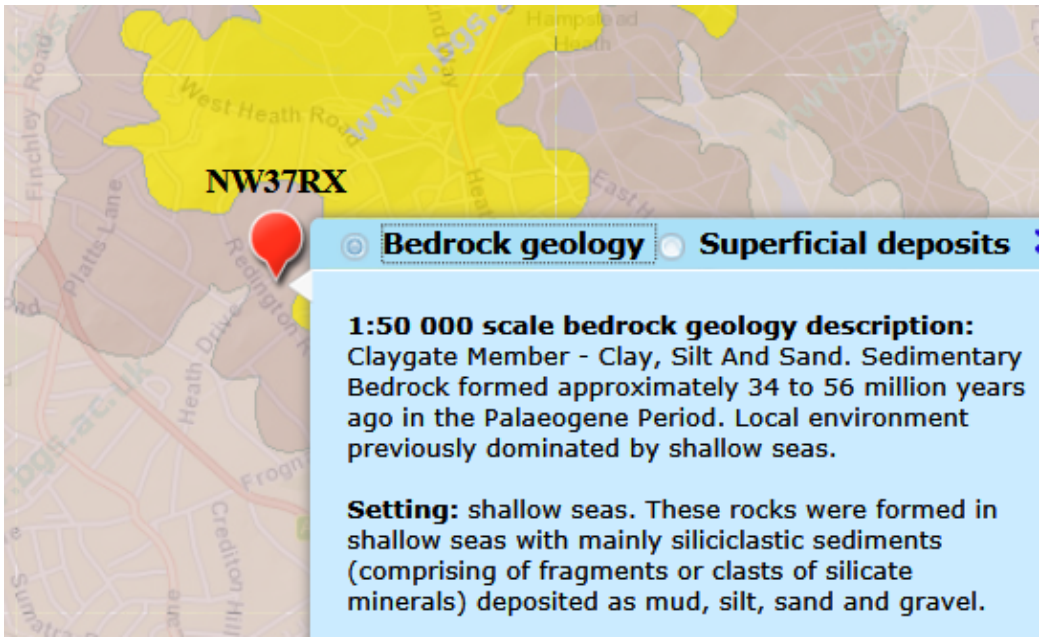


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject Trees

3.2.1	Of the 13 surveyed trees on and around the site 2 are category B category *(Moderate Quality), 10 are C category *(Low Quality) and 1 is U category *(Unsuitable for Retention). 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
3.2.2	The tree species found on site comprise cultivated apple, silver birch, Leyland cypress, magnolia, common yew, whitebeam and myrobalan plum, oak and holly.
3.2.3	In terms of age demographics there is a preponderance of mature trees on the site with a few young and semi-mature trees in the population.

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report.
3.2.5	There are recommended works for 3 trees including the felling of category U tree T9. These are listed in Appendix 2.

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 Redington/Frognal Conservation Area designation, 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, although trial pits have been undertaken to determine root colonisation within the proposed development area (see overleaf).**

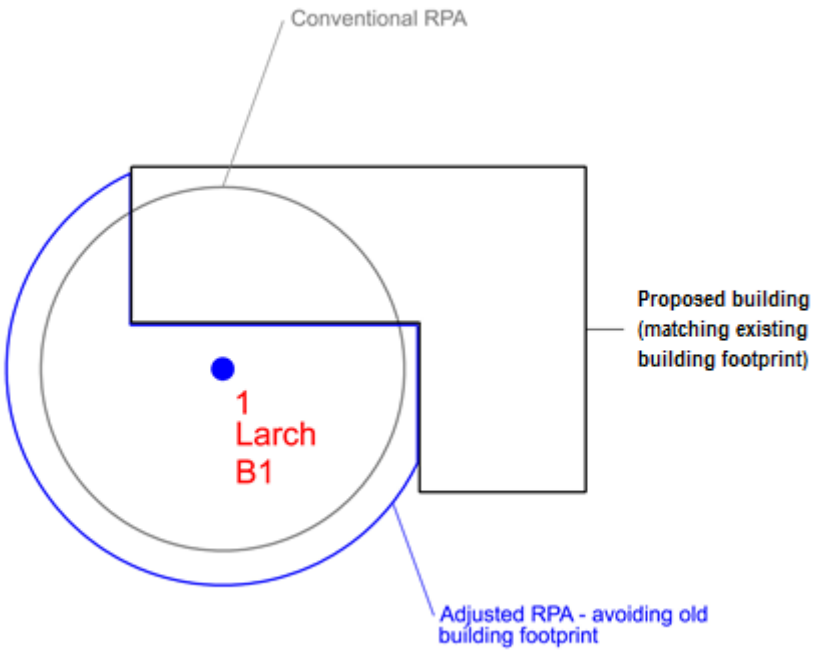
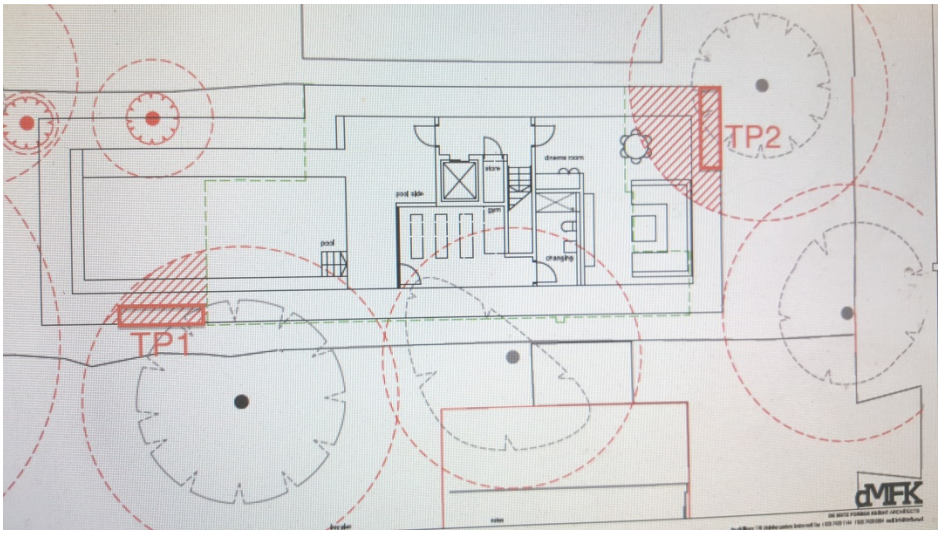


Figure 2 – Generic BS 5837 RPA Adjustments

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. Accordingly two trial pits were excavated by Ruskins Trees and Landscapes on the 26th October 2015. The findings of the trial pit were discussed on site with the Tree Officer Nick Bell on 21/10/15, where it was agreed that the root in TP2 was from the birch, which should be protected to retain the tree.



Plan Extract 1: Location of Trial Pits

Photograph 2: Trial Pit 1 (200cm long 900mm deep) – no roots

Photograph 3: Trial Pit 2 (200cm long 900mm deep) with Root 1 (120mm diameter at 100mm deep -measured at widest part before the root splits)

4.1.5	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.

4.1.6 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.

4.1.7 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.

4.1.8 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.

4.1.9 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.

4.1.10 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. (In this instance, no such collective impact is proposed).

4.1.11 In this instance, the trial pits and existing building/hard standings have determined that there are few significant primary constraints upon development, provided any proposals respect the findings of Trial Pit 2.

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.

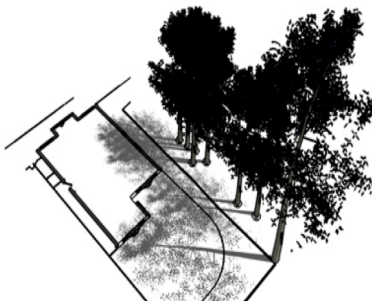


Figure 3 –
Generic Shading Constraints

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.

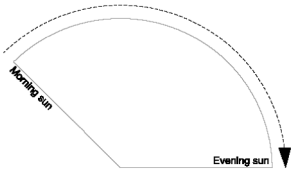


Figure 4 – Shading Arc

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-site trees T1 and T2, in addition to off-site trees T3 and T4, have the potential to provide a variety of secondary constraints, including shading, organic deposition and the potential need to maintain crown clearance in the future. 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: DMFK/24RG/AIA/01

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	Plum, Myrobalan	Existing hard standings removed & replaced New porous hard standings and a bin store/bike store	28.8 m^2 31.43 %	Mature	Moderate	Moderate	Medium (Low subject to mitigation)	N/A	Airspade / manual excavation with no-dig/porous replacement surfaces No-dig construction
C	2	Birch, Silver	Existing hard standings removed & replaced New steps Minor encroachment from new lightwell (negligible)	40.8 m^2 41.7 %	Mature	Moderate	Moderate/ poor	Medium/ high (Low subject to mitigation)	N/A	Airspade / manual excavation with no-dig/porous replacement surfaces No-dig construction for steps
C	3	Birch, Silver	Demolition of existing building Excavation of basement/ new elevations (all existing)	26 m^2 29.68 %	Mature	Moderate	Moderate/ poor	Medium (Low subject to mitigation)	N/A	Pull-back demolition; minor remedial tree works Hand dig top 750mm of basement line thro' RPA
B	4	Whitebeam	Demolition of existing hard landscaping Excavation of basement/ new elevations (trial pit evidence - minimal rooting)	20.8 m^2 17.67 %	Mature	Normal	Moderate	Medium (Low subject to mitigation)	N/A	Pull-back demolition; minor remedial tree works Hand dig top 750mm of basement line thro' RPA
C	11	Magnolia	Felled to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting / landscaping
C	13	Leylandii	Felled to Facilitate Development	m^2 N/A %	Mature	Moderate	N/A	N/A	Low	New planting / landscaping

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal primary impact of the scheme comprises the felling of two category C trees T11 and T13. The loss of these trees is rated as a low impact, with no significant effect on the local conservation area (both internal site trees of low public visibility). Suitable replacement planting can be provided on site as mitigation for these losses.

6.1.2 In terms of the impact on the retained trees, two trial pits were excavated by Ruskins Trees and Landscapes on the 26th October 2015 (see Section 4 below). The findings of the trial pit were discussed on site with the Tree Officer Nick Bell on 21/10/15, where it was agreed that the root in TP2 was from the category C silver birch T2, which should be protected to retain the tree. TP1 was agreed to be free of constraint from off-site trees.

6.1.3 In the light of the trial pits and discussions with the Tree Officer, the basement element of the proposals has been pulled back. The theoretical impacts of the proposals are rated as medium; however the mitigation proposed, particularly the longer term benefits to the trees from the removal of existing surfaces and replacement with porous surfaces, will ensure the impacts are low. The overall impact to the off-site trees T3 and T4 is rated very low, following the trial pit evidence in Trial Pit 1 and the fact that the distribution of an RPA below the existing building is in principle, unjustified: notwithstanding a reduced probability of rooting below significant structures, the principle of protecting and promoting root colonisation below vulnerable building foundations conflicts with other responsibilities of / liabilities for the Council.

6.1.4 Minimal pruning will be required to the over-hanging branches of T3 and possibly T4 to facilitate construction and maintain convenient canopy clearance. The proposed elevations are only slightly more demanding in terms of canopy clearance than the current elevations, with a future requirement to maintain canopy clearance from T4.

6.1.5 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.

6.1.6 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.

6.1.7 "**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.*

6.1.8 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 building should proceed inwards in a "pull down" fashion. Hard surfacing should be manually lifted with caution where it lies within an RPA.

6.3.2 As a precautionary measure, the path of foundations through RPAs will be manually excavated to 750mm depth under arboricultural supervision; any roots encountered within the trenches / pits will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs back to a junction. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.

6.3.3 The replacement paving/hard landscaping and proposed bin store/bicycle store and steps 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 of T3 and T4 can be avoided with minor pruning to cut back the over-hanging lower limbs.

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 columnar tree species cultivars for constricted sites is provided in Appendix 4.

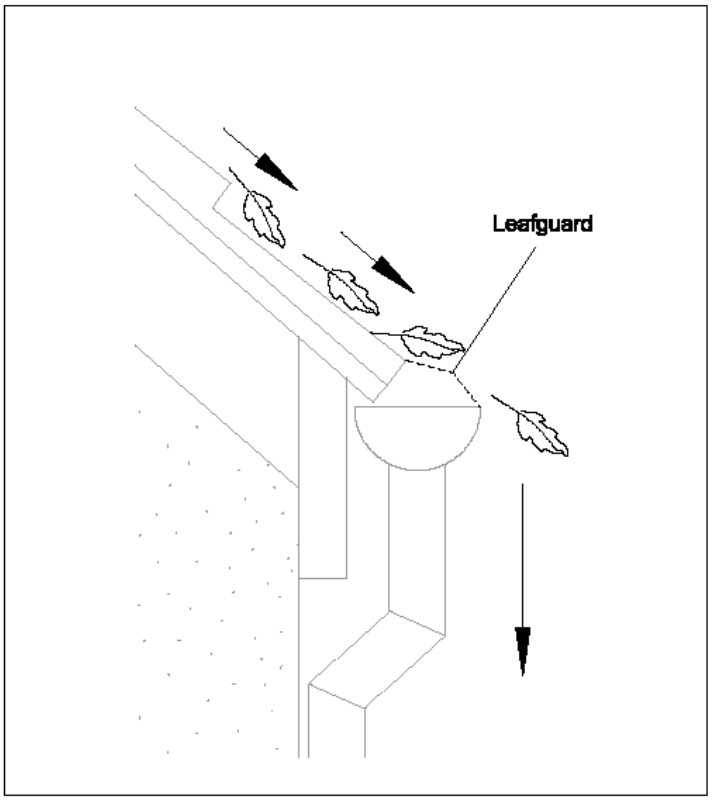


Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

7.0 CONCLUSION

7.1 The potential impacts of development are all relatively low in terms of both quality of trees removed.

7.2 The full potential of the impacts on the retained trees 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 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. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Current tree works recommendations are found in Appendix 2 to this report, with works to facilitate development in Appendix 3 and a selection of columnar tree species cultivars for constricted sites provided in Appendix 4. Any tree removals recommended within this report should only be carried out with local authority consent.

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.

8.1.3 Replace felled trees with suitable native 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

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Landmark Trees

PART 2 – APPENDICES

APPENDIX 1

TREE SCHEDULE

Botanical Tree Names

Apple	: Malus sp	Oak	: Quercus spp
Birch, Silver	: Betula pendula	Pear, Common	: Pyrus communis
Cypress, Leyland	: Cupressus × leylandii	Plum spp	: Prunus spp
Holly, Common/English	: Ilex aquifolium	Plum, Myrobalan	: Prunus cerasifera
Magnolia	: Magnolia spp.	Yew, Common	: Taxus baccata

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: 24 Redington Gardens
Date: 07/09/2015

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd
020 7851 4544
Surveyor(s): Vince Cainey
Ref: DMFK/24RG/AIA/01

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	Plum, Myrobalan	9	3343	2.0	450	Mature	5.4	Moderate	Fair	C	2	20+	
2	Birch, Silver	10	3	3.0	465	Mature	5.6	Moderate	Fair	C	2	20+	Ivy
3	Birch, Silver	9	5414	3.0	440	Mature	5.3	Moderate	Fair	C	2	10+	In neighbor's property
4	Whitebeam	8	4	3.0	510	Mature	6.1	Normal	Good	B	2	40	In neighbor's property
5	Yew, Common	9	3423	2.0	745	Mature	8.9	Moderate	Fair	C	2	40+	
6	Oak	14	5563	3.0	540	Mature	6.5	Normal	Fair	B	2	40+	Ivy on stem

Landmark Trees

Site: 24 Redington Gardens
Date: 07/09/2015

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd
020 7851 4544
Surveyor(s): Vince Cainey
Ref: DMFK/24RG/AIA/01

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	Leylandii	4	1	1.0	100	Semi-mature	1.2	Moderate	Fair	C	2	20+	
8	Apple	8	3433	2.0	335	Mature	4.0	Moderate	Fair	C	2	>40	
9	Apple	3	2	1.0	120	Mature	1.4	Moderate	Poor	U	2	10+	
10	Holly	3.5	2	2.0	120	Young	1.4	Normal	Good	C	2	>40	
11	Magnolia	4	1	2.0	100	Young	1.2	Normal	Good	C	2	>40	
12	Apple	3	2212	2.0	360	Mature	4.3	Moderate	Fair	C	2	20+	In neighbor's property

Landmark Trees

Site: 24 Redington Gardens

Date: 07/09/2015

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Vince Cainey

Ref: DMFK/24RG/AIA/01

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
13	Leylandii	3	1	0.0	195	Mature	2.3	Moderate	Fair	C	2	10+	

APPENDIX 2

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 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.

*Not generally specified following BS3998:2010

Landmark Trees

Site: 24 Redington Gardens
Date: 07/09/2015

Surveyor(s): Vince Cainey
Ref: DMFK/24RG/AIA/01

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
2	Birch, Silver	C	10	3.0	3	Svr Ivy	Ivy Recommended husbandry 3
6	Oak	B	14	3.0	5563	Svr Ivy	Ivy on stem Recommended husbandry 3
9	Apple	U	3	1.0	2	Fell	Recommended husbandry 3

APPENDIX 3

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.

*Not generally specified following BS3998:2010

Landmark Trees

Site: 24 Redington Gardens
Date: 07/09/2015

Surveyor(s): Vince Cainey
Ref: DMFK/24RG/AIA/01

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
3	Birch, Silver	C	9	3.0	5414	CB Cut back over-hanging branches from piling works	In neighbor's property To facilitate development
4	Whitebeam	B	8	3.0	4	CB Cut back over-hanging branches from piling works	In neighbor's property To facilitate development
11	Magnolia	C	4	2.0	1	Fell	To facilitate development
13	Leylandii	C	3	0.0	1	Fell	To facilitate development

APPENDIX 4: TREE SELECTION FOR CONSTRICTED LOCATIONS

Table A4.1: Rosaceous Tree Species for Constricted Planting Locations

Common Name	Species	Selected Form
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
Rowan / Mountain ash	Sorbus aucuparia	Rossica Major
Rowan / Mountain ash	Sorbus aucuparia	Sheerwater Seedling
Swedish whitebeam	Sorbus intermedia	Brouwers
B. whitebeam	Sorbus x thuringiaca	Fastigiata

Table A4.2: Specimen Tree Species for Constricted Planting Locations

Common Name	Species	Selected Form
Chinese red bark birch	Betula albosinensis	Fascination
Swedish birch	Betula pendula	Dalecarlica
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

Landmark Trees

PART 3 – PLANS

PLAN 1

TREE CONSTRAINTS PLAN

8
Apple
C

9
Apple
U

10
Holly
C

12
Apple
C

6
Oak
B

7
Leylandii
C

5
Yew
C

11
Magnolia
C

13
Leylandii
C

4
Whitebeam
B

3
Birch
C

2
Birch
C

1
Plum
C

GREENHOUSE
CONSERVATORY
RECEPTION ROOM
KITCHEN
UTILITY
GARAGE
AUDLEY BUILDING
PROPERTY
GARAGE NO ACCESS
TARMAC
BUILDING
LOW WALL
TOP OF WALL
TOP OF FENCE
100cm
1000cm
ac access
ELEC
GAS
SW
BT
OHL

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: 24 Redington Gardens	1:100@ A1
Drawing Title: Tree Constraints Plan	September 2015

Key:

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

Category
Root Protection Area
Crown Spread
Tree Number
Species
Category
13 BIRCH B

Tree Position Approximate (not shown on original survey)

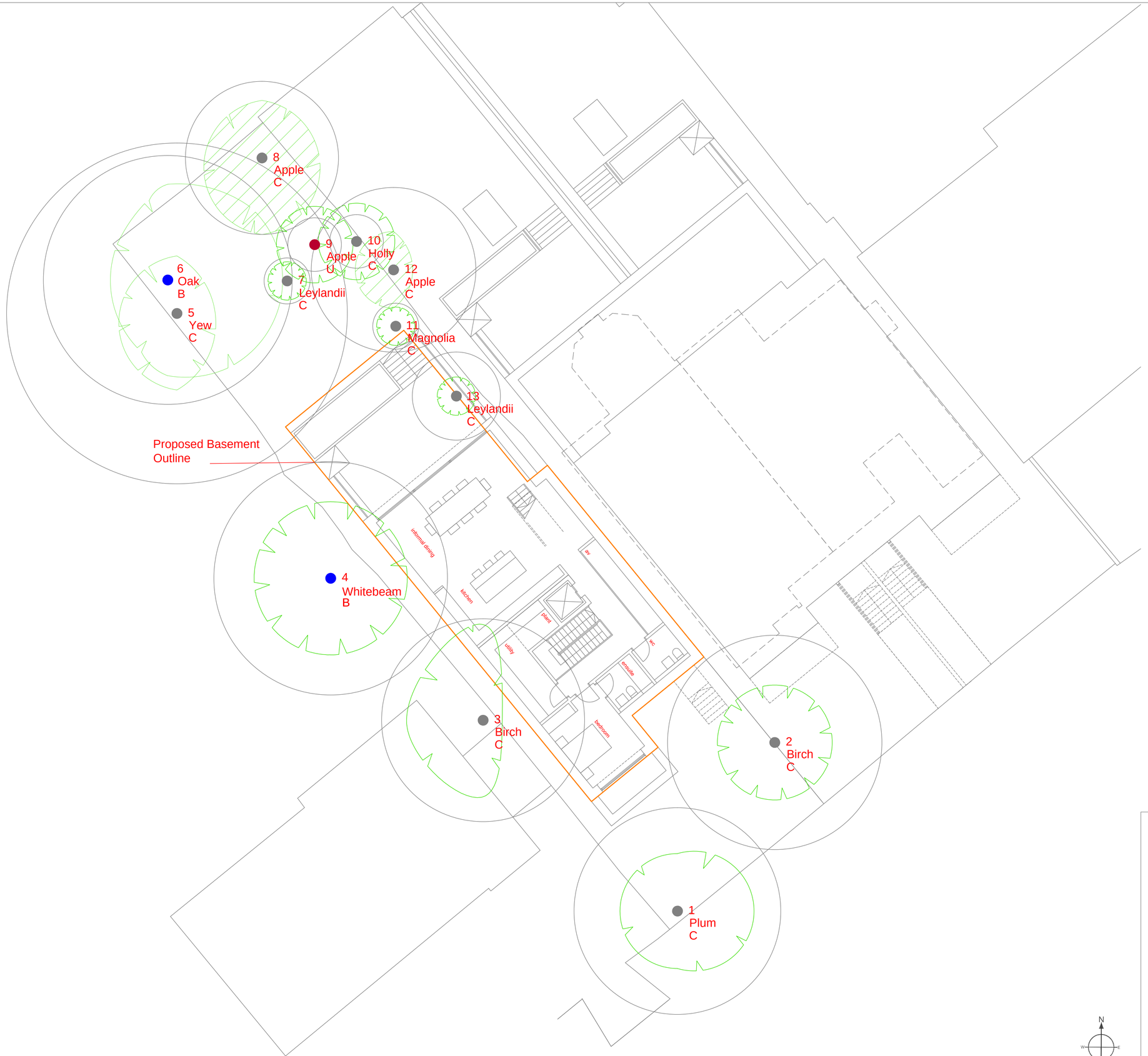
N
W
E
S

5m
10m

PLAN 2

ARBORICULTURAL IMPACT ASSESSMENT PLAN (S)

i. Lower Ground Floor
ii. Ground Floor



Proposed Lower Ground Floor 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).

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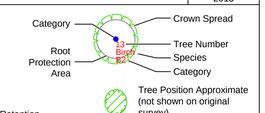
Site: 24 Redington Gardens	1:100@ A1
Drawing Title: Arboricultural Impacts Assessment	November 2015

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)

8
Apple
C

9
Apple
U

10
Holly
C

12
Apple
C

6
Oak
B

7
Leylandii
C

5
Yew
C

11
Magnolia
C

13
Leylandii
C

4
Whitebeam
B

3
Birch
C

2
Birch
C

1
Plum
C

living room

WC

cloak

formal dining

bike store

bin store

garage

log store

Proposed Ground Floor Plan

N
W
E
S

5m
10m

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).

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e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 24 Redington Gardens	1:100@ A1
Drawing Title: Arboricultural Impacts Assessment	November 2015

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
13 Birch B2

Tree Position Approximate (not shown on original survey)