Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

19 Parliament Hill

London

NW3 2TA

REPORT PREPARED FOR:

Mr Gideon Wood

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REPORT PREPARED BY

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Ref: FHA/19PH/AIA/01A

Date: 7th January 2014

Appendices

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:	Mr Gideon Wood	**Case Ref:**	FHA/19PH/AIA/01A
Local Authority:	LB Camden	**Date:**	7/1/15
Site Address: 19 Parliament Hill, London NW3 2TA			
Proposal: Application for the formation of a below ground level basement with associated external access stair and skylights			

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

Site Layout					
Site Visit	Y	Date: 22/10/14		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

Site investigations revealed no significant root colonisation from low quality, but third-party, off-site ash trees T5-8. Felling of sapling T4 rated as a low impact only.

Impact of proposed landscaping within RPA of T9 to be mitigated with manual excavation, pre-emptive root pruning and crown pruning to provide construction clearance. Future maintenance of current ground clearance of 2m.

Comments

Recommended works for T17 regardless of development, but also pertinent to maintaining a safe site of work.

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	TBC
4	Proposal will mean retained trees are too close to buildings	TBC
5	Specialist demolition / construction techniques required	Y
6	The Proposal will result in significant root damage to retained trees	TBC
7	Further investigation of tree condition / rooting recommended	Y

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

1. SUMMARY

1.1 This report comprises an arboricultural impact assessment of the proposals for 19 Parliament Hill, London NW3 2TA, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 There are 23 trees surveyed on or around the site, of which 1 is category B category (Moderate Quality), 21 are C category (Low Quality) and 1 is C/u category (Low Quality/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 impacts in the current proposals affect the young, off-site ash trees T5 – T7 and the semi-mature T8. Although they are low-quality / category C trees, they are also third-party boundary trees and planning will wish to protect them. The proposed basement lies within 1m of their stems, in addition to encroaching the theoretical RPA's by between 10% and 35%. Furthermore, all of these off-site trees overhang the proposed development area with a ground clearance of only 2.5m, and would require cutting /tying back to enable piling works (unless manually underpinning). The level differences, existing internal hard landscaping and the intervening boundary have evidently limited root colonisation of these off-site trees within the site: trial pit investigations revealed no significant rooting from these trees along the basement outline. Those roots encountered can be hand pruned as necessary. The trees' relatively young age works in the applicant's favour – the trees will be more resilient: young trees commonly have 90% of their roots pruned in nursery operations and the crowns of young trees are commonly raised in maintenance operations. Therefore, the proposals can be developed without substantial harm to the trees.

1.4 The proposals will also result in an 11.4% encroachment of the theoretical RPA of the on-site category C crab tree T9, from the excavation of the proposed steps. This is considered a low impact, subject to the proposed mitigation, again requiring manual excavation with pre-emptive root pruning. The current ground clearance of 2m will be sufficient, although the canopy overhanging the proposed development area will require pruning to facilitate construction. As an internal site tree within the client's ownership, this category C tree is less important in planning terms.

1.5 The development will also require the removal of the cherry sapling T4; the loss of the low quality, interior site tree/sapling is rated as a low impact. A suitable replacement will be agreed with the local planning authority.

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

1.7 Subject to the findings of the proposed trial pits confirming that existing hard landscaping and other features has limited root colonisation from the off-site ash trees and that the risk of injury is low, the site has potential for development without impacting significantly on the wider tree population or local landscape.

* 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 Mr Gideon Wood, C/o Finley Harrison Architectural Services Ltd to provide a survey and an arboricultural impact assessment of proposals for the site: 19 Parliament Hill, London NW3 2TA. The report is to accompany a planning application.

2.1.2 The proposals are for the formation of a below ground level basement with associated external access stair and skylights. 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: 14051-13-B-GA

Proposals: 006 (Landmark Trees)(24-10-2014)(CAD Drawings)_0.00-Ground Floor

2.3 Scope of survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, James Bell surveyed the trees on site on 22nd October 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: 19 Parliament Hill, London NW3 2TA

3.1.1	The site comprises an existing residential dwelling located on the western side of Parliament Hill opposite the junction with Nassington Road. The property has a small garden to the front and a landscaped rear garden.
3.1.2	The levels vary across the property, rising 5.5 meters from front to rear with local variations created by hard landscaping such as the rear patio.
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.

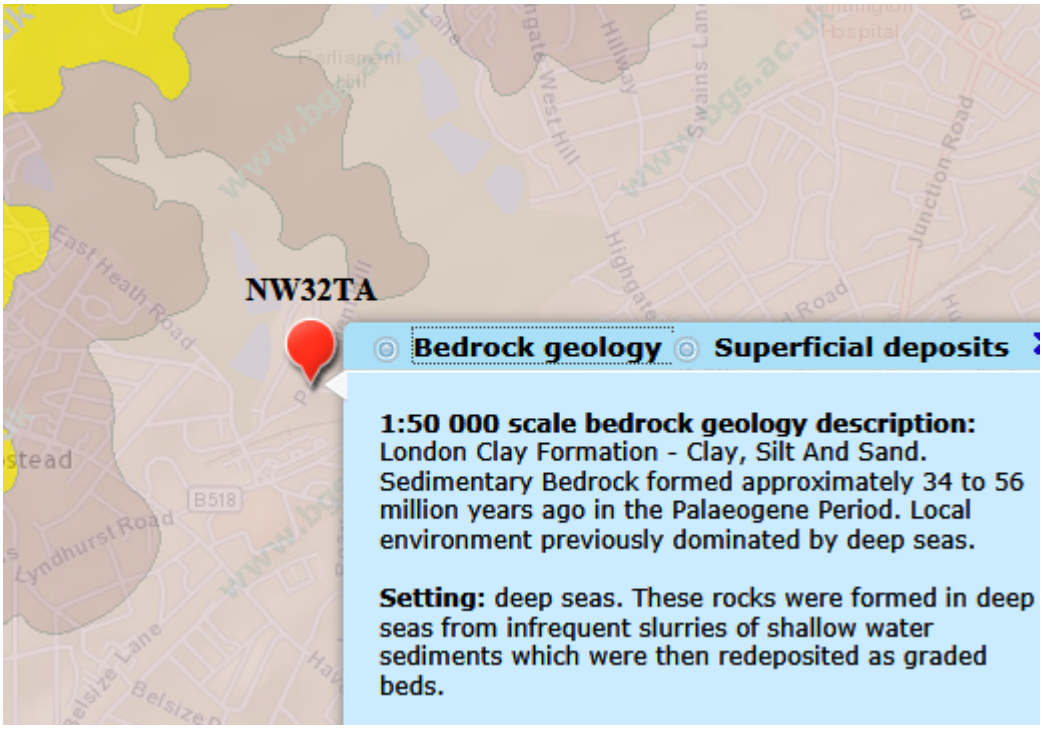

Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject trees

3.2.1	Of the 23 surveyed trees 1 is category B category (Moderate Quality), 21 are C category (Low Quality) and 1 is C/u category (Low Quality/Unsuitable for Retention).
3.2.2	The tree species found on site comprise common ash, cultivated apple, crab apple, flowering cherry, fig, holly, common lime, magnolia, pear, plum, pyracantha, common yew, zelkova and fatsia.
3.2.3	In terms of age demographics the trees range from young through to early-mature trees in the population.

Photograph 2: View of T9 (category C crab apple) and off-site T7 & T8 (category C ash)

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report.
3.2.5	There are standard recommended works for T17, which requires pollarding. This is 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 South Hill Park 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. 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. 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, though trial pit investigations undertaken by Ruskins on 25/11/14 (please see Fig. 2 below and overleaf) indicate little root colonisation of the site from the off-site trees T5 – T8.**

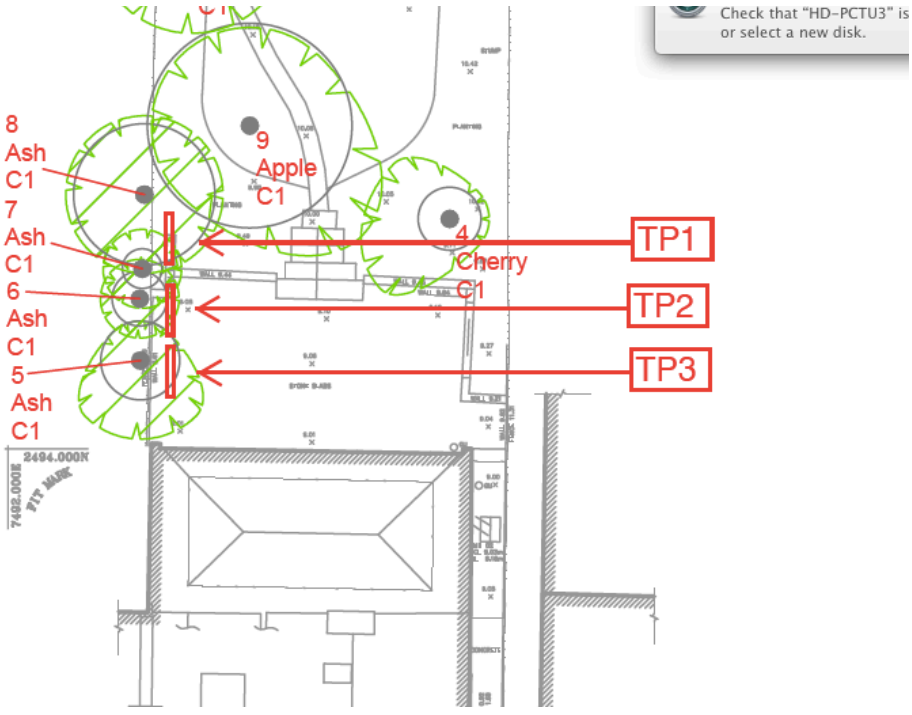

Fig. 2: Trial pit locations

Root Investigation with Air Spade at 19 Parliament Hill

H O U S E

Trench 1
90cm deep

Trench 2
90 cm deep

Trench 3 lhs
65cm rhs 75cm
deep

Trench 1 R1

20cm deep, 5-10mm

diameter

Trench 2 R1

20cm deep

10-12mm diameter

Trench 3 R1

10cm deep, 10-
15mm diameter

Trench 3 R2

30cm deep 20mm
diameter

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.

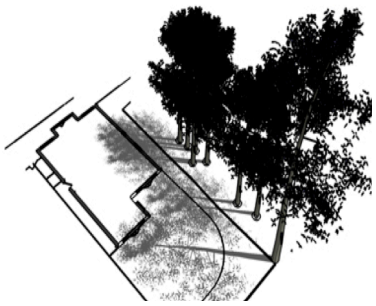

Figure 3 –
Generic Shading Constraints

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.

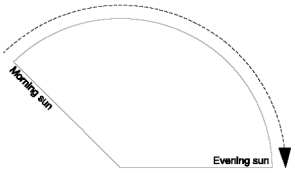

Figure 4 – Shading Arc

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 on and off-site trees 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: FHA/19PH/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
C	4	Cherry, Flowering	Felled to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting / landscaping
C	5	Ash, Common	Basement Construction within RPA Canopy clearance 2.5m Basement within 1m of stem	1 m^2 34.53 %	Young	Normal	Moderate	High	N/A	Trial pits / further investigation Remedial tree surgery (see Rec. Works)
C	6	Ash, Common	Basement Construction within RPA (less than 0.5m) Canopy clearance 2.5m Basement within 1m of stem	0.4 m^2 24.56 %	Young	Normal	Moderate	Medium /high	N/A	Trial pits / further investigation Remedial tree surgery (see Rec. Works)
C	7	Ash, Common	Basement Construction within RPA (less than 0.5m) Canopy clearance 2.5m Basement within 1m of stem	0.2 m^2 21.83 %	Young	Normal	Moderate	Medium/ high	N/A	Trial pits / further investigation Remedial tree surgery (see Rec. Works)
C	8	Ash, Common	Basement construction within RPA/canopy Canopy clearance 2.5m Basement within 1m of stem	1 m^2 9.82 %	Semi-mature	Normal	Moderate	Low/ medium	N/A	Trial pits / further investigation Remedial tree surgery (see Rec. Works)
C	9	Apple, Crab	Excavation of steps within RPA Construction within canopy	2.5 m^2 11.42 %	Early Mature	Normal	Moderate	Medium	N/A	Manual excavation with pre-emptive root pruning Remedial tree surgery (see Rec. Works)

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal, primary impacts in the current proposals affect the young, off-site ash trees T5 – T7 and the semi-mature T8. Although they are low-quality / category C trees, they are also third-party boundary trees and planning will wish to protect them. The proposed basement lies within 1m of their stems, in addition to encroaching the theoretical RPA's by between 10% and 35%. Furthermore, all of these off-site trees overhang the proposed development area with a ground clearance of only 2.5m, and would require cutting /tying back to enable piling works (unless manually underpinning). The level differences, existing internal hard landscaping and the intervening boundary have evidently limited root colonisation of these off-site trees within the site: trial pit investigations revealed no significant rooting from these trees along the basement outline. Those roots encountered can be hand pruned as necessary. The trees' relatively young age works in the applicant's favour – the trees will be more resilient: young trees commonly have 90% of their roots pruned in nursery operations and the crowns of young trees are commonly raised in maintenance operations. Therefore, the proposals can be developed without substantial harm to the trees.

6.1.2 The proposals will also result in an 11.4% encroachment of the theoretical RPA of the on-site category C crab tree T9, from the excavation of the proposed steps. This is considered a low impact, subject to the proposed mitigation, again requiring manual excavation with pre-emptive root pruning. The current ground clearance of 2m will be sufficient, although the canopy overhanging the proposed development area will require pruning to facilitate construction. As an internal site tree within the client's ownership, this category C tree is less important in planning terms.

6.1.3 The development will also require the removal of the cherry sapling T4; the loss of the low quality, interior site tree/sapling is rated as a low impact.

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 There will always be marginal secondary impacts of litter deposition and partial shade on this site, regardless of development. The status quo is unlikely to change with further development of the basement with skylights and replacement patio. Thus, the secondary impacts of development are minimal.

6.3 Mitigation of Impacts

6.3.1 Existing hard landscaping can be lifted manually working away from the trees. All plant and vehicles engaged in excavation works should either operate outside the RPA, or should run on a temporary surface designed to protect the underlying soil structure.

6.3.2 Following the findings of the trial pits, 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.

6.3.3 The excavation of the proposed steps within the RPA of T9 should be undertaken manually, with pre-emptive pruning as above. The replacement paving for these steps will require a porous surface to promote healthy soil water relations for future root growth.

6.3.4 The immediate canopy encroachment of the off-site trees during construction may be resolved by minor tree works or tying back the branches; a mini piling rig (e.g. Klemm MR701) with no more than a 3.5m rig will be required along the south-western boundary. Alternatively, the potential for manually underpinning could be explored. The future encroachment of T9 can be avoided with minor pruning of lower limbs, maintaining the current 2m ground clearance.

6.3.5 The landscape impact of tree/sapling loss 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.

7.0 CONCLUSION

7.1 The potential impacts of development are all relatively low in terms of both quality of trees removed and also RPA encroachments of trees retained.

7.2 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 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 tree T4 with suitable native ornamental nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:

- 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

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

8.2.4 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.

8.2.5 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.

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

8.2.7 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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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: 19 Parliament Hill, NW3

Date: 22/10/14

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): James Bell

Ref: FHA/19PH/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	12	2.5	4.0	260	Early Mature	3.1	Normal	Good	C	1	20+	Heavily reduced street tree Suckering from base Roots lifting pavement and cracking front wall of property
2	Magnolia (M. X soulangiana)	5	2/2.5/2/2	2.0	200	Early Mature	2.4	Normal	Good	C	1	20+	Garden ornamental
3	Fatsia	2.5	1121	1.8	70	Young	0.8	Normal	Good	C	1	10+	Shrub;irrelevant
4	Cherry, Flowering	2	1/2.5/1/2	1.0	70	Young	0.8	Normal	Good	C	1	20+	Sapling
5	Ash, Common	10	1221	2.5	80	Young	1.0	Normal	Good	C	1	10+	Remote survey Offsite
6	Ash, Common	10	1	2.5	60	Young	0.7	Normal	Good	C	1	10+	Remote survey Offsite
7	Ash, Common	5	1	2.5	45	Young	0.5	Normal	Good	C	1	10+	Remote survey Offsite

Landmark Trees

Site: 19 Parliament Hill, NW3

Date: 22/10/14

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): James Bell

Ref: FHA/19PH/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
8	Ash, Common	10	2	2.5	150	Semi-mature	1.8	Normal	Good	C	1	10+	Remote survey Offsite
9	Apple, Crab	5	2.5/2.5/4/2.5	2.0	220	Early Mature	2.6	Normal	Good	C	1	20+	Garden fruit tree
10	Nettle Tree, Southern	4	2.5	1.8	116	Semi-mature	1.4	Normal	Good	C	1	10+	Garden curiousity Confirm ID vae
11	Apple, Cultivated	4	1/2.5/2.5/1	2.0	130	Semi-mature	1.6	Normal	Fair	C	2	10+	Propped Garden fruit tree
12	Fig	4.5	0331	1.7	92	Young	1.1	Normal	Fair	C	2	10+	Garden fruit tree
13	Pyracantha	3	1121	1.0	100	Early Mature	1.2	Poor	Fair	C/u	2	10+	Irrelevent
14	Holly	3	1222	0.5	106	Semi-mature	1.3	Normal	Fair	C	2	10+	Understorey

Landmark Trees

Site: 19 Parliament Hill, NW3

Date: 22/10/14

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): James Bell

Ref: FHA/19PH/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
15	Pear	4	0121	2.0	120	Semi-mature	1.4	Normal	Fair	C	2	10+	
16	Ash, Common	8	5022	2.5	208	Early Mature	2.5	Moderate	Fair	C	2	10+	Poor form Decay in smaller trunk
17	Ash, Common	15	5	2.5	410	Early Mature	4.9	Normal	Fair	C	1	10+	Broken branches Decay at 4.5m at branch/trunk union Topped & reflushed; tight forks; playhouse around base; crown sagging apart a little above fork
18	Plum	8	2412	2.5	120	Semi-mature	1.4	Moderate	Fair	C	2	10+	Poor form Understorey
19	Plum	8	4012	2.5	130	Semi-mature	1.6	Moderate	Fair	C	2	10+	Poor form Understorey
20	Plum	8	0431	2.5	150	Semi-mature	1.8	Moderate	Fair	C	2	10+	Poor form Understorey
21	Plum	4	0120	2.5	70	Young	0.8	Moderate	Fair	C	2	10+	Poor form Understorey

Landmark Trees

Site: 19 Parliament Hill, NW3

Date: 22/10/14

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): James Bell

Ref: FHA/19PH/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
22	Yew, Common	2	0.5	0.3	50	Young	0.6	Normal	Good	C	1	10+	Irrelevent
23	Ash, Common	16	5559	4.5	0	Mature	0.0	Normal	Fair	B	1	20+	Remote survey In adjoining garden 3m beyond boundary; base out of site

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.

Landmark Trees

Site: 19 Parliament Hill, NW3
Date: 22/10/14

Surveyor(s): James Bell
Ref: FHA/19PH/AIA

Appendix 2

Recommended Tree Works

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
17	Ash, Common	C	15	2.5	5	CR 35% or pollard at weak fork	Broken branches Decay at 4.5m at branch/trunk union Topped & reflushed; tight forks; playhouse around base; crown sagging apart a little above fork Recommended husbandry 2

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.

Landmark Trees

Site: 19 Parliament Hill, NW3

Date: 22/10/14

Surveyor(s): James Bell

Ref: FHA/19PH/AIA

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
4	Cherry, Flowering	C	2	1.0	?	Fell	Sapling To facilitate development
5	Ash, Common	C	10	2.5	1221	CB Cut back/tie back from basement construction	Remote survey Offsite To facilitate development
6	Ash, Common	C	10	2.5	1	CB Cut back/tie back from basement construction	Remote survey Offsite To facilitate development
7	Ash, Common	C	5	2.5	1	CB Cut back/tie back from basement construction	Remote survey Offsite To facilitate development
8	Ash, Common	C	10	2.5	2	CB Cut back/tie back from basement construction	Remote survey Offsite To facilitate development
9	Apple, Crab	C	5	2.0	2.5/2.5/ 4/2.5	CB Cut back overhanging canopy - possible minor crown lift to raise height of canopy above steps	Garden fruit tree To facilitate development

APPENDIX 4: TREE SELECTION FOR CONSTRICTED LOCATIONS

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

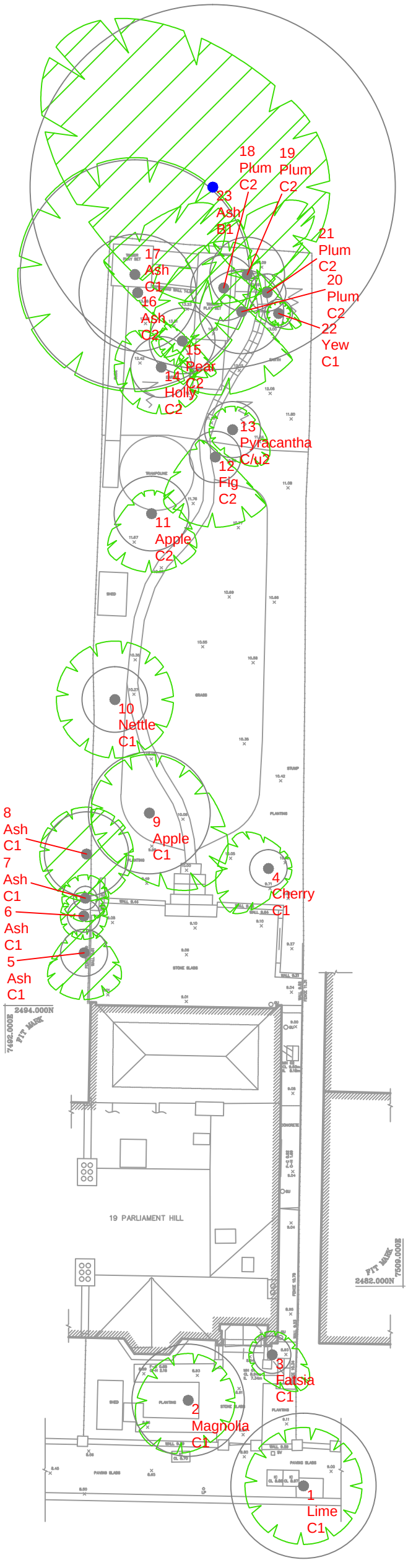
Common Name	Species	Selected Form
Hawthorn	Crataegus monogyna	Stricta
Cockspur	Crataegus prunifolia	Splendens
Cherry	Prunus x hillieri	Spire
Bird cherry	Prunus padus	Albertii
Rowan / Mountain ash	Sorbus aucuparia	Cardinal Royal
Rowan / Mountain ash	Sorbus aucuparia	Rossica Major
Rowan / Mountain ash	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

APPENDIX 5

TREE CONSTRAINTS PLAN



NOTE:

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

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

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

Landmark Trees

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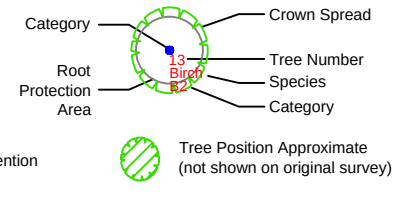
Site: 19 Parliament Hill, London, NW3 2TA	1-200@A3
Drawing Title: Tree Constraints Plan	Oct 2014

Key:

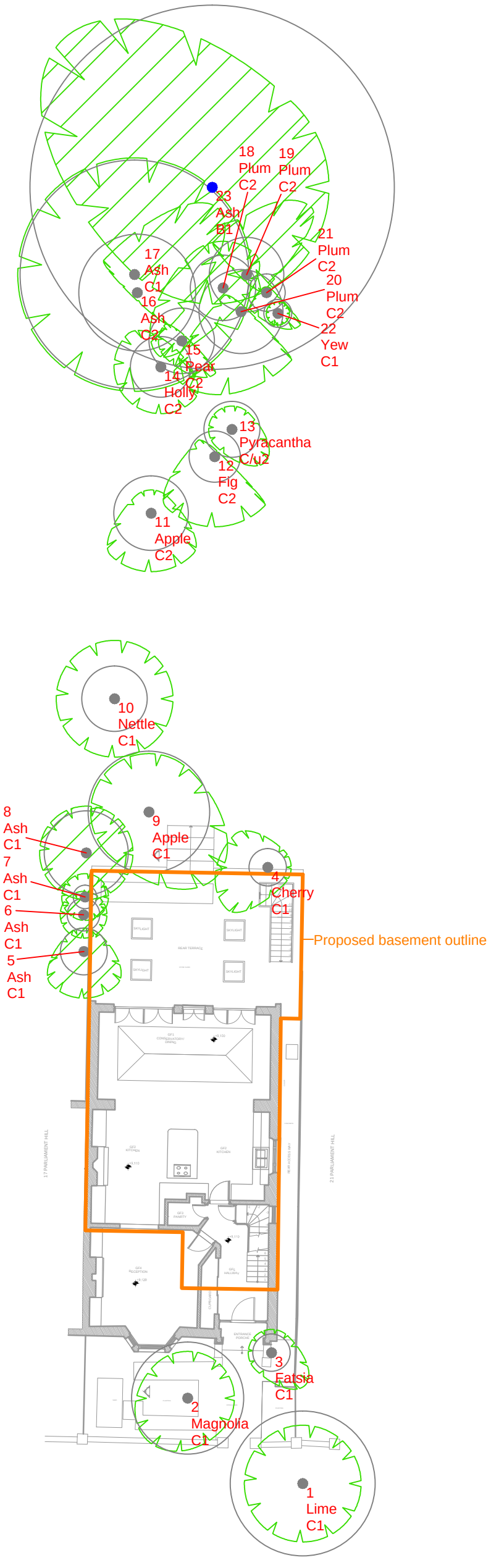
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention



Tree Position Approximate (not shown on original survey)

APPENDIX 6

ARBORICULTURAL IMPACT ASSESSMENT PLAN



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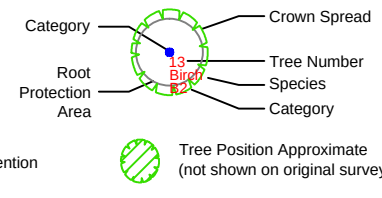
Site: 19 Parliament Hill, London, NW3 2TA	1-200@A3
Drawing Title: Arboricultural Impact Assessment	Oct 2014

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)