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BS 5837:2012 Tree Survey & Arboricultural Impact

Address: 15a Well Walk, Hampstead, London

Site Surveyed by Peter Holloway

**Report prepared by
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Date 20th October 2012

Report Prepared for John & Morwenna Lawson

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1. Introduction

1.1 Instructions:

I am instructed by Mr Francis Birch on behalf of Mr John Lawson and Mrs Morwenna Lawson.

My brief is:

- To carry out a Tree Survey in accordance with the British Standard 5837:2012, *Trees in relation to construction – Recommendations*.
- To Produce and **Arboricultural Implications Assessment** of the proposal.

2. Documents

2.1 I was provided with the following documents:

- i. Existing site plans and section JL 2011 001 D01, March 2011.
- ii. Proposed site plans and section JL 2011 002 D04, March 2011.
- iii. Existing site plans and section JL 2011 001 D01 annotated with proposed trial hole locations. Undated.

3. Scope of this report

3.1 This report includes:

- i. Standard BS5837 Methodology (Appendix 1)
- ii. Tree Survey Data (Appendix 2)
- iii. Existing Site Plan with Tree Constraints Plan & Proposed Site (Arboricultural Impact Assessment Plan) (Appendix 3)
- iv. Trial Hole evaluation (Appendix 4).

3.2 The trees were surveyed from ground level using the visual tree assessment method. No detailed tree examinations were undertaken during the survey.

3.3 I looked at the site planning decision history on the Camden Council Planning Applications web site and I do not believe that any trees at the site are protected by Tree Preservation Orders. However, I the site is within the Hampstead conservation area. The status of tree protection should be confirmed and the correct procedures followed before undertaking any tree pruning or tree removal work.

- 3.4 I have not included an assessment of shading by trees as a tree constraint. The Proposed extension is within a basement well on the North West side of the four story house. The proposed building will be shaded by the existing building and it will be in direct shade from the Lime tree T1 in the afternoon.
- 3.5 The tree positions were taken from site measurements and superimposed on the existing site layout (2.1.i). I included all the trees that I thought could be affected directly or indirectly by the proposal.
- 3.6 The Wildlife and Countryside Act 1981(as amended), the Conservation (natural habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000 provide protection for many species of animal that live in trees. This includes birds and bats. I did not see any protected species in the trees during my survey. If any tree works affect protected species then this could be a criminal offence.

4. Site visit and data collection

- 4.1 I carried out the site visit on 9th August 2012. I met Mr Francis Birch on site but I was not accompanied during the tree survey.
- 4.2 The site contains a an end of terrace four storey property plus roof conversions including the basement flat (15a) There is a rear garden that slopes down to the house, so the basement flat is a part below ground level at the front and below ground level at the rear. The front garden is really a light well for front bay windows of the basement flat.
- 4.3 The soil is likely to be Clay Gate Beds (Clay Gate Member) overlying London Clay as indicated on British Geological Survey Sheet 256 North London: Bedrock and Superficial Deposits Edition (NERC 2006). Clay Gate Member is an interbedded fine grained sand, silt and clay (www.bgs.ac.uk). Judging from the trial hole excavation I did not see any evidence of clay, only fine sand.

5. Tree Survey

5.1 Tree survey method

The methodology for the tree survey is described in Appendix 1.

5.2 Appraisal of trees surveyed

5.2.1 I recorded all the trees in the rear garden. There were no trees in adjacent property that might be affected by works within the site. I recorded 5 trees that could be affected by construction work within the site. There were some smaller shrubs that I did not include in the survey. The tree survey was carried out in accordance with BS5837:2012.

5.2.2 The quality of the trees is summarised in Table 2 below.

Tree Quality	A High	B Moderate	C Low	U Unsuitable for retention
Tree number	None	T1	T2, T3,T4 & T5	None
Total Quantity	0	1	4	0

Table 2: Tree quality category

5.3 I did not observe any significant defects that require remedial tree work at present.

6. Trial Hole results

6.1 The trial hole results are included in Appendix 4.

6.2 Two roots were discovered in Trial Pit 1 (TP1). One was 20mm in diameter and one was 40mm in diameter. The species of root was not known but if they came from the Lime tree they had grown through the wall and would need to be removed to repair the wall. Nor roots could be seen growing beneath the wall or wall foundation.

6.3 No roots were discovered in Trial Pit 2 (TP2).

6.4 There were a number of small white roots from the ivy in the surface soil of both trial pits.

6.5 The sub-soil in the trial holes from approximately 300mm deep was sandy and saturated at the bottom of the pits. Water was rising to within 50cm of the top of the pit indicating that it was waterlogged. The pits needed to be bailed out to be inspected.

- 6.6 I doubt whether the two roots discovered were from the Lime tree because I could not see how they could have grown through the wall. I suspect that they may have originated from a shrub in the raised bed that is no longer present. A pile of spoil and the walls prevented me tracing the origins of these roots.

7. Arboricultural Impact Appraisal

- 7.1 The proposal consists of constructing a rear extension on the north side of the building. There are no proposed changes to the garden levels in the rear garden.
- 7.2 The extension could affect trees, particularly T1, and so a trial hole was excavated to see if any roots were present where construction is proposed. Two roots were found in one of the trial holes as detailed in section 6. There is some doubt that they are Lime tree roots but if they are Lime roots their removal will not have a significant effect on the trees health or longevity and if they have grown through the wall they would have to be sacrificed to repair the wall in any case.
- 7.3 As a result of the trial hole excavations I have shown a modified RPA on the drawing in Appendix 3. This demonstrates that the proposal will not have any direct impact on the trees in the garden.
- 7.4 The proposed work could have an indirect affect on the trees and their roots and so there will need to be precautions to prevent any damage to trees and their roots during demolition of the existing walls and structures and constructing the new retaining walls and other structures.
- 7.5 I have assumed that all construction work will be carried out by hand. All construction and demolition must take place within the footprint of the proposed construction. If working space is required in the rear garden then ground protection and fencing will be required to prevent compaction and contamination of the ground that the trees are rooting in. If any machinery is required, assuming it is practical, then more substantial tree protection measures may be required if it needs to be operated outside of the footprint of the existing building and basement patio area.

- 7.6 I am not aware of any changes to the hard or soft landscaping within the retained part of the garden that could affect the trees.

8. Conclusions

- 8.1 The existing retaining walls in the rear garden have acted as a root barrier and so no significant roots are expected within the proposed construction site.
- 8.2 The proposed construction will not have a direct impact on the trees in the rear garden.
- 8.3 Construction access is expected to be through the existing building and not via the alley or rear garden. All construction work will be carried out by hand as access for large machinery is severely limited. Therefore indirect impacts of working space and construction will be minimal and can be controlled with fencing and ground protection.
- 8.4 As far as I am aware existing services will be used and no new services are proposed that would require excavations within the RPAs of retained trees.

9. References

- 9.1 British Standard 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations' April 2012.

10. Appendix 1 Standard Methodology

A.1 Survey

A.1.1 All my observations were from ground level without detailed investigations and I measured tree stem diameters where possible and estimated height and crown spread by pacing and using a clinometer. I do not normally have access to trees outside the boundaries and so my observations and comments on these trees are based on the visual assessment made from within the site or the surrounding public highway.

A.1.2 All data was captured on a PC survey tablet using Excel software. I surveyed all trees objectively without reference to any design proposals supplied or suggested by the client. The trees were located using the topographical survey supplied. If the topographical plan did not include all relevant trees, they would be added in their approximate positions.

A.1.3 As suggested in the BS 5837:2012 all single stem trees with a stem diameter of less than 75 mm at 1.5 m above ground level were excluded from the survey as they are not deemed to be of significant size to be included in any survey. Multi stemmed trees were measured near ground level or just above the root flare.

A.1.4 Trees and shrubs are living organisms whose health and condition can change rapidly, for this reason the BS 5837 grades, along with any conclusions or tree management recommendations can only remain valid for a period of 12 months.

A.1.5 Where possible trees were assessed as individual specimens, however, where there were trees that formed distinctive groups of the same species within the landscape they can be assessed and graded as groups.

A.1.6 Trees on or adjacent to development sites are a material consideration that may have a significant impact on the future development and use of the site.

A.2 Use of survey data

A.2.1 The British Standard 5837:2012 provides 'guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees... with structures'.

A.2.2 The tree survey with minimum requirements of BS5837 is enclosed in the appendices of this report.

- A.2.3 The tree survey data is used to produce a Tree Constraints Plan. The Tree Constraints Plan shows the crown spreads and retention categories of all the trees within the surveyed area.
- A.2.4 The British Standard 5837:2012 Trees in relation to construction – Recommendations, provides guidance and specifies measures to be adopted in order to avoid or minimise damage to trees retained on or in proximity to construction sites. One of the key recommendations is that a Root Protection Area (RPA) should be established around each retained tree. The RPA is calculated as an area equivalent to a circle with a radius 12 times the stem diameter measured at 1.5 metres above ground level for a single stem tree. In order to prevent disturbance or contamination of the RPA they are usually enclosed by robust fencing.
- A.2.5 Circular Root Protection Areas (RPAs) can be adjusted by an arboriculturalist by taking into account obstructions for root growth, including building foundations, retaining walls, metalled roads, topography, Soil type and tolerance of individual trees.
- A.2.6 The Tree Constraints Plan can include data on shading by trees. The method within BS5837 involves drawing an arc equivalent to the height of the tree (and future growth) from northwest to east indicating shadow during the main part of the day. However, this is only applied when specifically requested. Daylight studies by specialists provide more detailed information and would normally be recommended.
- A.2.7 The British Standard recommends that trees within categories A-C (where A is highest quality) are a material consideration in the development process. Category U trees are trees that will not be expected to exist for long enough to justify their consideration in the planning process. The tree categories are used with the number 1, 2, or 3, which is shown in Table 1. These signify whether the justification for the category was made based on mainly arboricultural values, mainly landscape values or mainly cultural/conservation values respectively. The tree categories are shown on the tree constraints plan by colour coding. Category A trees are green, category B trees are blue, category C are grey and category U are dark red.

- A.2.8 It is important to recognise that tree roots are particularly vulnerable during any adjacent construction operations. Tree roots grow where conditions are most favourable, this tends to be near the soil surface, for this reason the majority of tree roots grow in the upper 600mm of the soil. This means that operations during construction such as shallow excavations, soil compaction by heavy plant or machinery or contamination by substances such as cement, diesel or other chemicals, even water in excess, can be damaging to the root system.
- A.2.9 The presence of surrounding walls, roads and retaining walls can affect the root distribution of trees within and around the site. Normally when a Root Protection Area is adjusted its shape is changed but the total area is maintained.
- A.2.10 Approved tree work should be carried out in accordance with BS 3998:1989 by suitably qualified and experienced professional tree surgeons. Under no circumstances shall site personnel undertake any tree pruning operations. All tree works should also take into consideration The Wildlife and Countryside Act 1981(as amended), the Conservation (natural habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000 protected species of flora and fauna.
- A.2.11 If the site is within a conservation area then the local authority will need to be notified of your intention to prune the tree which they can prevent by making a Tree reservation Order. Some forms of tree work are exempt from this requirement and tree works directly required to accommodate a development that has planning permission would be exempt. However, to avoid error I would always recommend notifying the local authority to avoid costly mistakes.
- A.2.12 If individual trees are protected by Tree Preservation Orders then written consent is required for tree pruning or tree removal except for a few exemptions and also if the work is directly required to accommodate a development which has planning permission. As above, I would always recommend applying for consent rather than assuming that works are exempt from requiring consent.

11. Appendix 2 Table 1 'Tree data'

Tree Table

Key to Tree Table

Tree number: the number used in the table corresponds to Figures 1.

Species: the Common and Botanical names of each tree.

Height and **branch spread** are estimated listed in metres.

Stem diameter has been measured at 1.5m above ground level (a.g.l.). It is listed in the table in mm.

Code

- * = multi-stemmed from below 1.5m a.g.l. and therefore measured in accordance with BS5837:2012
- # = estimated stem diameter

Height of crown above ground level (a.g.l.): gives an indication of whether the crown extends to the ground, or has low hanging branches. The height of the lowest branch and its direction will also be recorded.

Age class: this refers to the age of the individual tree relating to the average life expectancy of each species in a similar environment.

- Y - young
- SM – Semi-mature
- EM – Early mature
- M - mature
- OM - over mature

General observations

Physiological condition: general state of health of the tree, good (G), fair (F), poor (P) or dead (D).

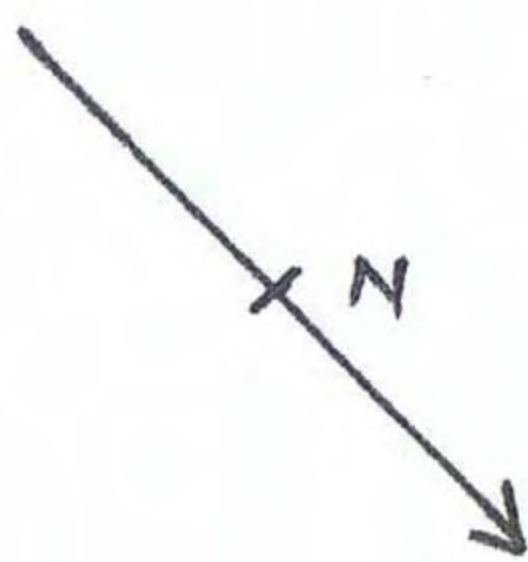
Structural condition: Any defects/ habits/previous management of note.

Remaining contribution in years: has been estimated by taking the age of the tree away from an estimate of the total number of years the tree may live for in those conditions, it has been banded as recommended in BS5837:2012.

Retention category: each tree is given a category from the guidance in BS 5837:2012

Table 1			15 Well Walk, Hampstead, London														9th October 2012	
Tree Number	Tree Name (species)		Height (m)	Estimated dimensions			Crown constraints			North west (m)	South east (m)	North east (m)	South west (m)	Age class	Observations		Remaining contribution years	Tree Category
	Common	Botanical		Calculated Stem Diameter (mm)	Number of Stems	Root Protection Area (Radius, m)	Crown height m	Lowest branch m	Direction lowest branch						Summary of Physiological condition	Structural Condition & General comments		
T1	Common Lime	Tilia x europaea	11	520	1	6.24	6m	5m	E	2.5	2.5	2.5	3	M	G	Originally pollarded at 3m a.g.l. Regrown to 6m pollard. The crown subsequently regrown to 9m pollard and then at current height. Crown reduced Spring 2012.	20 to 40	B1
T2	Common Lime	Tilia x europaea	5	420	1	5.04	2.5	3	E	1	0.5	1	1	M	G	Originally pollarded at 2m above ground level, then at 3m and now at current height. Topped spring 2012	20 to 40	C1
T3	Common Lime	Tilia x europaea	5	530	1	6.36	3.5	3	E	1	0.5	0.5	1	M	G	Possibly Pollarded at 3m a.g.l. When young but not clear anymore. Tree topped Spring 2012. Some chainsaw damage during ivy removal in the past but occluded now.	20 to 40	C1
T4	Apple	Malus sp.	6	241	2	2.89	2	1.5	S	2.5	3.5	3.5	3	M	G	Fork 1.5m a.g.l. Crown reduced to 3.5m high in the past. Reduced to 5m a.g.l more recently	20 to 40	C1
T5	Common Yew	Taxus baccata	5	190	1	2.28	2.2	2.5	S	2	2.5	3	2	Y	G	Forks 1.4m a.g.l. but bifurcation appressed and conjoined to 2.1m. Branch pegs from crown lifting, Fork grafts again at 3m a.g.l.	40+	C1

12. Appendix 3 Existing & Proposed Site Plan with Tree Constraints



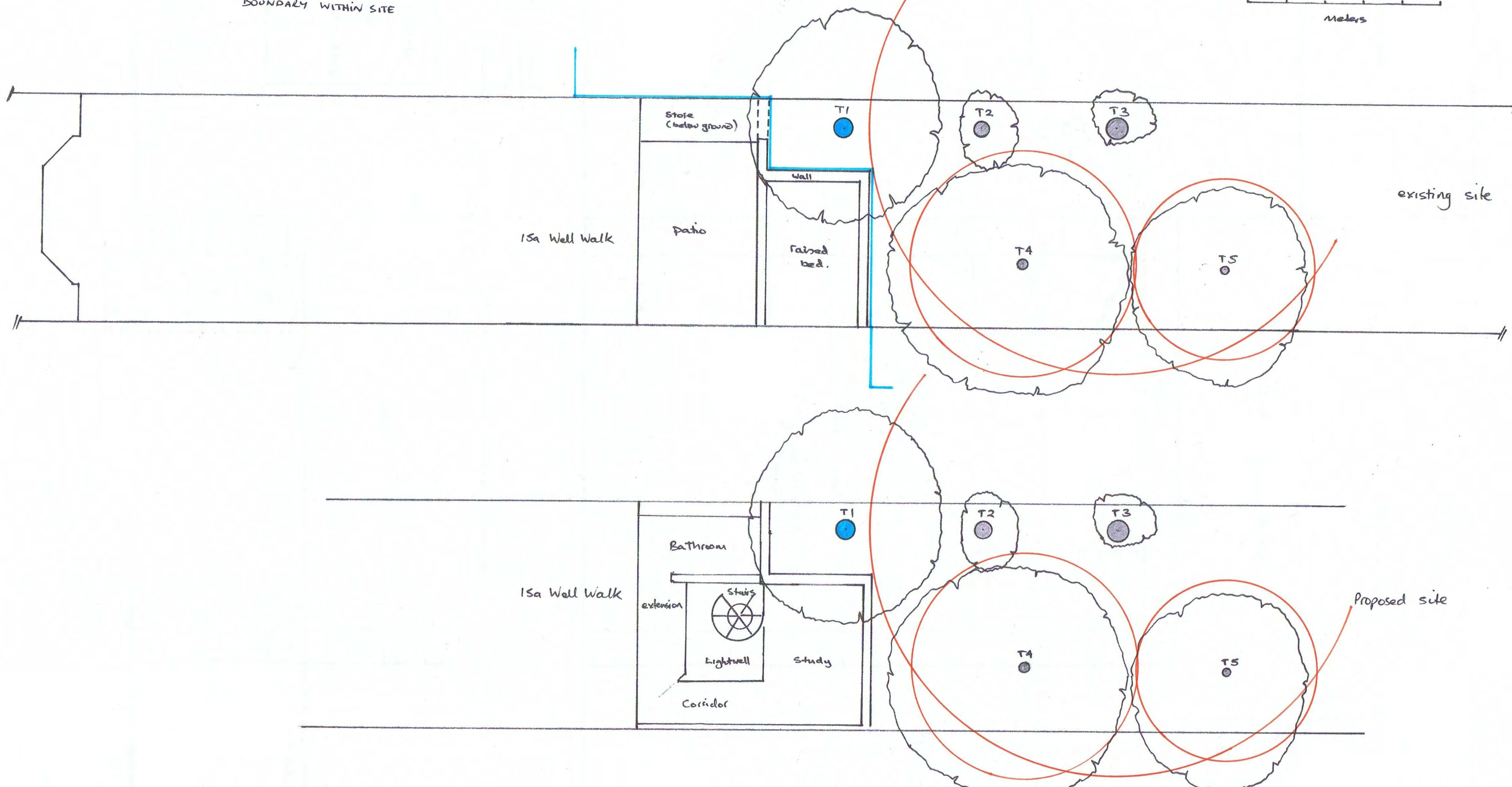
TREE CATEGORY ●A ●B ●C ●u

CIRCULAR ROOT PROTECTION
AREA (RPA)

ADJUSTED (AVAILABLE) RPA.
BOUNDARY WITHIN SITE

15a Well Walk Hampstead
Existing and Proposed Site
Peter Hollaway 20 Oct 2012
Scale 1:100/A3

0 1 2 3 4 5
meters



13. Appendix 4 Trial Hole Investigations

A3.1 The plan of the trial hole excavations is attached at A3.4.

A3.2 Two trial holes were excavated at the most suitable location at the base of the retaining wall adjacent to Lime tree T1. It was not possible to excavate for roots along the whole length of the wall as it would undermine support for the foundations.

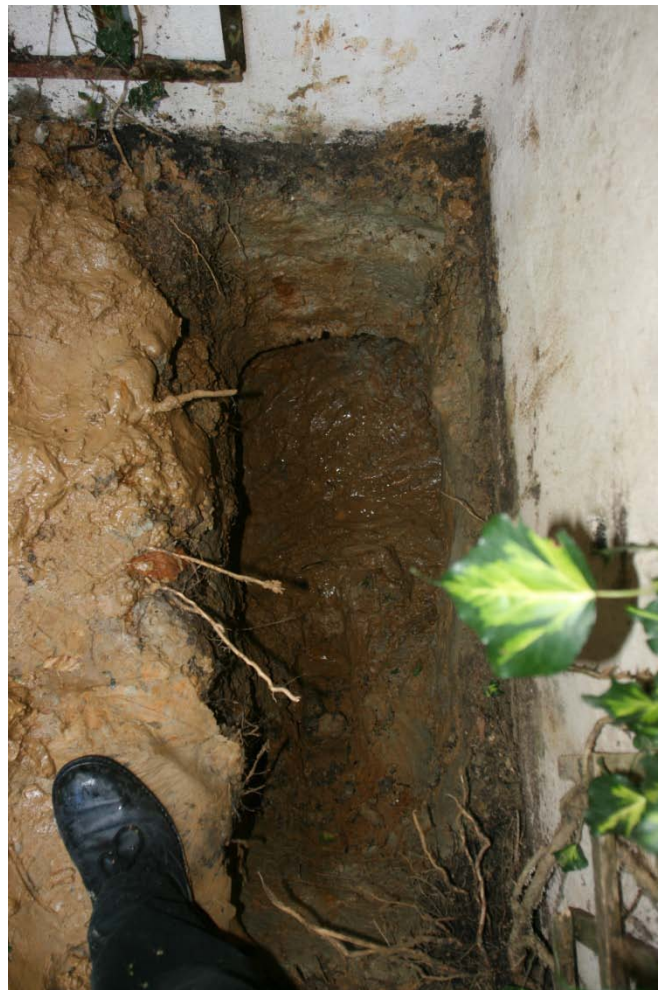
A.3.3 Photographs of trial holes.



P1: Trial Pit 1 showing two roots high retaining wall at top.



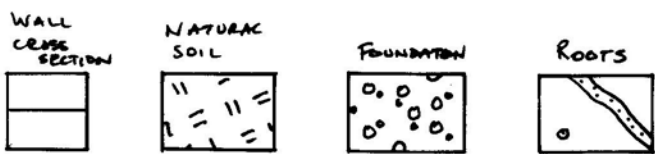
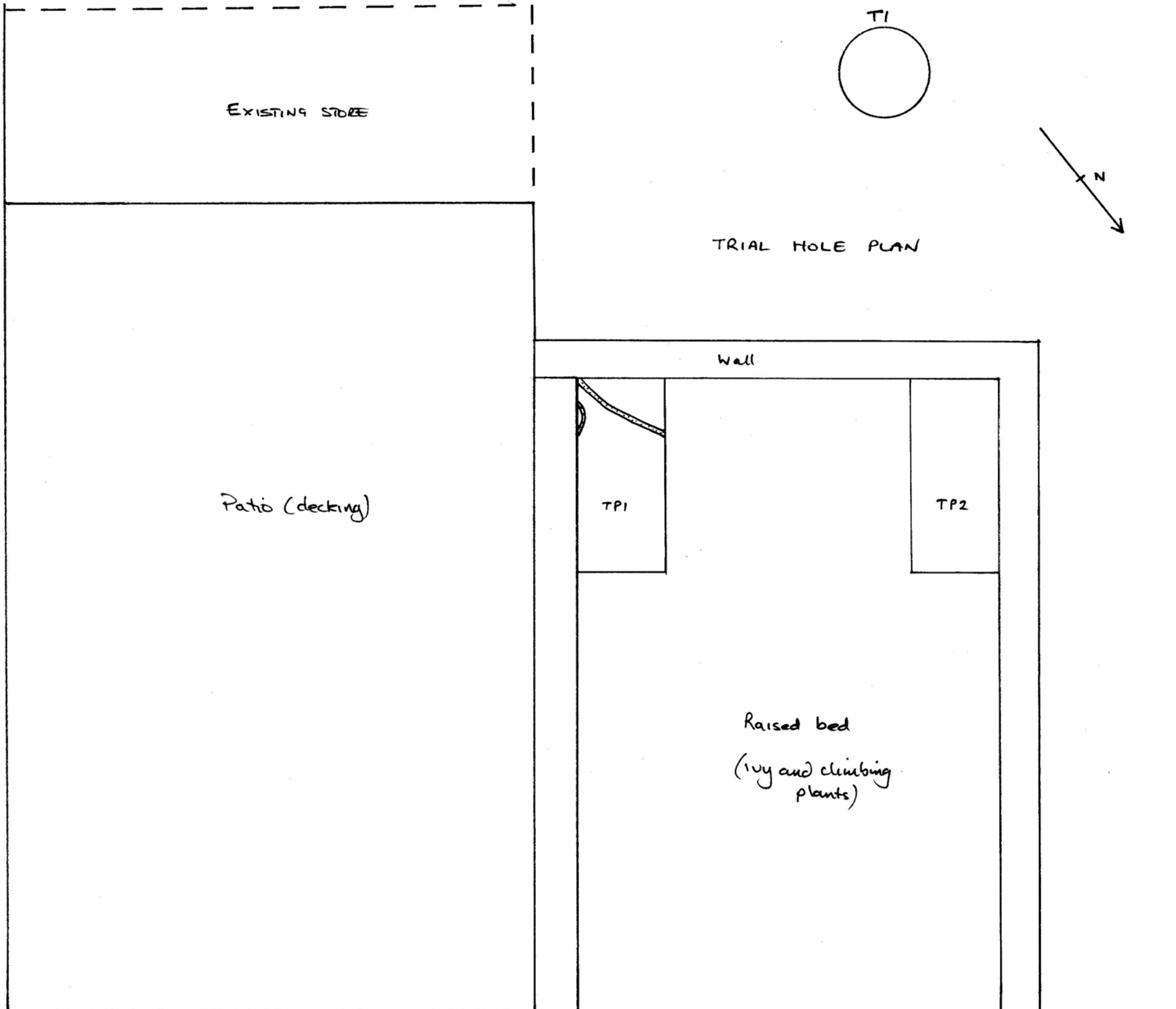
P2: Annotated Photo of TP1



P3: Trial Pit 2 showing ivy roots near the surface.

A3.4 Plan and cross section of Trial Hole results.

15a
Well Walk



15a Well Walk, Hampstead
Trial Hole Drawings
Peter Holloway 20 OCT 2012
SCALE 1:25/A3

0 25 50 75 100
cm

decking

TRIAL HOLE CROSS SECTION

