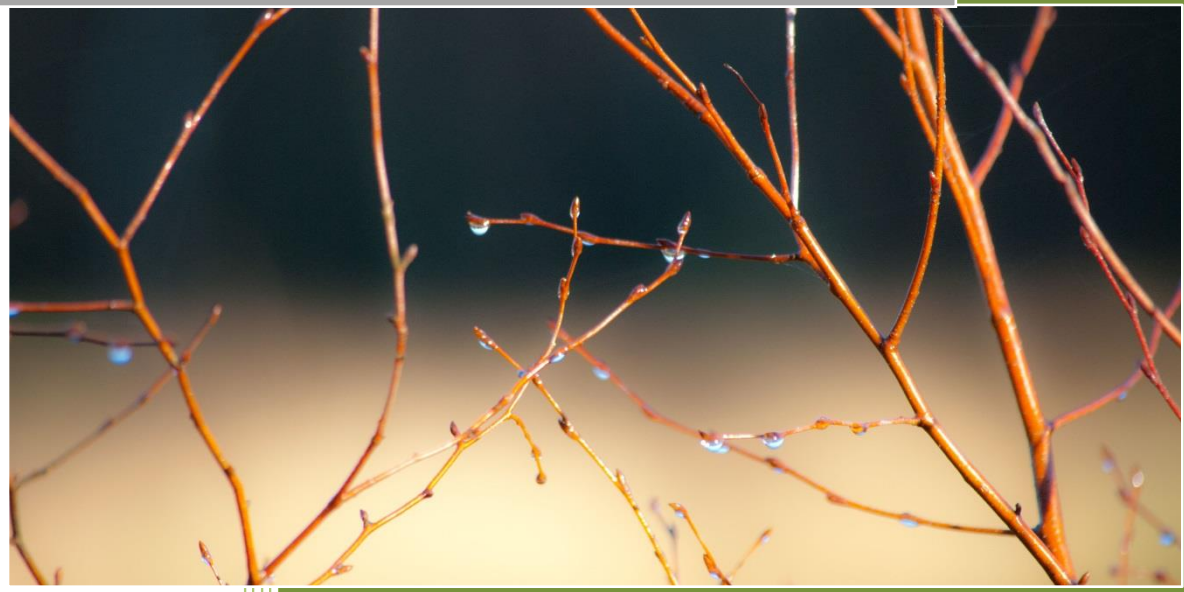
BS5837 Arboricultural Impact Assessment



38 Hillfield Road, London, NW6 1PZ

Client: **Mr D Oram**

Job Reference: 03725R

Consultant: Keiron Hart (BSc Hons, C.Env, F.Arbor.A, MICFor, MEWI)

Tamla Trees
consulting arborists

February 2022

Contents

1. Executive Summary

1.1 Tamla Trees ltd has been appointed by Mr D Oram to provide advice on the arboricultural issues relating to *'Proposed conversion/ enlargement of existing detached garage to create residential dwelling'*.

1.2 We surveyed the site in February 2022. The survey accorded with BS5837:2012 "Trees in relation to design, demolition and construction – Recommendations".

1.3 The main constraint trees relative to the proposal are TG1 (Prunus & Ash). These are low quality trees (Cat C) but form a constraint by virtue of their location on the boundary within 3rd party land. The excavation in levels to form the proposed extension to the rear of the existing structure necessitates a level of ground cut that means these trees require removal. This report is constructed on the basis that this agreement is in place for the removal of these trees. A further small Elder (T1) located within the site will be removed.

1.4 To the front of the proposal (within 3rd party land) is T4 (Acer). There is existing hard standing within the Root Protection Area (RPA) of this tree which will be retained for the duration of works before being carefully broken out by hand to allow soft landscaping works. Further remaining trees within the garden area will be protected by herras fencing securing the complete RPA.

1.5 The tree issues can be summarised as: **Tree Removal of TG1 & T1> Effective Tree Protection (excavation & construction)> Surface removal and replacement> Site operative knowledge of tree protection issues> Soft landscaping to make good/ deliver landscape improvements.**

1.6 The site and surveyed trees are not within a designated Conservation Area or affected by a Tree Preservation Order (TPO).

1.7 Subject to the working practices detailed within this report there should be no discernible impact on the site trees. This report is based on the client plans ref: TJS_38_HILLFIELD ROAD_GARAGE CONVERSION_EXISTING AND PROPOSED DRAWINGS_16.02.22 (and associated drawings).

2. Statutory Protection

2.1 At the time of writing we are advised as follows:

Conservation Area Status	
Is the site located within a Conservation Area?	No
Notes: (i)All trees larger than 7.5cm diameter at 1.5m above ground level are subject to regulations within a Conservation Area. Exemptions apply for trees which are dead and dangerous but clarification before any tree works is advised. A notification is required in many circumstances.	
Tree Preservation Order Status	
Are inspected trees subject to a TPO?	No
Type of TPO	~~**Area**~~
	~~**Individual**~~
	~~**Group**~~
	~~**Woodland**~~
TPO Reference	-
Date TPO Made	-
Notes: (i) The type and details of any TPO determine which trees are 'protected'. Exemptions apply for trees which are dead and dangerous but clarification before any tree works is advised. An application may be required before undertaking works. (ii) Protected status advised by Camden Council.	

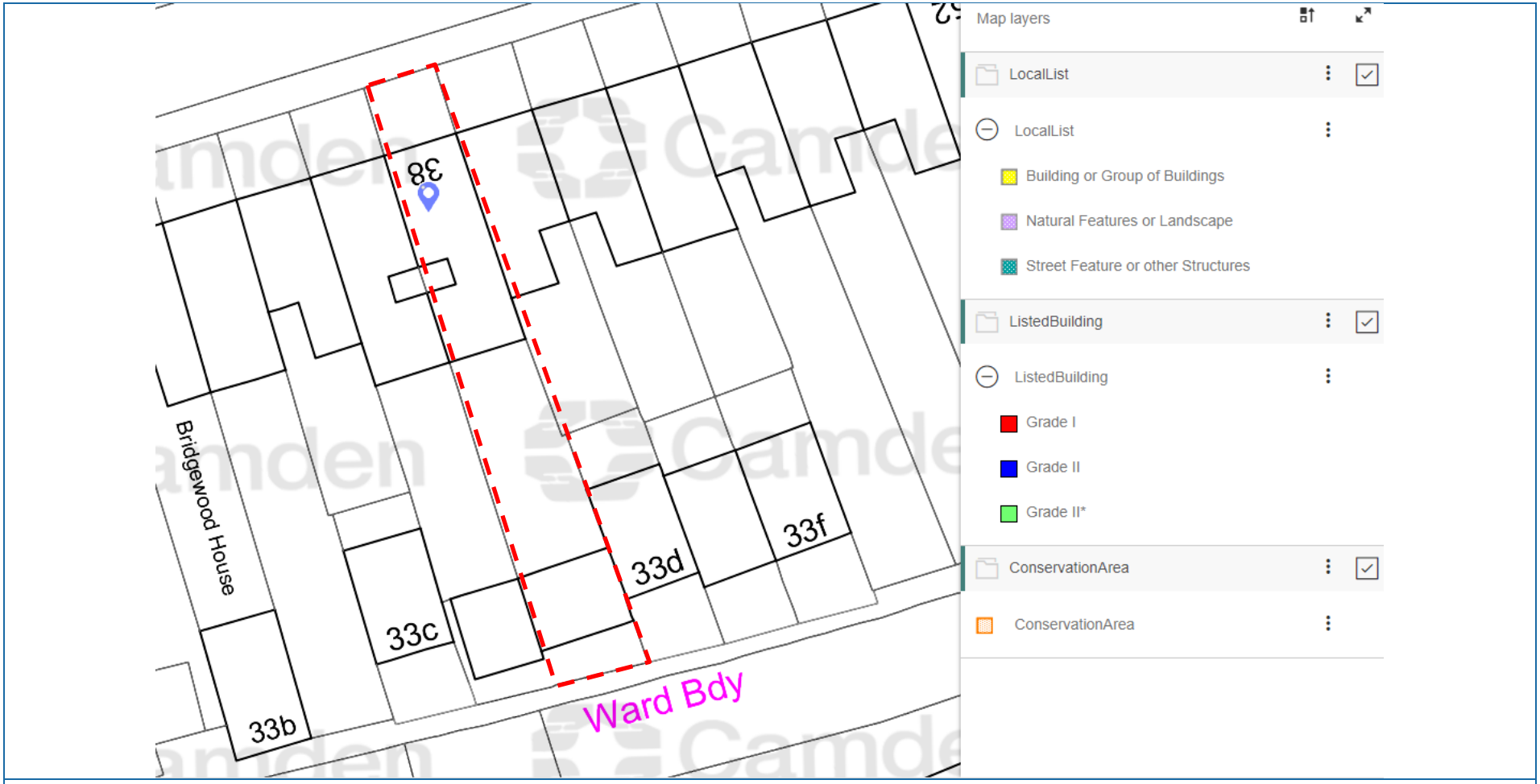


Fig 1 – Camden Constraint Plan indicates the site is not within a designated Conservation Area. An email check has confirmed the site is not affected by a TPO.

3. Terms of Reference

3.1 BS5837:2012 'Trees in relation to design, demolition and construction – recommendations'

3.2 BS3998:2010 'Tree work – recommendations'

3.3 NJUG 4 – National Joint Utilities Group "Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London: NJUG 2007" To include Operatives Hand-out Guidance

3.4 BGS Open-Source Soil Data http://www.bgs.ac.uk/nercsoilportal/maps.html

3.5 HSE (2014) Avoiding danger from underground services: https://www.hse.gov.uk/pubns/books/hsg47.htm

3.6 Eissenstat & Yanai (1997) The ecology of root lifespan. *Advances in Ecological Research*, 27, 1-60.

3.7 Hendricks & Pregitzer (1992) The demography of fine roots in a northern hardwood forest. *Ecology*, 73, 1094-1104.

3.8 BRE Digest 412: Desiccation in clay soils.

3.9 Matheny & Clark (1998) Trees and Development: A Technical Guide to Preservation of Trees During Land Development.

3.10 https://www.trees.org.uk/Help-Advice/Help-for-Tree-Owners/Guide-to-Tree-Pruning

3.11 https://www.trees.org.uk/ARB-Approved-Contractor-Directory

3.12 https://www.camden.gov.uk/web/guest/tree-preservation-orders

4. The Trees

4.1 The trees can be summarised as follows:

BS 5837 Cat	A	B	C	U
Specific Trees	-	-	T1, T2, T3, T4 TG1, SG1	-
Total Number	None	None	4 individuals, 1 tree group and 1 shrub group	None

4.2 These tree locations and a summary of their visual contributions can be summarized as follows:

BS 5837 Cat	A	B	C
Hillfield Road **Contributing to the local residential amenity, potential screening between properties**	-	-	T2, SG1 & TG1
Mill Lane **Contributing to the local residential amenity, potential screening and local public amenity.**	-	-	T4

4.3 There were no hedgerows that qualify for consideration under the 1997 Hedgerow Regulations. Other non-listed trees are considered of minimal local and wider amenity. None of the surveyed trees were considered of quality or amenity to justify the creation of a new TPO.

5.1 Site Specific Soils

5.1.1 Soil is an important factor in tree growth and the type of underlying soil can impact on successful integration of new developments.

5.1.2 A free draining sandy soil containing sand/gravel is likely to lead to water being accessible in the upper horizons during the growing season and available at greater depths and trees will generally be forced to explore a larger volume/ depth on such soils. The structure of such soil also makes compression more difficult (by heavy construction plant) and root penetration is easier for the trees. By comparison, a clay soil is more easily compressed, particularly when wet and compression can have a greater impact on tree health.

5.1.3 British Geology Survey (BGS) data indicates the site is located with a London Clay.[1]

Soil Description
Bedrock Deposits: London Clay Formation - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas. **Superficial Deposit:** None recorded

[1] http://mapapps.bgs.ac.uk/geologyofbritain/home.html?

Underlying Soil Material contains Clay	**Yes**
Soil Type increased rooting depth profile?	**No**
Increased risk of soil compaction due to soil type	**Yes**

5.1.4 All comments regarding soils should be verified with onsite geotechnical investigations and laboratory testing with foundation depth and design undertaken by a structural engineer comments regarding soils should be verified with onsite geotechnical investigations and laboratory testing with foundation depth and design undertaken by a structural engineer in accordance with the requirements of NHBC Chapter 4.2.

5.1.5 BS5837 indicates: 4.6.2 "*The RPA for each tree should initially be plotted as a circle centred on the base of the stem. 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*." It advises at Section 4.6.3 That any deviation in the RPA from the original circular plot should take account of a number of site-specific factors.

5.1.6 BS5837 recognises that the root morphology of trees may be affected by a number of factors and in certain situations the plotting of RPA's will deviate from the circle to reflect site specific considerations. It is our experience that to consider structures such as driveways, houses and garages as areas trees cannot utilise for rooting (and to then modify RPA plotting where they exist within an identified RPA) is too simplistic and not aligned with how trees actually utilise soil.

5.1.7 Within around 3 to 4m of the base of mature trees there will generally be a structural root system providing both support and the main structure/ root architecture for smaller roots to originate. These larger roots have the very real capacity to be influence by any significant structures (footings, roads to adoptable standard construction etc) where there may be a physical obstruction close to them and this can affect root morphology in such locations. In addition to this there will generally be a noticeable increase in structural rooting to the southwest of mature trees in the UK to reflect the prevailing wind direction, particularly where a tree may be isolated/ open grown increasing its wind exposure. Root growth and location will also be influenced by the presence of other trees, structures sheltering trees etc all of which can combine to affect the shape and location of a structural root system.

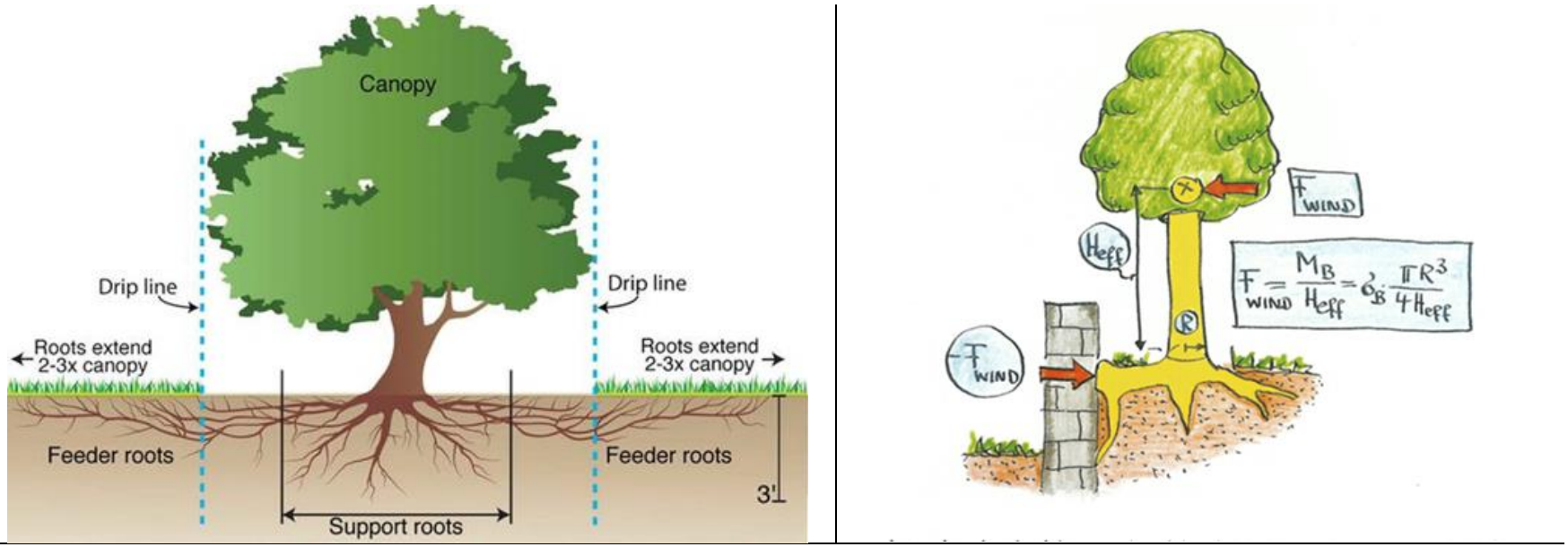


Fig 2 – Open grown trees or those with minimal obstructions close to their stems will have a network of structural roots supporting feeder/ fine root growth beyond (above left). In certain situations root morphology can be affected by structures close to the main stem (above right: Mattheck).

5.1.8 Beyond the structural (and generally permanent) root system will be a network of smaller roots which in turn subdivide to fine roots. Fine roots will also be found throughout the root system (i.e. both close to and distant from a tree) to maximise soil resource uptake and reflect underlying soil conditions. Some larger roots (>25mm and sometimes much larger) can extend away from this area and remain permanent particularly where there may be a constant supply of water (such as a broken downpipe on a building some distance away) which encourages a roots development. Generally the smaller roots (<10mm and particularly fibrous roots) outside of the immediate structural root plate can be considered to be in a state of constant change. They will grow seasonally and tree roots generally grow at night. Small fibrous roots are also mostly short lived (ranging from anything

between 10 days to over a year[2]). The cyclical death and decay of roots releases both nitrogen and carbon into the soil and is an important part of soil nutrient cycling process. The extent and location of the trees fine root system reflects a trees resource requirement (as resources are removed from certain areas of the soil and exploited in others) as well as the resource capacity required to form such a fibrous root system. Fine roots produced near the soil surface tend to live longer than those deeper in the soil[3]. The fine root system shows species variation and will also vary in depth (depending on species dynamics and underlying soil conditions). Adopted highways generally have a footing that extends < 0.5m and most UK residential properties have footings in the range of 0.5-1.5m depth. Trees will easily root below these depths and this is evidenced by the fact that every year in the UK there are thousands of tree related subsidence cases.

[2] Eissenstat & Yanai (1997) The ecology of root lifespan. *Advances in Ecological Research,* 27, 1-60.
[3] Hendricks & Pregitzer (1992) The demography of fine roots in a northern hardwood forest. *Ecology*, 73, 1094-1104.

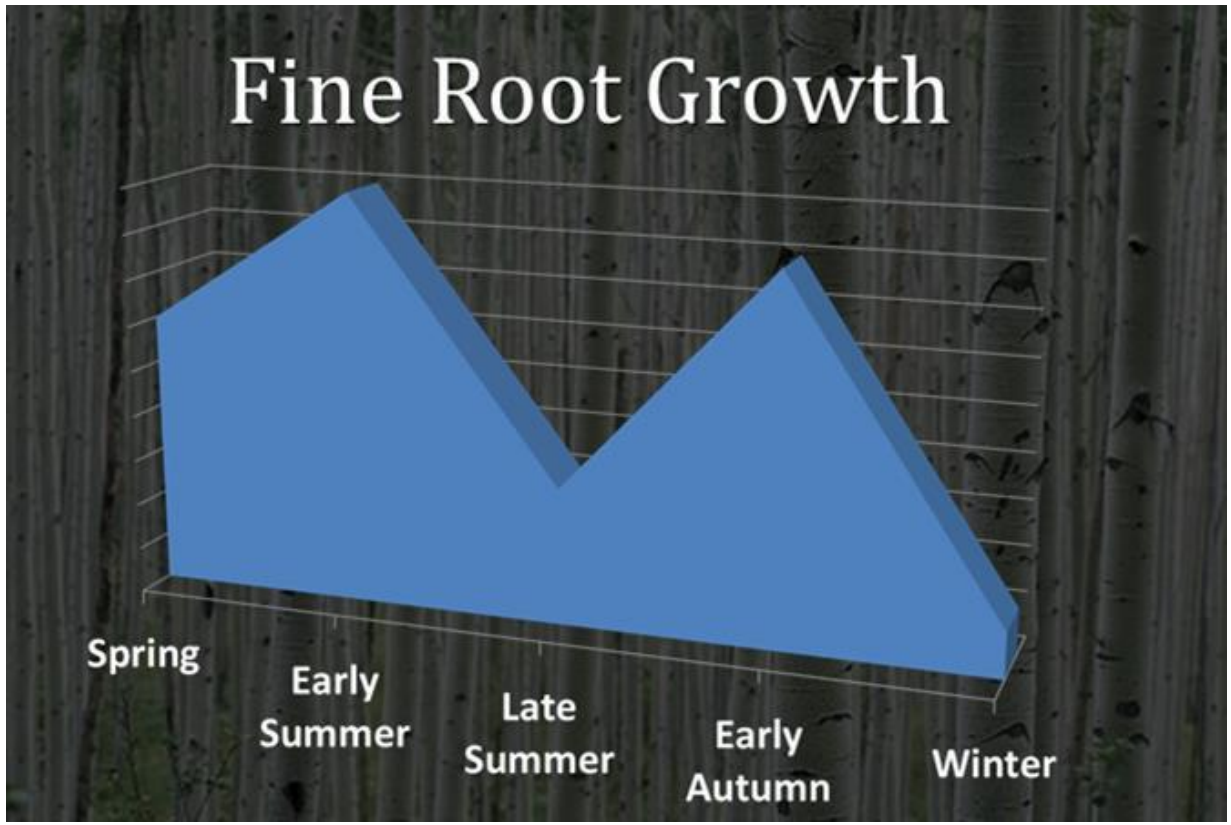


Fig 3 – Fine root growth is (generally) seasonal peaking in late spring and again in early autumn but dying back in winter dormant periods when photosynthetic production ceases. This is an important part of the soil nutrient cycle and demonstrates that a static RPA as calculated by BS5837 is a 'simplistic' view of the tree rooting dynamic. (Image Source: Tamla Trees**)**

5.1.9 The fine root system shows species variation and will also vary in depth (depending on species dynamics and underlying soil conditions). Adopted highways generally have a footing that extends < 0.5m and most UK residential properties have footings in the range of 0.5-1.5m depth. Trees will easily root below these depths and this is evidenced by the fact that every year in the UK there are thousands of tree related subsidence cases.

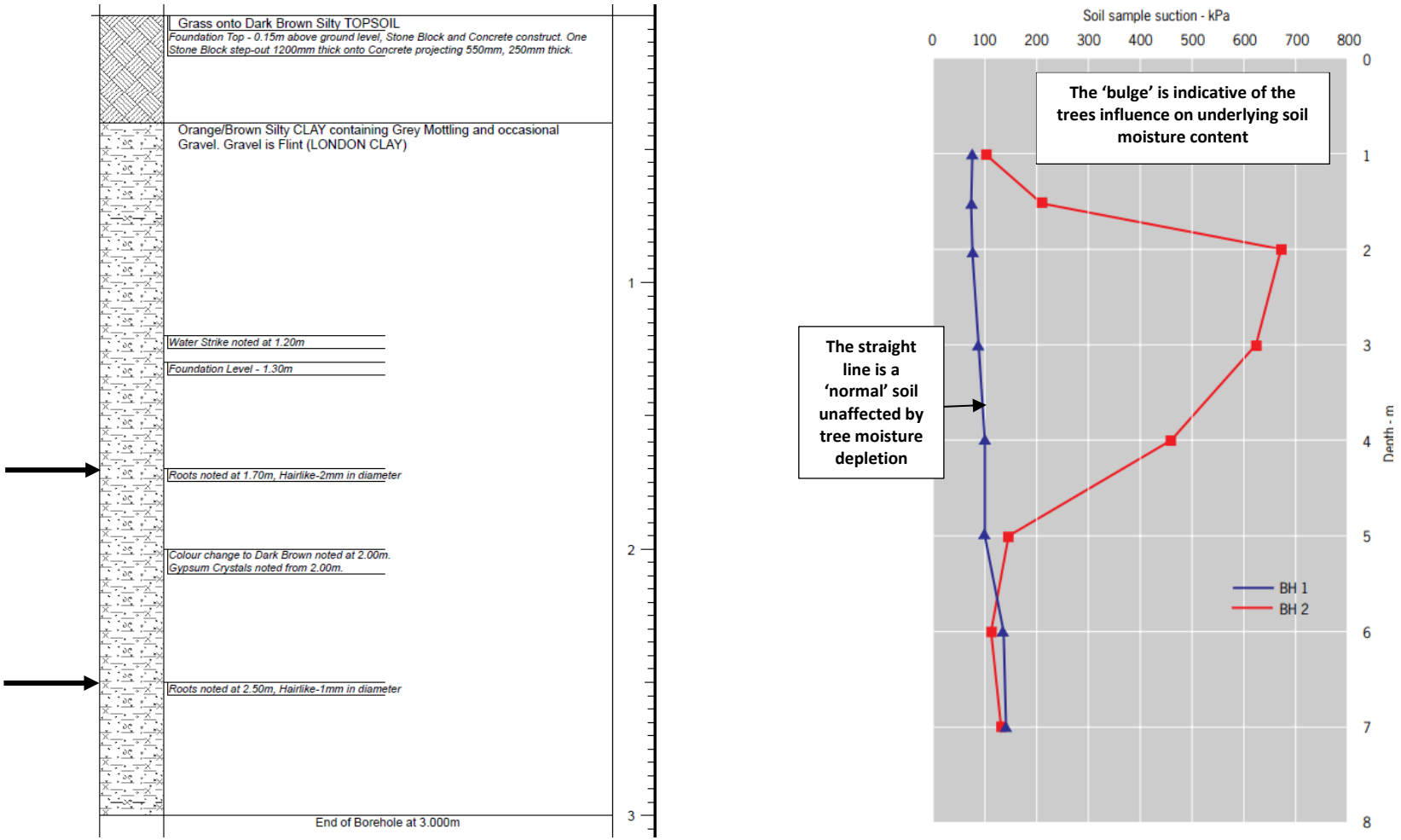


Fig 4 – Borehole log 10m from mature Oak tree on clay soil detailing fine roots to depths of 2.5m indicated with arrows (Source: Tamla Trees project) and annotated soil moisture depletion by trees showing a peak influence at 2m and extending to 5m (above right)

5.1.10 Against this backdrop rooting information seeking to manipulate RPA shapes to account for the presence of houses, garages etc outside of the immediate zone of structural rooting (3-4m) is not considered appropriate. Unless ground obstructions are present within the immediate structural rooting area or to such a depth as to nullify potential fine root growth (below basements or retaining wall step changes in levels for example) Tamla Trees ltd will show RPA's in a circular fashion but seek to maximise the quality and positioning of specified tree protection measures and encourage ground treatments (such as mulching – see Section 5.7). **Clients and developers must implement these measures for them to be effective. A failure to protect trees during the development process adversely affects soil and roots. Symptoms may not present themselves for a number of years following the development as the tree(s) enter a spiral of potentially irreversible decline.**

Fig 5 - Manion's spiral of tree decline for Norway Spruce (modified by Mrkva 1993)

5.1.11 BS5837 Section 4.6.3 Site Specific Assessment:

Section	Consideration	Site Specific Comments
4.6.3 (a)	*the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures, and underground apparatus);*	• TG1 is located close to the existing retaining boundary wall where soil is at a lower level within the site and this will have caused localised deflection of roots and atypical root growth formation. • T4 is located with roots which will grow below the existing concrete surface. This was in place when the tree was planted and the rooting will have developed with this localised constraint (which is likely relatively shallow). • All other trees are located in generally open garden rooting areas.
4.6.3.(b)	*topography and drainage;*	• The site is generally level (minor slope down) within the garden before a step change down to the south/ existing garage. Drainage will therefore progress down the gentle slope given site topography. There were no areas of apparent waterlogging/ pooling.
4.6.4.(c)	*the soil type and structure;*	• Soil is indicated by the BGS as London Clay. Clays are generally more easily compacted but bound water remains available. The removal of the existing concrete within the RPA of T4 will deliver a positive improvement to this relationship. • **Protection measures detailed in this report will only be effective if these are instated immediately prior to all site works and maintained for the duration of the works.**
4.6.4.(d)	*the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.*	• The only RPA incursion is the removal of existing hard surfacing within the RPA of T4. This will be undertaken by hand in a pull back manor and only after all other site works are complete. This approach significantly reduces the risk of damaging underlying roots and *Acer* spp is tolerant as a species to root disturbance[4]

[4] Matheny & Clark (1998) Trees and Development: A Technical Guide to Preservation of Trees During Land Development

5.2 Root Protection Area (RPA) Incursions

5.2.1 The following incursions into the RPA's of trees to be retained have been identified:

BS 5837 Cat	A	B	C	Summary
RPA Incursion	-	-	T4	**Surfacing Removal –** The existing surface will be removed by hand in a pull back manor only after all other site works are complete. This area then becomes soft landscape improving the rooting area of this tree. T2, T3 & SG1 are fully protected by herras fencing for the duration of all site works. **Services** – Services will connect in Mill Lane and should be located outside the RPA of T4 given the apparent localized service locations. In the event of any change to this or encroachment within the RPA of T4 NJUG 4 – National Joint Utilities Group "Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London: NJUG 2007" will be adhered to. **Contractors must be made aware of this requirement.** **Landscaping (Soft) –** The RPA area below T4 (within the site) will be changed from existing concrete to soft/ open landscaping.

5.2.2 There are no new incursions into the RPA of retained trees on the basis that T1 & TG1 will be removed:

Tree Number	RPA Total (Sqm)	Incursion (Sqm)	As % of trees RPA

Tree & Development Risk Indicator

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- The main risk tree is T4 and this is currently protected by virtue of its 3rd party location and existing hard surfacing within the RPA. As a result the risk profile to this tree from the proposal is considered low.
- **Note:** This level of risk if a visual guide only and is only relevant **if all advised tree protective measures are put in place prior to any on site activity and maintained for the duration of the works.**
- **Note:** Only on-site testing can confirm the local soil conditions below foundation level but available information suggests the presence of a London Clay.

Fig 6 – Existing hard standing within the RPA of T4 (Acer spp). This is retained for the duration of all construction works before being removed by hand and soft landscaped.

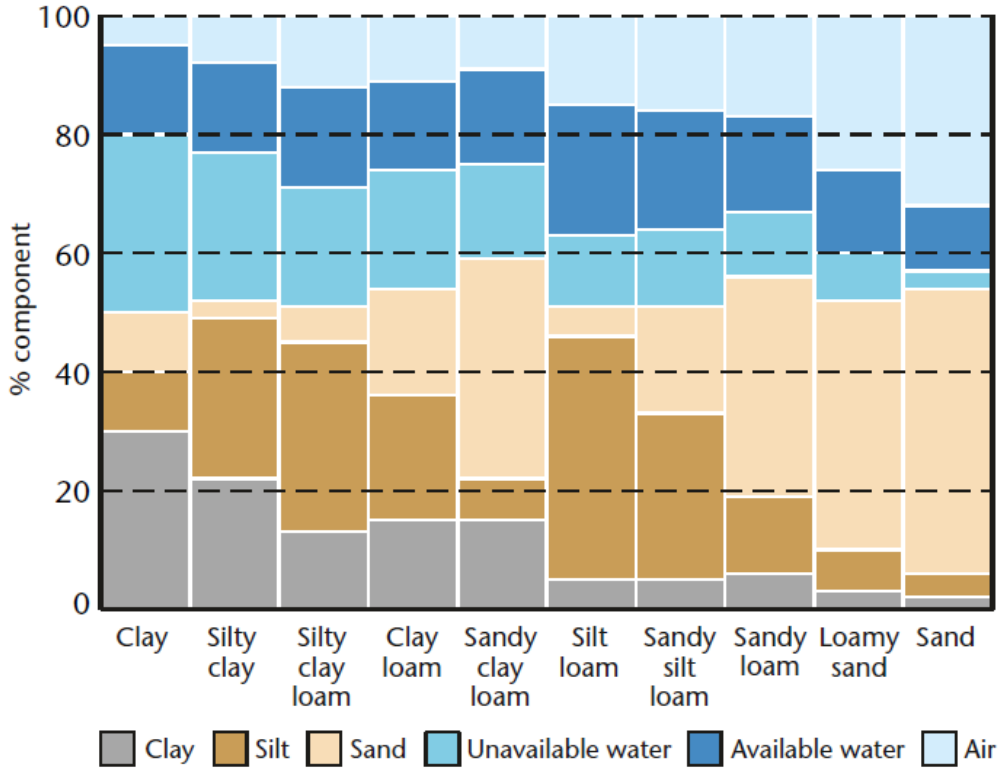

Fig 7 – Diagram showing the typical particulate composition and air/ water content at field capacity for mineral soil types[5] The variation in soil type has a direct bearing on the potential impact of adverse construction techniques (such as soil compaction) as well as overall root system morphology & development. Clay soils tend to have shallower rooting as moisture remains readily available while soils containing free draining gravel and sand can encourage deeper rooting based on reduce soil bulk density and greater seasonal variations in moisture availability. The immediate underlying soil is identified from BGS data as CLAY.

[5] Forestry Commission (2005) The Influence of Soils and Species on Tree Root Depth

5.3 Tree Loss

5.3.1 T1 (Elder) within the site and TG1 (Prunus & Ash) within the 3rd party garden will be removed to facilitate the proposal. These trees are of very limited quality and minimal amenity. Scope exists to plant new trees as required within the third party garden to mitigate the loss of TG1.

Tree Surgery

Tree No.	Species	Proposed Tree Works	BS Cat

Proposed Removal

Tree No.	Species	Proposed Tree Works	BS Cat
T1	Elder	Remove to facilitate the proposal	**C1**
TG1	Prunus & Ash	Remove (subject to 3rd party permission) to facilitate the proposal.	**C1**

Fig 8 – T1 (Elder) (left) and TG1 (Prunus & Ash) (right) will be removed to facilitate the proposal. Note: TG1 is located on 3rd party land and agreement is therefore required before these works can be completed.

5.3.2 **Birds -** In the event future tree works are required to be completed between 1st March & the 31st July (inclusive) a due diligence check for nesting birds must be completed before work starts in order to comply with the Wildlife & Countryside Act 1981. This check should be recorded in the Site-Specific Risk Assessment. If active nests are found work should not take place until the young have fledged.

5.3.3 **Bats** – It should be noted that in England and Wales, the relevant legislation is the Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010).

Tree Pruning Indicator

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- Intermittent cutting back of T4 will be required as this tree develops. There is already evidence of some crown pruning management to the tree and the need for future pruning is not altered by the proposal as this relationship already exists between the tree and existing garage building.
- **Note:** This is an indicative assessment. All and any future works should be undertaken in accordance with BS3998 (Tree Works) and we recommend the use of Arboricultural Association approved contractors.[6]

[6] https://www.trees.org.uk/ARB-Approved-Contractor-Directory

Fig 9 – Branches of T4 are already close to the existing structure and this relationship remains unchanged. Intermittent pruning will be required to address this relationship as this tree growths further. The 3rd party tree owner already has the tree under an apparent form of cyclical crown pruning management.

5.3.4 Please note that this is not a health and safety assessment report and that vigilance for the emergence of any fungal pathogens is advised.

5.4 Demolition & Foundations

5.4.1 All tree protection will be installed prior to any on site activity. The proposed tree protection procedure can be summarised as follows:

Stage 1

- Install BS5837 tree protection - feet fencing (See Appendix 6)
- Remove TG1 & T1

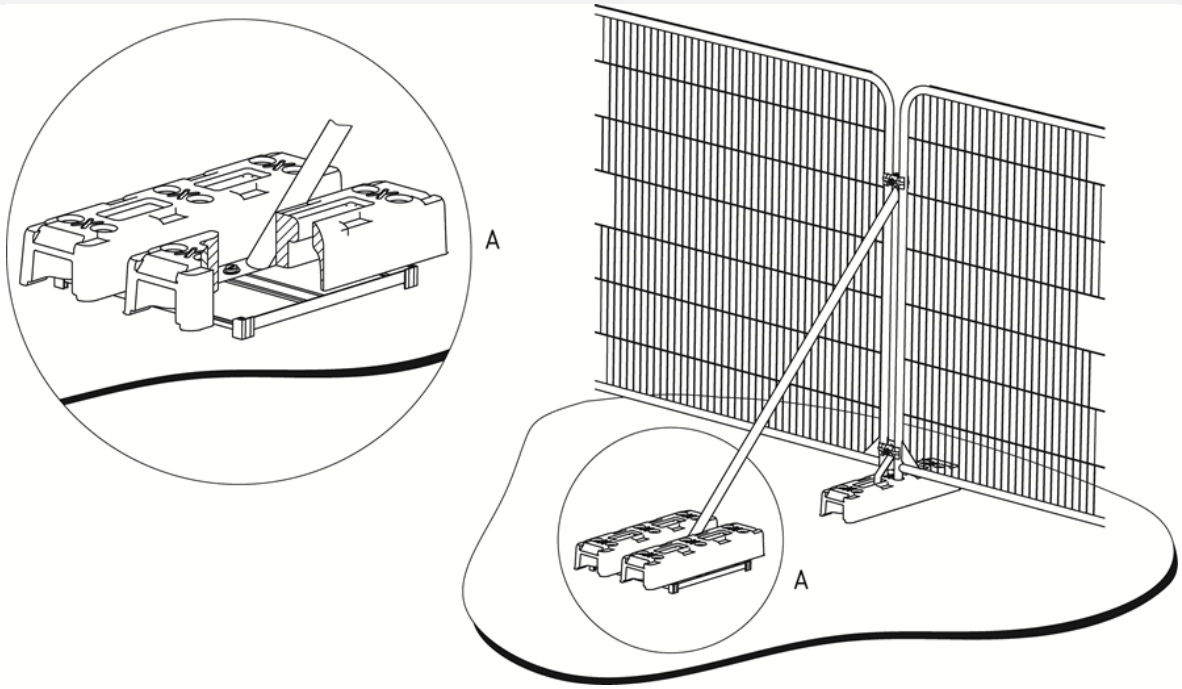
Stage 2

- Construct extension to garage/ conversion works.
- Retain surfacing within RPA of T4 for main construction cycle.
- Break out hard surface by hand following all construction works (when machinery removed from site).

Stage 3

- Protection remains in place for complete redevelopment cycle. Removed prior to soft landscaping.
- BS3882 compliant topsoil imported and raked out where required to 'make good'.
- Undertake soft landscaping within RPA of T4.

5.4.2 High quality BS5837 compliant tree protection will be installed within the garden area. T4 is located behind an existing brick wall on 3rd party land.

Tree Protection	
	**Overview** • ***Feet fence specification.*** • ***Note: To be marked with signs (inset) and purpose to be briefed to all ground workers.*** • ***Maintained for duration of the build.***
Threat Level to Retained Trees	**LOW**

5.4.3 All internal tree protection must be appropriately signed to ensure that all site operatives know its purpose.

Fig 10 – Professional grade weatherproof tree protection signs no smaller than 297 x 420 mm (A3) will be located at 5m intervals and all 'return' faces for tree protective fencing

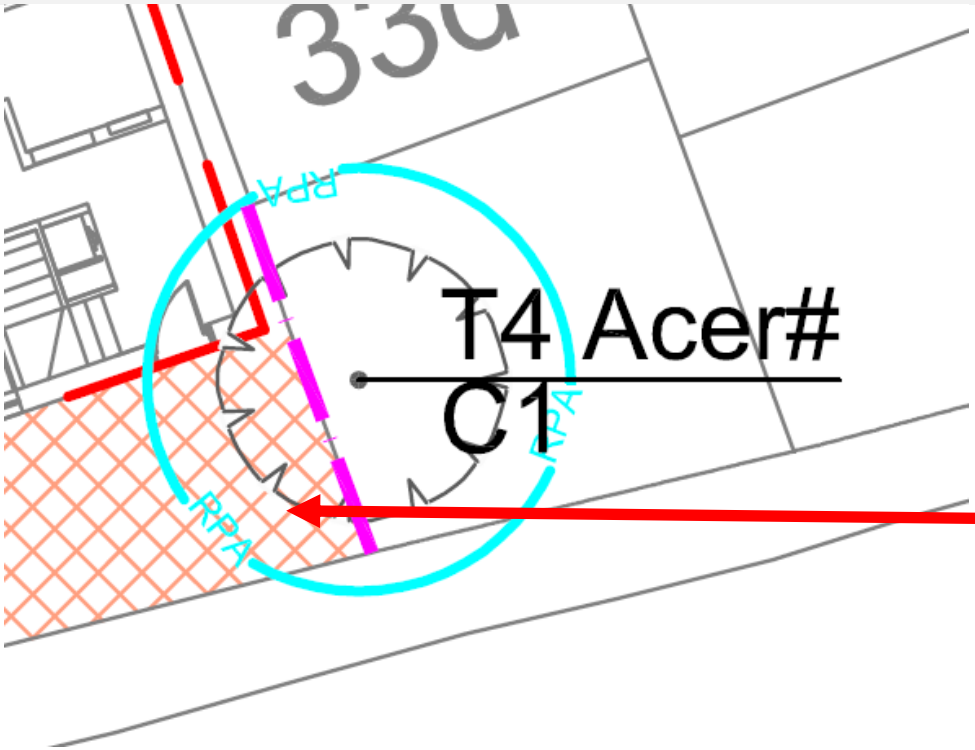
5.4.4 **Site Manager/ Consultant Sign Off:** At this point a site inspection is required to confirm the appropriate tree protection measures have been completed.

Date of Inspection	Compliance with Tree Protection Plan?			
	Yes		No	
Rectification Actions (insert notes)				
Site Manager Signature:				
Print Name:				
Arboricultural Consultant Signature:				
Print Name:				

SITE TREES ARE NOW ADEQUATELY PROTECTED AND CONSTRUCTION ACTIVITY CAN COMMENCE

5.4.5 Existing surfacing within the protected area of T4 will be broken out at the end of the main construction project and prior to landscaping. This limits the risk of tracking of exposed ground and contamination from undertaking the work earlier in the development cycle.

Surface Removal Works within Protected Area of T4



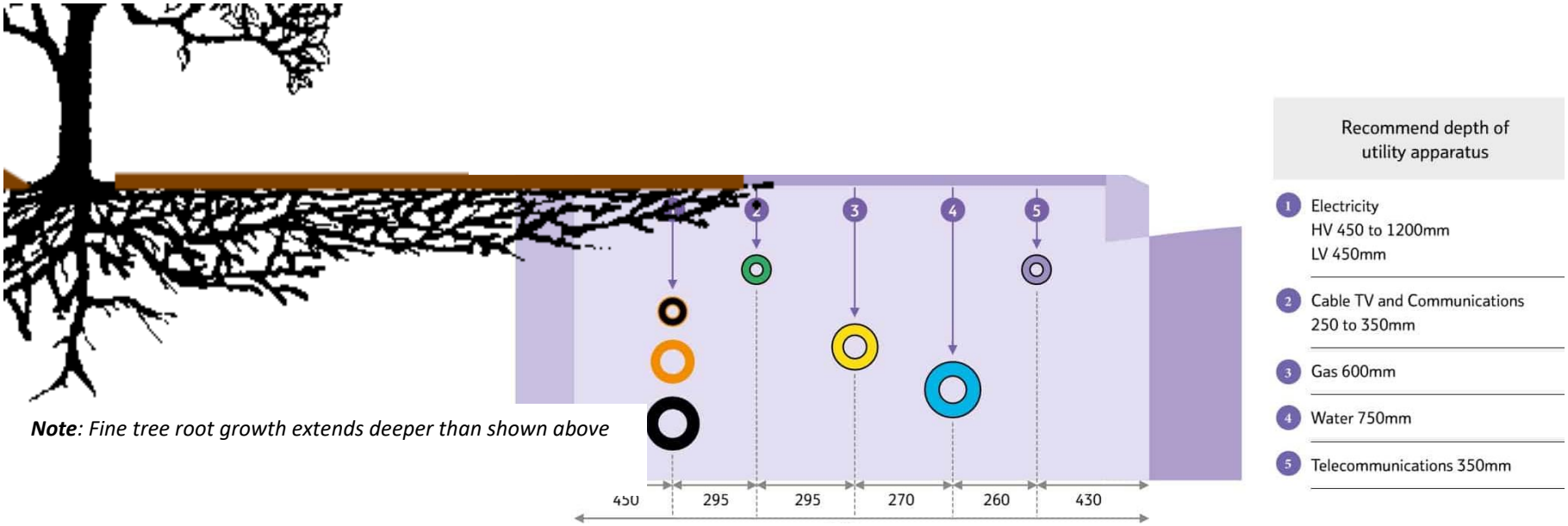
Threat Level to Retained Trees	LOW

5.5 Surfaces near Trees

5.5.1 No new surfaces are proposed within the RPA of any retained tree.

5.6 Site Service Provision

5.6.1 Any services within RPA's will be hand dug (none currently proposed as services will be located outside the RPA of T4) with the route seeking to maximise spatial distance from retained trees and avoid incursions into RPA's where possible. Any unforeseen excavation within retained tree RPA's will be undertaken by hand. Overview information on this process is provided as follows.



***Note**: Fine tree root growth extends deeper than shown above*

Fig 11 – Annotated service installation depth drawing (source: Thorne & Derrick**). Service installations occupy the same soil volume/ depth where the greatest level of tree roots will likely be found. Currently no excavations are planned within the RPA of any retained tree but this will be kept under review.**

5.6.2 **Services -** Any activity to excavate within the RPA has the capacity to cause root damage and should be hand dug in accordance with the principles detailed elsewhere within this report. None are currently proposed but this will be kept under review as part of the proposed site inspection regime.

PLEASE NOTE THIS OPERATION HAS AN ELEVATED CAPACITY TO CAUSE DAMAGE TO TREE ROOTS

5.6.3 **Planning the excavation:** A 'toolbox talk' will spot mark and agree the locations and working practices. In the event tree roots (multiple &/or roots >25mm in diameter) are encountered work will stop and progress with hand tools only.

				
Narrow Face Spade & Hand Trowel	**Stiff Hand Brush**	**Hi Vis Paint (for spot marking roots)**	**Hessian (to wrap exposed roots)**	**Duct Tape (to secure hessian)**

Fig 12 – Advised tools/ materials which should be available for all excavation works within RPA

5.6.4 Digging around tree roots is a skill and operatives must proceed with caution. Once a root is located it is often necessary to use a combination of hand tools and a stiff hand brush to track and 'trace' the roots location. Spot marking roots >25mm with spray paint is advised. **All roots >25mm in diameter will be retained. Please also note that retention of all roots where possible (including fibrous ones) is advised.**

5.6.5 **How deep?** – The excavation need only be as deep as the relevant service to be installed requires. **WARNING:** Breaking the ground has the potential to uncover services/ destabilise adjacent structures etc. Some general advice from the HSE can be found here.

5.6.6 **Root Wrapping/ Protection:** In the event the footing works expose any roots >25mm in diameter these must be wrapped or protected with a covering of soil if left exposed overnight or for longer than any single 4-hour period before backfilling following service install.

Root Wrapping	
  	**Overview** • ***Any exposed roots >25mm should be wrapped in hessian (example left) if exposed overnight or for any 4-hour period.*** • ***Spot marking with spray paint to highlight locations also advised.*** • ***Alternatively roots can be covered over with topsoil to maintain moisture retention.*** • ***Example Tamla Trees project on London Plane (left).***
Threat Level to Retained Trees	**LOW**

5.7 Ground Level Changes

5.7.1 Ground levels remain unchanged other than the removal of existing hard standing within the RPA of T4 detailed elsewhere within this report. All 'making good' will be with BS3882 compliant topsoil raked out by hand (to no more than 100mm depth within any tree RPA) and then seeded/ planted as appropriate. Further comment on landscaping is outside the scope of this report.

Fig 13 – All 'making good' topsoil will be BS3882 compliant and raked out by hand to no greater depth than 100mm

5.7.2 We encourage the use of composted bark mulch below tree canopies where possible to aid water retention and increase soil microbial activity. This is particularly relevant to mature retained trees.

Mulching	
	**Overview** • ***Circular area edged to 50-100mm depth to stop mulch from 'creeping' on to surround lawn.*** • ***Composted mulch then spread around below tree by hand – no need to lift or remove underlying grass.*** • ***Mulch topped up annually/ as required.*** • ***Positive benefits for mulched trees***
Threat Level to Retained Trees	**LOW**

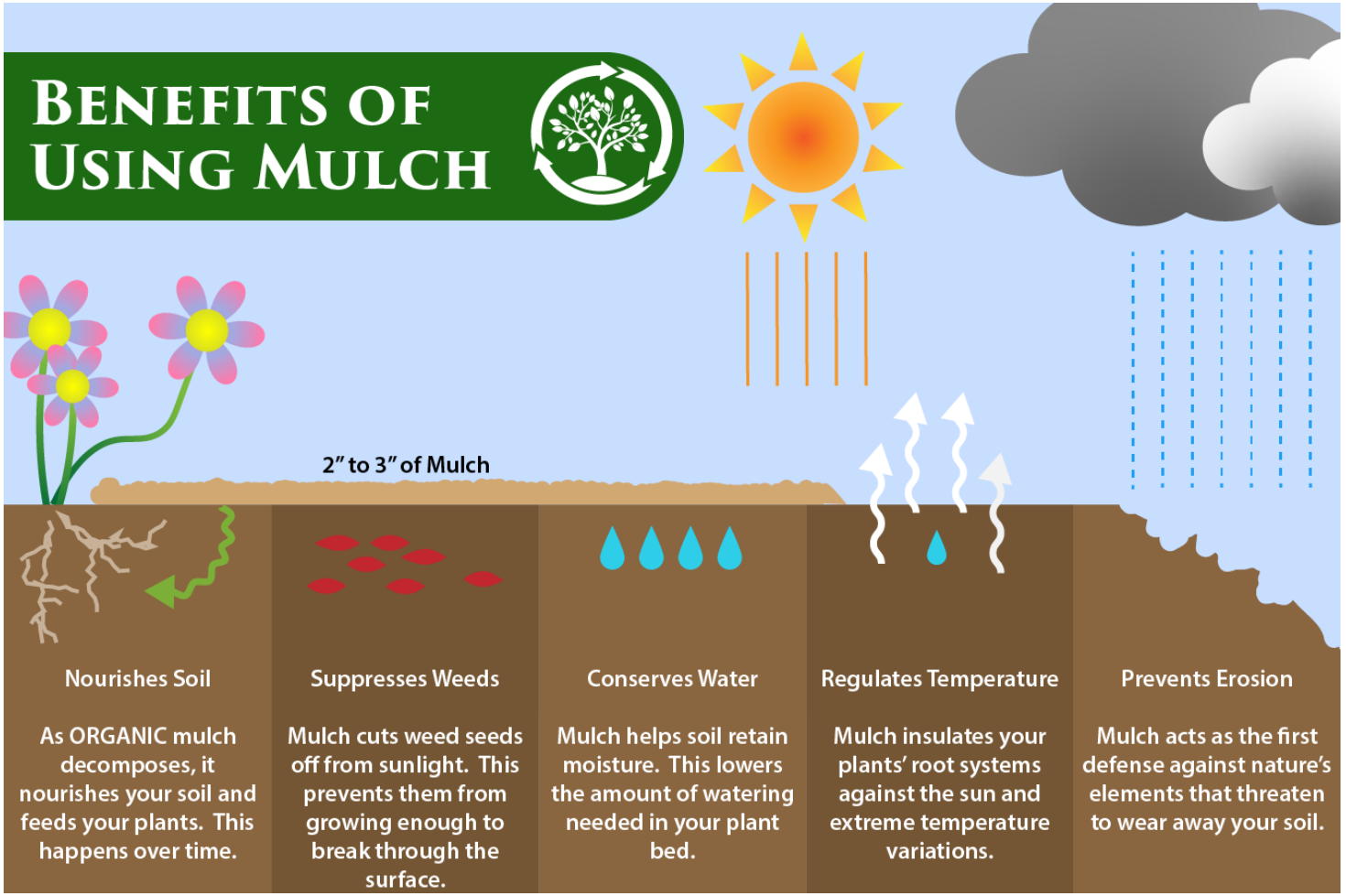


Fig 14 – Benefits of Mulch (Image Source 1st Stop Landscape Supply (US)

5.7.3 Where soft landscape planting occurs within the RPA of retained trees, we advise the use of small pot sizes and plug planting where possible to minimize the risk of root disturbance.

Plug and Pot Planting	
	**Overview** • ***Within 1.5m of retained trees planting should be with plug stock (left)*** • ***Small plant pot sizes <3l utilised for new planting in further areas.*** • ***Hand dug planting holes.*** • ***Top dressed in compacted bark mulch/ soil as appropriate.*** • ***Watered weekly May – September during season 1 & 2***
Threat Level to Retained Trees	**LOW**

5.8 Tree Shading of Proposal

5.8.1 There are no issues of shading associated within this project given the open nature and southerly orientation.

5.9 Arboricultural Project Supervision

5.9.1 Most damage to trees on developments sites is caused inadvertently and to ensure continued protection during development a system of site monitoring is normal.

5.9.2 Basic checks will be undertaken as the construction phase progresses to ensure that protective fencing remains intact and ensure the proposed works close to trees are completed in accordance with this report. Any unforeseen issues can be identified and discussed with the consulting arboriculturalist before any damage to trees occurs.

5.9.3 This approach allows a strong working relationship with the site manager/ construction staff to identify issues that may affect retained trees and ensure they are addressed before they escalate.

5.9.4 After each site inspection is completed, a formal record will be sent to the local authority. On this basis we would advise the following inspection regime:

Visit Detail	Date	Status
1st Site Inspection Attend site once tree protection is in place. Inspect/ Toolbox talk with site operatives regarding tree protection and surface removal. Update local authority on findings.	**TBC**	**Incomplete**
Final Site Inspection Final site visit to confirm that no damage has been done to retained trees/ identify any remedial actions in the event damage has occurred. Assess any required tree surgery following construction. Update local authority and project team on findings.	**TBC**	**Incomplete**

Note: Actual visit dates subject to change/ confirmation depending on project program.

Appendix 1 – BS5837 Survey Key

BS 5837 Cat	Description
A	Those of high quality and value: in such a condition as to be able to make a substantial contribution (> 40 years)
B	Those trees of moderate quality and value: those in such a condition as to make a significant contribution (> 20 years)
C	Those trees of low quality and value: currently in an adequate condition to remain until new planting could be established (> 10 years)
U	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed regardless of development (< 10 years)

Note: Subcategories are denoted in the tree survey data (A1, B1, C2 etc.). You are referred to BS5837 for further detail if required.

Tree No.	T (tree), G (group), H (hedge), W (woodland) + Ref No.
Species	Common Name
Ht (m)	Measured height in metres
DBH (m)	Diameter at 1.5m above ground level
No of stems	An indication of the trees form @1.5m (1 = single stem, m/s = multi-stemmed)
Branch Spread	In m to cardinal points
Cr Ht Clearance (m)	Overall height of lowest branches from the ground level on side of proposed development
Life Stage	Young, Semi-Mature, Early Mature, Mature, Over-Mature
General Observations	Observations on the condition of the tree(s)
Tree Work Specification	Proposed tree works in accordance with BS3998
BS Cat	See above
Life Exp	Estimated remaining contribution in years.
RPA Radius(m)	Radius of the trees Root Protection Area measured from the trunk to the edge of the RPA circle in metres

Appendix 2 – BS5837 Tree Classification

The classification of trees is undertaken during the survey to inform decisions as they relate to designs and retention/ removal. The 'value' of a tree in terms of its visual amenity is subjective and the full condition of a tree may not be apparent given access and other site-specific factors. If a tree is proposed for retention in many respects its BS category is irrelevant. We encourage the retention of all trees where the design realistically allows this with the exception of U cat trees (as these are usually 'defect' trees). There should not be a presumption that all C category trees can or should be removed. Generally A & B Category trees are those of greatest value to a development and designs should be manipulated to retain these where possible. Further detail on classification of trees is contained at Section 4.5 of BS5837. Some selective extracts are detailed below:

4.5.2 *The purpose of the tree categorization method, which should be applied by an arboriculturist, is to identify the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained in the event of development occurring.*

4.5.5 *When determining the appropriate category for any given tree, group, or woodland (see* ***4.4****), the arboriculturist should start by considering whether the tree falls within the scope of category U. Assuming that it does not, the arboriculturist should then proceed on the presumption that all trees are considered according to the criteria for inclusion in category A. Trees that do not meet these criteria should then be considered in light of the criteria for inclusion in category B. This process should be repeated, as required, until the appropriate quality or value assessment is reached.*

4.5.6 *Trees of generally high quality and/or value which have a defect or defects that do not reduce their retention span below the suggested 40-year threshold, should be placed in category A, i.e. they should not be downgraded as a result of minor imperfections.* **Tamla Trees Note:** We do not apply a simple >40 = Cat A approach as many trees will have retention values in excess of 40 years but not be considered Cat A.

4.5.11 *The tree survey might identify the presence of veteran trees on the site. The implications of their presence on the use of the surrounding land should be assessed at the earliest possible stage of the design process. Where such trees are to be retained, particular care should be taken in the design to accommodate them in a setting that aids their long-term retention.*

Please note assessments are made based on available access and factors can affect full inspections (3rd party tree location, extensive basal undergrowth, Ivy etc). This survey is not a full health and safety inspection although obvious defects (where noted) will be identified.

BS5837 Table 1 is shown on the following page and provides detail on the relevant categorisation. Elements of this remain subjective and if a tree is shown for retention its category is somewhat irrelevant as we consider all trees should be afforded the same value/ protection if to be retained.

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix 3 – BS5837 Survey Data

Tree No.	Species	DBH (m)	No of Stems	Ht (m)	Crown Spread				BS Cat	Age Class	Life Expect	Cr Ht (m)	Observation	Recommendations	RPR (m)
					N	E	S	W							
T1	Elder	0.1	M/S	3	1.6	1.4	1.3	1.5	C1	Young	20 to 40	1	Low/ small tree. No wider amenity.	Remove to facilitate proposal.	1.2
T2	Sorbus	0.08	1	6	1.6	1.6	1.5	1.5	C1	Semi-mature	20 to 40	2	Establishing ornamental.	No works	1
T3	Cabbage Palm	0.18	1	7	1.5	1.5	1.5	1.5	C1	Mature	20 to 40	5	Established ornamental.	No works	2.2
T4	Acer spp	0.25	1	5.8	2	2.1	2	2	C1	Mature	20 to 40	1.9	Established 3rd party tree. Previously reduced.	No works	3
TG1	Prunus spp x 1, Ash	0.25	1	7	1.6	1.3	1.4	1.7	C1	Mature	20 to 40	1.6	Prunus is the dominant tree. Self-set Ash. Low quality.	Remove to facilitate proposal. Note: 3rd party owner	3

Tree No.	Species	DBH (m)	No of Stems	Ht (m)	Crown Spread				BS Cat	Age Class	Life Expect	Cr Ht (m)	Observation	Recommendations	RPR (m)
					N	E	S	W							
														permission required.	
SG1	Berberis x 1, Shrub x 1	0.12	1	4.6	1.7	1.6	1.6	1.6	C1	Mature	20 to 40	1.6	Berber is x 1, Shrub x 1 3rd party shrubs.	No works	1.4

Appendix 4 – Tree Works Schedule

Tree Surgery

Tree No.	Species	Proposed Tree Works	BS Cat

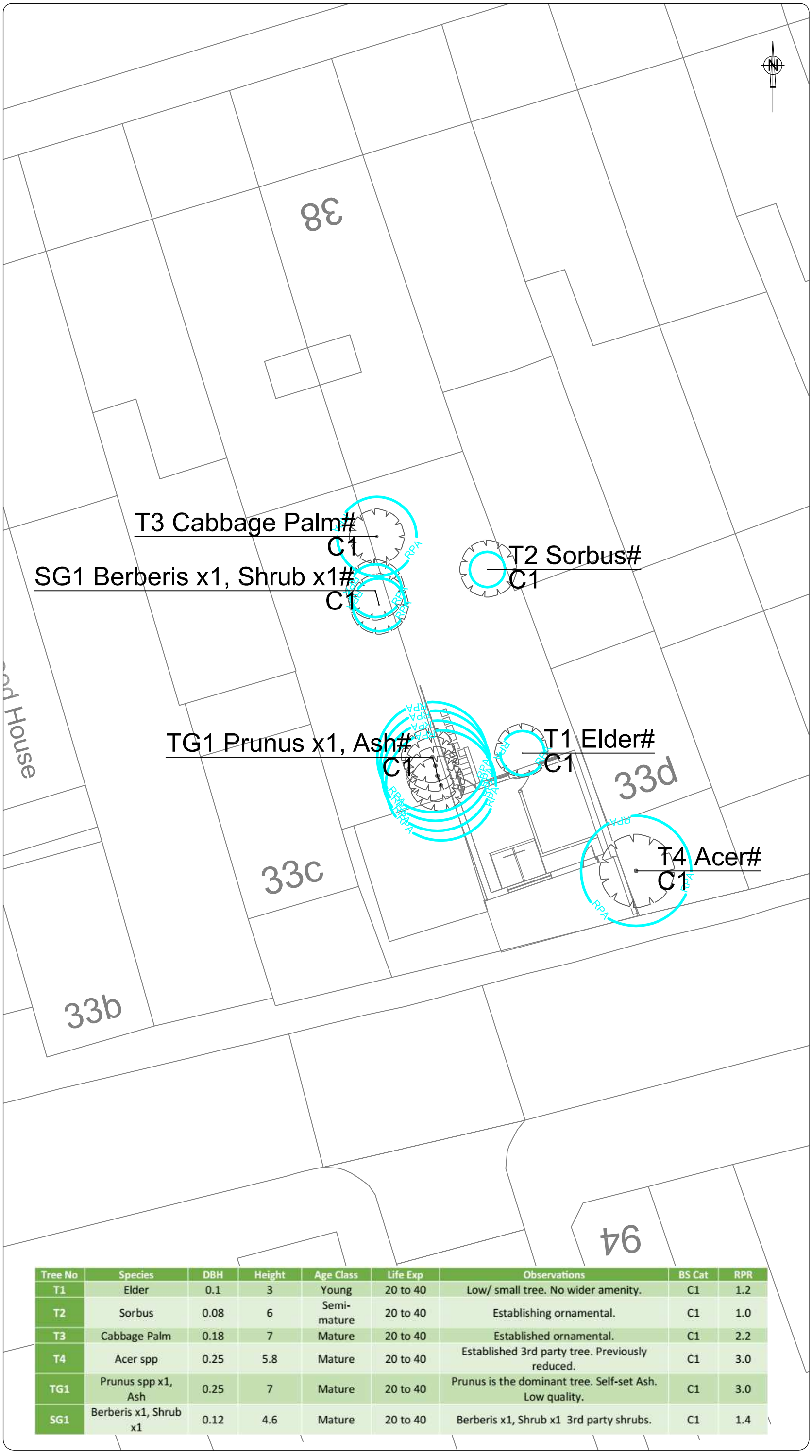
Proposed Removal

Tree No.	Species	Proposed Tree Works	BS Cat
T1	Elder	Remove to facilitate the proposal	**C1**
TG1	Prunus & Ash	Remove (subject to 3rd party permission) to facilitate the proposal.	**C1**

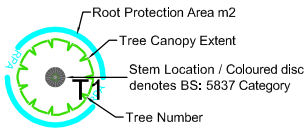
NOTE: All tree works to be undertaken in accordance with BS 3998:2010 'Tree work - Recommendations'.

NOTE: We recommend using Arboricultural Association approved contractors who can be sourced here

Appendix 5 - Tree Constraints Plan



Tree Survey Drawing Key



See Tamla Trees, Tree Survey for Individual Tree Details

KEY

Please refer to Tamla Trees report for details

- Category A - Trees of high quality
- Category B - moderate quality
- Category C - low quality
- Category U - Dead, Dying or Defect trees with <10 years retention value

RPA - root protection area as defined by Table 2 BS 5837:2012

Tree No	Species	DBH	Height	Age Class	Life Exp	Observations	BS Cat	RPR
T1	Elder	0.1	3	Young	20 to 40	Low/ small tree. No wider amenity.	C1	1.2
T2	Sorbus	0.08	6	Semi-mature	20 to 40	Establishing ornamental.	C1	1.0
T3	Cabbage Palm	0.18	7	Mature	20 to 40	Established ornamental.	C1	2.2
T4	Acer spp	0.25	5.8	Mature	20 to 40	Established 3rd party tree. Previously reduced.	C1	3.0
TG1	Prunus spp x1, Ash	0.25	7	Mature	20 to 40	Prunus is the dominant tree. Self-set Ash. Low quality.	C1	3.0
SG1	Berberis x1, Shrub x1	0.12	4.6	Mature	20 to 40	Berberis x1, Shrub x1 3rd party shrubs.	C1	1.4

NOTE # Tree positions indicatively mapped due to lack of detailed topographical plan

REV AMENDMENTS DRAWN DATE AUTH'D

PROJECT
38 Hillfield Road,
London,
NW6 1PZ

CLIENT
Mr & Mrs Oram

TITLE
Tree Constraint Plan (TCP)

Job	Scale	DRG NO	Revision
03725R	1:200 @ A3	03725P_TCP_01	-
Date 21/02/2022	Type a		

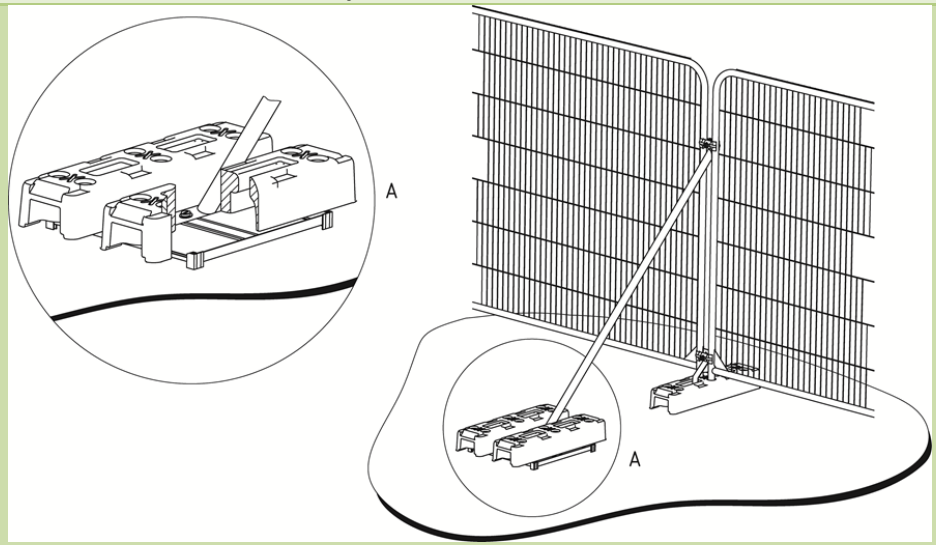
Tel: 01252 811 233
Email: info@tamlatrees.com
Web: www.tamlatrees.com
Tamla Trees consulting arborists

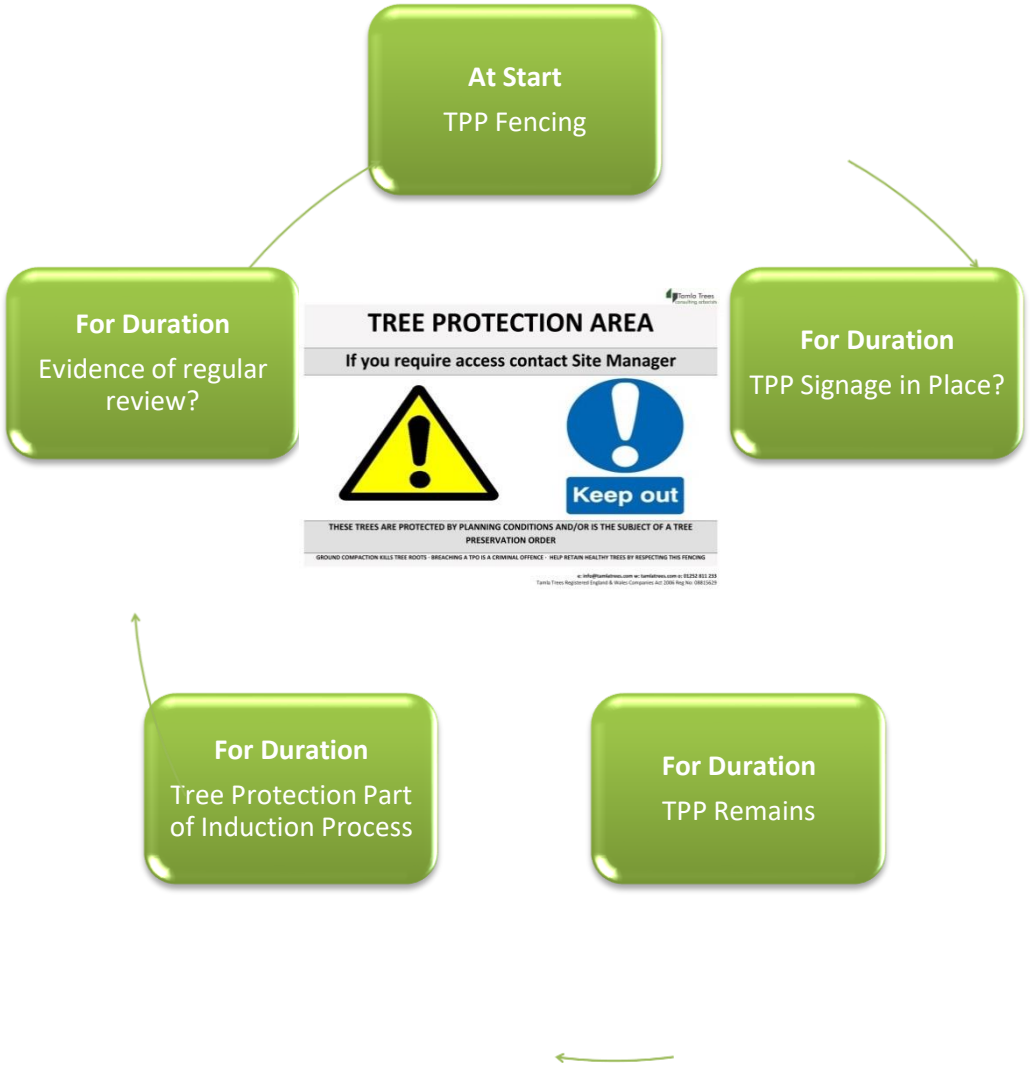
Appendix 6 - Tree Protection Plan

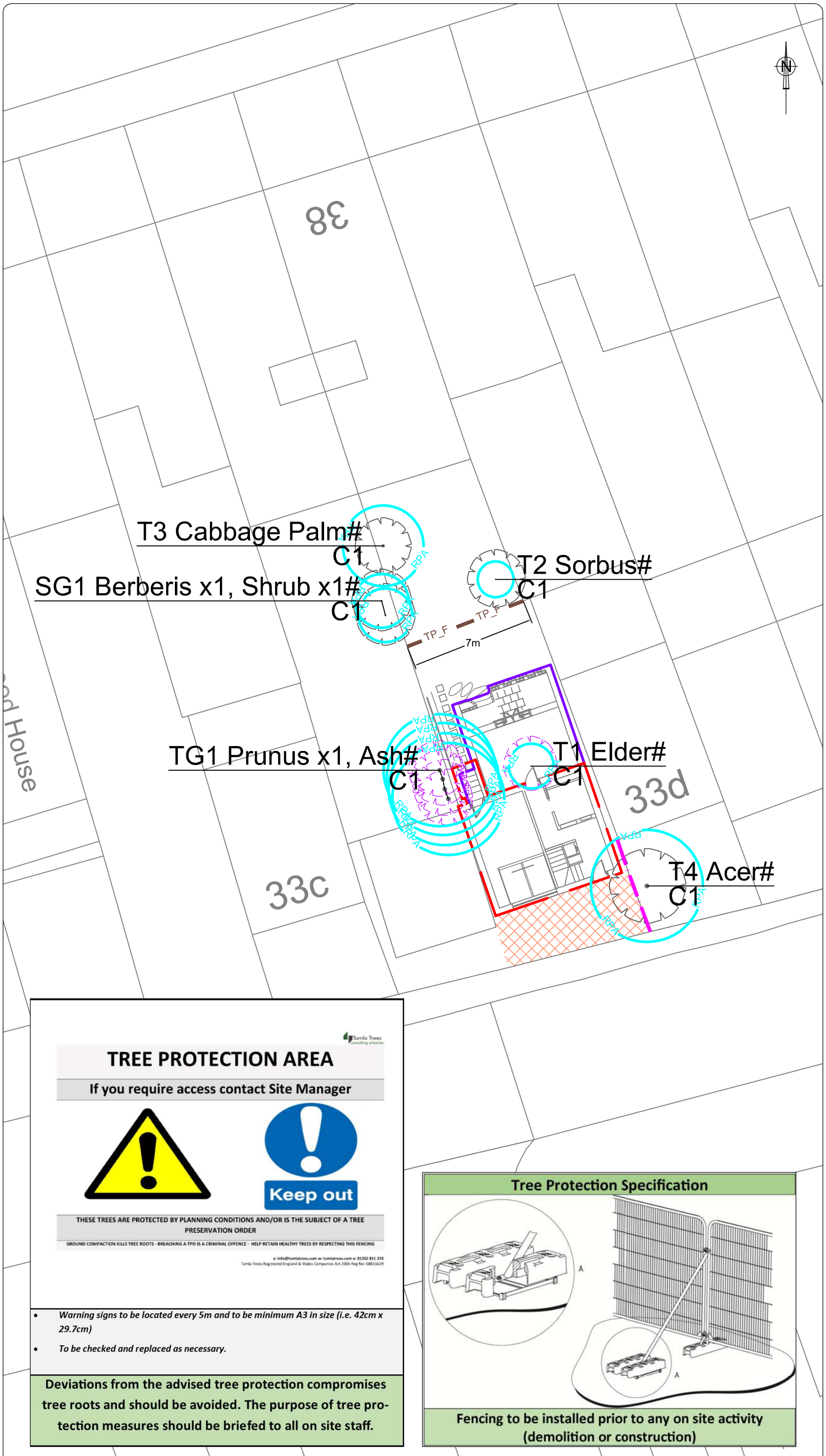
Tree protection is essential to successfully integrate the proposal into the surrounding trees. It is designed to manage the impact on the underlying soil and rooting environment. It must therefore be installed prior to any further site activity. Even apparently minimal tracking of the soil near trees has the capacity to irretrievably modify the soil environment to the detriment of tree health and stability.

All our fencing specifications accord with advice and guidance within BS 5837. Modifications to fence types are possible but should be discussed prior to implementation. In all other instances the form detailed below should be shown. This offers the best protection to retained trees.

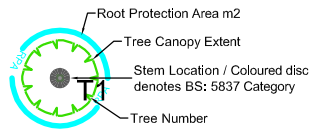
- **All tree protection must be in place prior to any site activities. It is recommended that this fencing is installed prior to any site works (including demolition).**
- **To be effective Tree Protection must remain in place for the duration of the development and form part of the site induction process.**
- **Fencing spec (right) proposed and installed prior to any on site demolition/ construction activity.**
- **Maintained for the duration of all site works.**




At Start
TPP Fencing
For Duration
TPP Signage in Place?
For Duration
TPP Remains
For Duration
Tree Protection Part of Induction Process
For Duration
Evidence of regular review?
TREE PROTECTION AREA
If you require access contact Site Manager
Keep out
THESE TREES ARE PROTECTED BY PLANNING CONDITIONS AND/OR IS THE SUBJECT OF A TREE PRESERVATION ORDER
GROUND COMPACTION KILLS TREE ROOTS - BREACHING A TPO IS A CRIMINAL OFFENCE - HELP RETAIN HEALTHY TREES BY RESPECTING THIS FENCING



Tree Survey Drawing Key



See Tamla Trees, Tree Survey for Individual Tree Details

KEY

Please refer to Tamla Trees report for details

- Category A - Trees of high quality
- Category B - moderate quality
- Category C - low quality
- Category U - Dead, Dying or Defect trees with <10 years retention value

RPA - root protection area as defined by Table 2 BS 5837:2012

Proposed removal - to facilitate Development

Location of protective fencing - BS 5837 Feet Fence (or similar)

Existing boundary acting as protective fencing

Existing hardstanding

Existing building and external steps

Proposed extension and external patio / steps

NOTE # Tree positions indicatively mapped due to lack of detailed topographical plan

REV AMENDMENTS DRAWN DATE AUTH'D

- *Warning signs to be located every 5m and to be minimum A3 in size (i.e. 42cm x 29.7cm)*
- *To be checked and replaced as necessary.*

Deviations from the advised tree protection compromises tree roots and should be avoided. The purpose of tree protection measures should be briefed to all on site staff.

PROJECT
38 Hillfield Road,
London,
NW6 1PZ

CLIENT
Mr & Mrs Oram

TITLE
Tree Protection Plan (TPP)

Job	Scale	DRG NO	Revision
03725R	1:200 @ A3	03725P_TPP_01	-
Date 21/02/2022	Type a		

Tel: 01252 811 233
Email: info@tamlatrees.com
Web: www.tamlatrees.com
Tamla Trees consulting arborists

Appendix 7 – Site Photographs

Image 1 – Looking towards existing garage structure with T4 visible right.

Image 2 – Looking west towards boundary and TG1

Image 3 –Existing hard standing within the RPA of T4. This should be retained during the works and removed only after all the main construction activity is complete.

Appendix 8 – Limitations

Full Legal Disclaimer

This report was prepared as a report of work instructed by client (as specified). Neither Tamla Trees ltd nor any associated company, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the report and its findings. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favouring by Tamla Trees ltd or any associated company. The views and opinions of authors expressed herein do not necessarily state or reflect those of Tamla Trees ltd or any associated company.

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Specific - Trees

All tree inspections, unless specified, have been undertaken from ground level and using non-invasive techniques. Comments contained within the report on the condition and risk associated with any tree relate to the condition of the tree at the date and time of survey. Please note that the condition of trees is subject to change. This change may occur but is not limited to biological and non-biological factors as well as mechanical/ physical changes to conditions in the proximity of the tree. Trees should be inspected at intervals relative to risk/ target areas and in accordance with relevant HSE guidance. Tamla Trees ltd can provide further information on this matter if required. Where full access to trees (Ivy, materials at base, location on 3rd party land) was not possible Tamla Trees ltd accept no liability for issues that arise.

Please note no statutory control checks have been undertaken (unless specified). Where tree surgery works have been identified these works are based on the assumption that planning is approved, no tree works should be undertaken prior to determination of this application without up-to-date confirmation of the Tree Preservation Order / Conservation Area Status of the vegetation. All works should be undertaken in accordance with the appropriate Duty of Care. This should include, for example, site specific risk assessments and due diligence inspections for the presence of protected species.

Any comment/ measurements relating to 3rd party trees have been made without full access to the tree(s). Should these trees have any impact on the proposed development we would advise you to instruct us to contact the 3rd party and undertake further detailed inspection work.

A legal Duty of Care requires that any tree works specified in this report should be performed by qualified, arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health & Safety Executive Guidelines. Additionally all works should be carried out according to British Standard 3998 (2010) Recommendations for Tree Work.