

BS5837 Arboricultural Impact Assessment



8 Aldridge Road Villas, London, W11 1BP

Client: **J Arbuthnot**

Job Reference: **03661R**

Planning Ref: **NA**

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

October 2021

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1. Executive Summary

- 1.1 Tamla Trees Ltd has been appointed by J Arbuthnot to provide advice on the arboricultural issues relating to the installation of a prefabricated Ecospace garden room. We surveyed the site in October 2021. The survey accorded with BS5837:2012 “Trees in relation to design, demolition and construction – Recommendations”. The garden room structure is a prefabricated panel structure assembled by hand and with a typical installation time of 10 days/ 2 weeks.
- 1.2 No trees are removed to facilitate the proposal although services pass below the retained hedge (H1). This is technically outside the scope of BS5837 but indicated for completeness. These hand dug service installations are also within the RPA of T5 but the encroachment is minor.
- 1.3 The structure encroaches into the Root Protection Area (RPA) of TG1 (Lime & Elder) and T5 (Elder). At the distance from TG1 and T5 and with the brick-built wall between the trees and the proposal combined with the minimal excavation we envisage no root issues. The building is supported on hand dug pre-cast pad footings which are manipulated in position to avoid any root >25mm in diameter. This approach minimises the real impact on the retained trees. The service connection to the main dwelling will be hand dug using the same principles of tree root retention although this is located outside retained tree RPA’s.
- 1.4 There is a void below the structure which means gas exchange is retained and the footprint of the structure is small enough that moisture gradients will remain unaffected in the soil below. The area is currently flag stones (see photos) and these will be lifted prior to the works increasing moisture/ oxygen exchange.
- 1.5 The potential tree issues can be summarised as: **Effective tree protection> Installation (including footings) of the garden room structure> service provision> landscaping**. The site is located within a Conservation Area (Aldridge & Leamington Road Villas) but we have not been advised of any Tree Preservation Order (TPO).
- 1.6 Subject to the working practices and tree protection measures outlined within this report there should be no discernible impact on the retained trees. This report is based on the client plans ref: 2128.SO.01 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?	Yes Aldridge & Leamington Road Villas
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?	TBC
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 taken from Westminster Council website October 2021.	



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.westminster.gov.uk/planning-building-and-environmental-regulations/design-and-heritage-planning/conservation-areas>
- 3.13 Supplementary Planning Guidance DEVELOPMENT AND DEMOLITION IN CONSERVATION AREAS (Westminster Council)

4. The Trees

4.1 The trees can be summarised as follows:

BS 5837 Cat	A	B	C	U
Specific Trees	-	T1, T2 & T4	T3, T5, TG1 & H1	-
Total Number	None	3 individuals	2 individuals, 1 group and 1 hedge	None

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

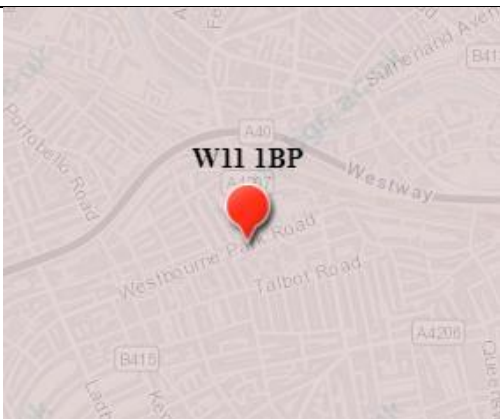
BS 5837 Cat	A	B	C
Aldridge Road Villas (front) Providing local amenity to the street scene (public)	-	T1 & T2	T2 & T5
Aldridge Road & Leamington Road (rear/ garden) Providing localized low-level/ garden amenity between properties (rear gardens) and contributing to private amenities	-	T3	T5 & TG1

4.3 There were no hedgerows that qualify for consideration under the 1997 Hedgerow Regulations. A number of smaller shrubs/ garden trees were present but are considered of low-level amenity given size/ location.

5.0 Arboricultural Impact Assessment

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 As shown below the site is located within what is defined as clay. The clay has a thickness up to 150m in depth. (Source: BGS¹).

	Soil Description
	<p>Bedrock: 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.</p> <p>Superficial Deposits: None recorded.</p>

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 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.

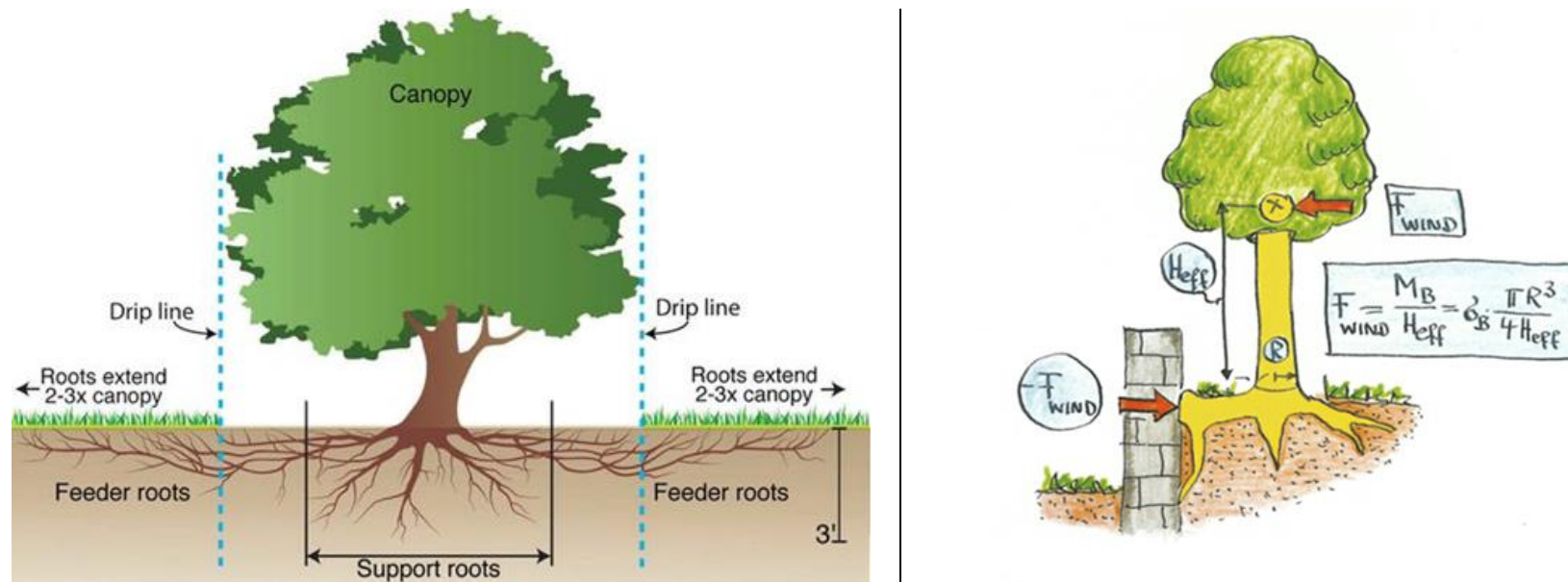


Fig 2 – Open grown trees or those with minimal obstructions close to their stems will have a network of structural roots supporting feeder/ fine root growth beyond (above left). In certain situations root morphology can be affected by structures close to the main stem (above right: Mattheck)

- 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 year²). 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 soil³. 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.

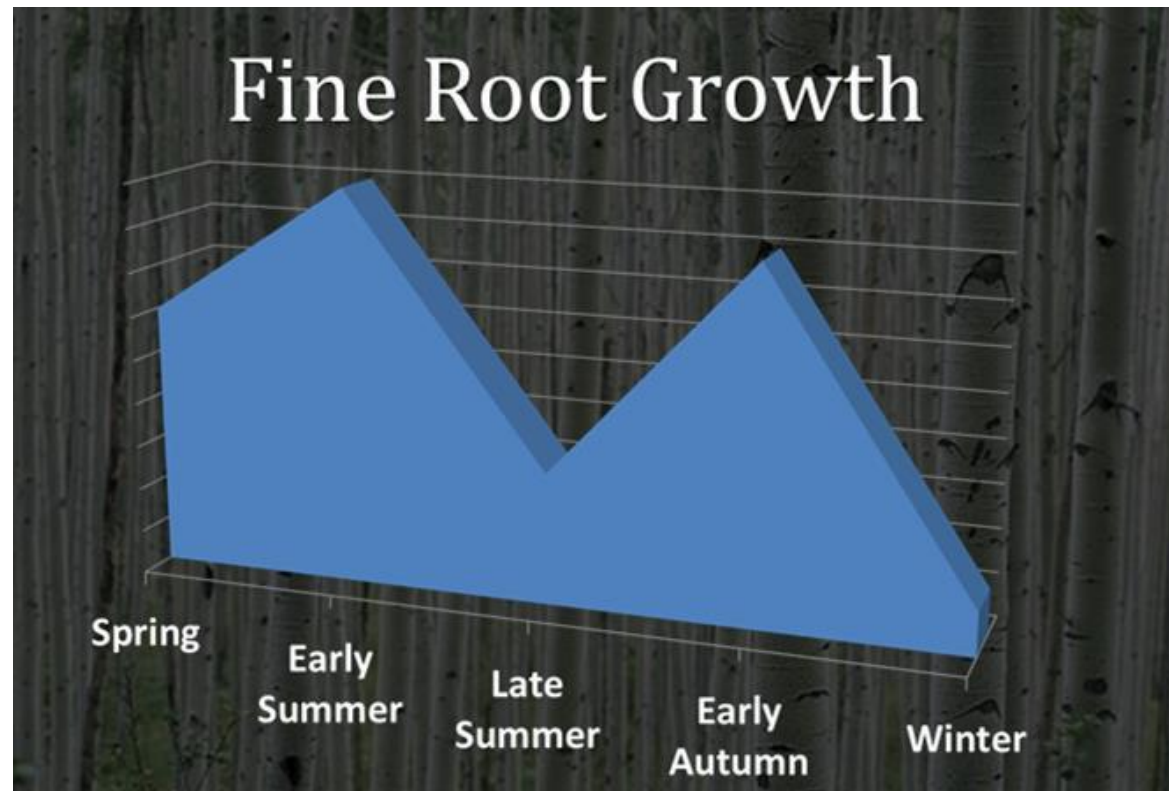


Fig 3 – Fine root growth is (generally) seasonal peaking in late spring and again in early autumn but dying back in winter dormant periods when photosynthetic production ceases. This is an important part of the soil nutrient cycle and demonstrates that a static RPA as calculated by BS5837 is a 'simplistic'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

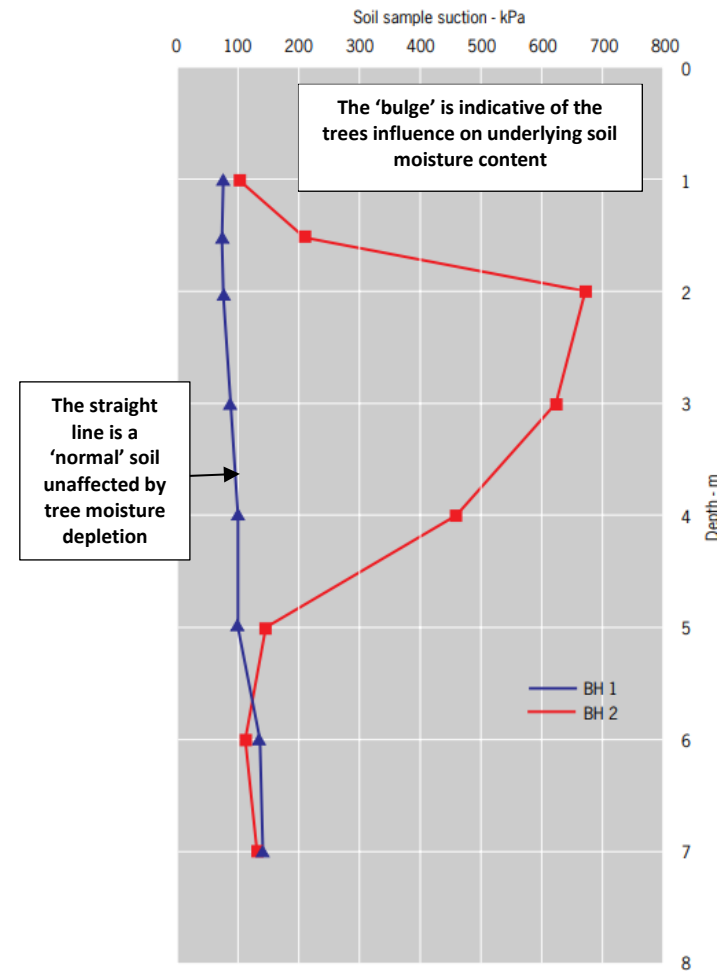
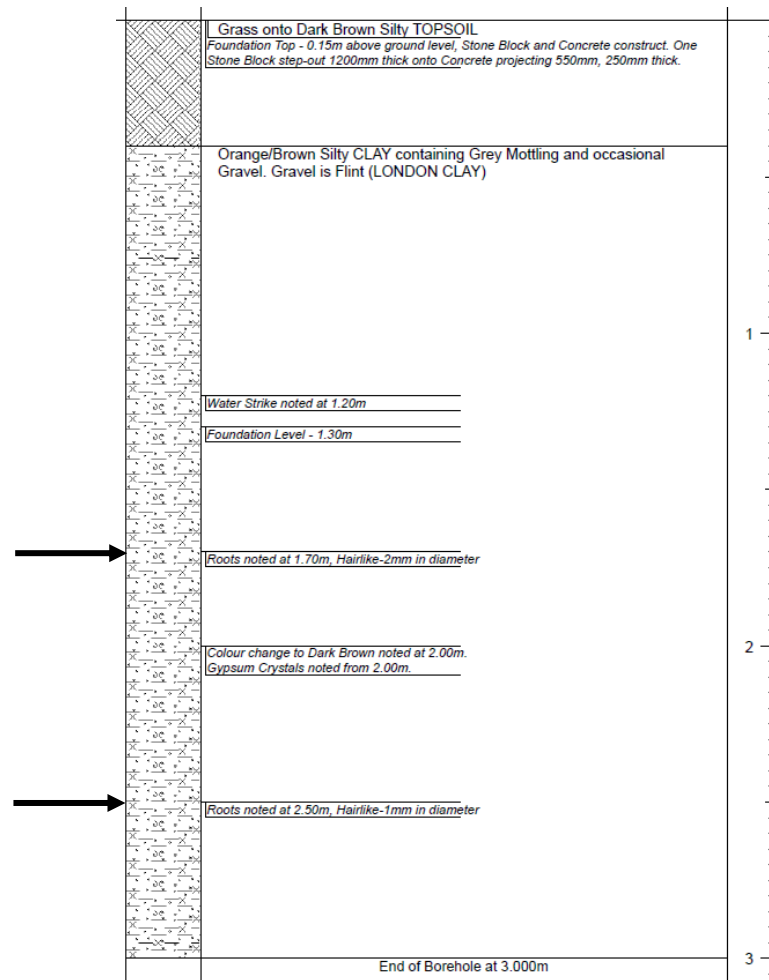


Fig 4 – Borehole log 10m from mature Oak tree on clay soil detailing fine roots to depths of 2.5m indicated with arrows (Source: Tamla Trees project) and annotated soil moisture depletion by trees showing a peak influence at 2m and extending to 5m (above right)

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)	<i>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);</i>	<ul style="list-style-type: none"> T4, T5 & TG1 are all located within adjacent rear gardens and there is a well-established brick-built wall between the trees and the proposal area. Whilst these trees will root below the footing and into the site it is likely that surface rooting has been affected (to a relatively minor level) by the wall footing which is likely to be not <300mm in depth. There is an existing slab surface throughout the rear garden but it will be relatively permeable given the gaps between slabs and its likely only bedded on a minimal (if any) subbase.
4.6.3.(b)	<i>topography and drainage;</i>	<ul style="list-style-type: none"> The site is level (save for a step down from front to rear) and there is nothing to indicate adverse draining conditions (such as water pooling at the base of the tree). The footprint of the proposal is so small that soil moisture distribution will not be affected. (I.e. rainfall into the garden/ RPA areas will even out moisture profiles both laterally and vertically within the clay).
4.6.4.(c)	<i>the soil type and structure;</i>	<ul style="list-style-type: none"> Soil is indicated by the BGS as clay but the existing hard surfacing through the property garden (front to rear) allows safe movement of pedestrians and materials to the work area without an adverse risk of soil compaction. A small area of temporary ground protection will be installed to allow safe movement around the northern side of the structure as it is erected. The wider RPA of retained trees is generally open garden areas. These areas are characterised by established shrub beds, herbaceous borders, and lawns. This means gas exchange and moisture soil infiltration/ diffusion is generally good further limiting the potential impacts.

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.*

- TG1 includes (*Tilia* spp) which shows intermediate tolerance to root disturbance/ pruning. Data is not available for Elder⁴. Given small pad excavations and service hand digging are the only proposed root disturbing action and the low level of incursion and distance from TG1 & T5 we do not envisage any adverse impact.
- It is accepted the proposal is close to the trees but they should be able to tolerate the very minor root damage incurred as a result of pad footing formation and hand digging of the relevant service connections (which track away from the trees) subject to the protection and working measures detailed within this report.

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	-	-	TG1 & T5	<p>Pad Foundations – The proposal places the structure within the RPA area of the identified trees. On an individual level the pad incursions are minimal. The collective impacts are tabulated on the following page. The pads are precast and excavations hand dug. In the event any roots >25mm are encountered during the hand digging scope exists to manipulate the exact position of the stone retaining the root and removing the conflict. This approach has worked well on the delivery of numerous projects of this type. Temporary ground protection around the northern edge of the proposed footprint further limits the risk of adversely affecting the underlying soil (and roots).</p> <p>Services – A service trench to the main property will be hand dug where within retained tree RPA's and pipes or cables will be fed below retained roots >25mm in diameter. It can be fed below the hedge (H1) if retained. Competent contractors are key to the effective delivery of service installations.</p> <p>Landscaping –Further to the proposal being completed there will likely be a need to 'make good.' BS3882 compliant topsoil will be spread/ raked out by hand to a depth no greater than 100mm and any localized shrub and tree planting completed. Areas below retained trees are recommended for mulching with composted bark mulch where possible. We recommend laying a layer of mulch below the structure as this helps moisture retention and suppresses weed growth. Detailed further comment on landscaping proposals is outside the scope of this report.</p>

5.2.2 The relative incursions into the RPA for the pile excavations/ building footprint are as follows.

Tree Number	RPA Total (Sqm)	Incursion (Sqm)	As % of trees RPA
T5	72	21 (b) 5 (p)	29% (b) 5% (p)
TG1	44	2 (b) 1 (p)	4.5% (b) 2% (p)

(b) = Building footprint (p) = Pad footing

5.2.3 It is recognised that BS5837 recommends all structures be placed outside the RPA of retained trees: *5.3.1 The default position should be that structures (see 3.10) are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s) (see Clause 7). If operations within the RPA are proposed, the project arboriculturist should: a) demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA; b) propose a series of mitigation measure.*

5.2.4 It is considered in this instance that there is 'overriding justification' on the basis the incursions are so minimal and construction activities so limited. The remaining garden areas are high quality rooting (soft surface). In addition the footprint of the proposal is already hardstanding which will be removed locally to allow for the installation increasing gas exchange to the underlying soil below.

5.2.5 The remaining free draining soft surface garden areas where the trees root significantly limits the impact of the minor incursion detailed above. These RPA incursion figures for the pads are well within the tolerable range for the trees subject to localised manipulations to avoid any roots >25mm and with remaining areas of soil undisturbed and not covered by existing hard standing or buildings.

5.2.6 The assessed risk based on the likely impact to the health and safety of the retained trees on the basis that all the tree protection measures outlined within this report are implemented and maintained for the duration of all site works is summarised below:

Tree & Development Risk Indicator							
^							
<ul style="list-style-type: none"> Our assessment has confirmed the presence of probable underlying CLAY soil Ground and tree protection and the underlying gravel soil lessens the real risk of damage. The Tree & Development Risk Indicator (TDRI™) is therefore LOW. Note: This level of risk is 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 CLAY subsoil. 							

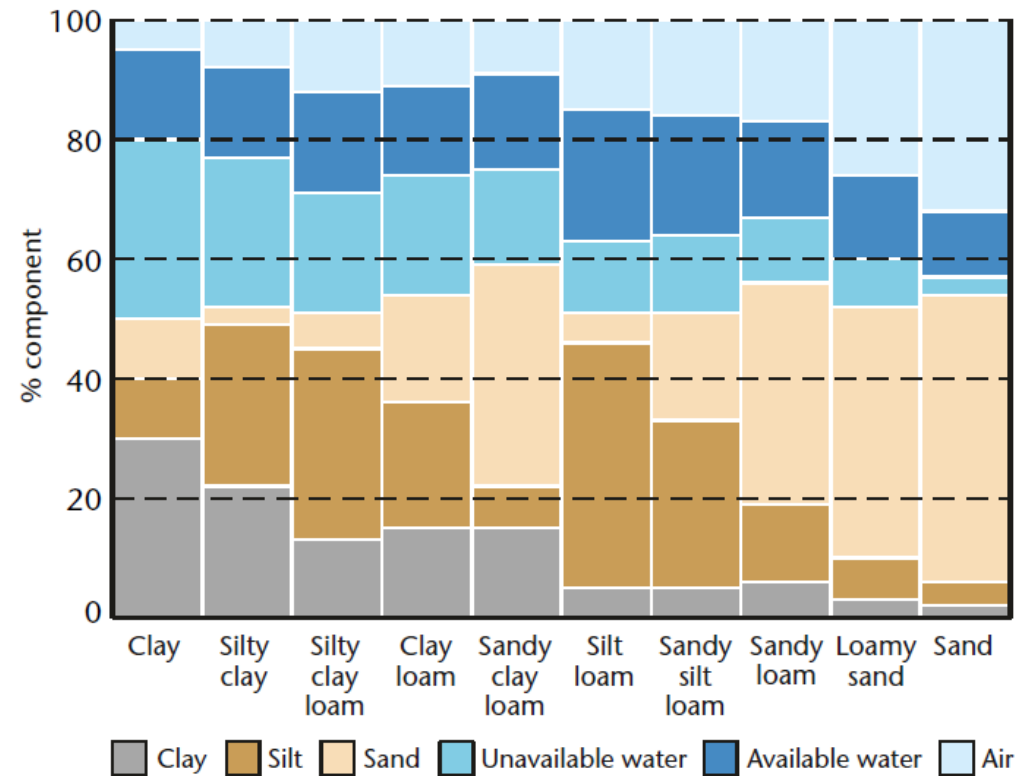


Fig 6 – Diagram showing the typical particulate composition and air/ water content at field capacity for mineral soil types⁵ The variation in soil type has a direct bearing on the potential impact of adverse construction techniques (such as soil compaction) as well as overall root system morphology & 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 underlying clay means bound moisture within soils remains at a high level.

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

5.3 Tree Loss

- 5.3.1 No trees are proposed for removal or pruning to facilitate the proposal. H1 is outside the scope of Conservation Area legislation given form and stem diameter meaning no formal notification is needed prior to undertaking removal or pruning works.

Tree Surgery

Tree No.	Species	Proposed Tree Works	BS Cat

Proposed Removal

Tree No.	Species	Proposed Tree Works	BS Cat

- 5.3.2 **Birds** - In the event future tree works will 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).
- 5.3.1 The Conservation Area designation allows the local authority to retain control over the pruning of the trees and a s211 notification is required in the event of any works being required. The process takes 6 weeks. Further information can be found here: <https://www.westminster.gov.uk/planning-building-and-environmental-regulations/planning-applications/trees-and-high-hedges>

Tree Pruning Indicator



- The canopy of T5/ TG1 will likely grow towards the proposal although suitable clearance appears to exist at this time.
- Council retains control over works by way of Conservation Area meaning a s211 Notification is required before works can be completed. Please note this process takes 6 weeks.
- **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>

5.4 Demolition & Foundations

5.4.1 The existing small storage unit and paving lifted as required, area to be cleared by hand prior to installation.

Existing Shed Removal



Overview

- Existing structure (shown left) removed by hand to provide access to/ clear work area.
- Paving slabs lifted as required.
- H1 visible (left).

Threat Level to Retained Trees

LOW

5.4.2 The tree protection process is summarised below:

Stage 1

- Tree and ground protection measures installed.
- Existing storage unit removed/ slabs lifted by hand. Building location marked out

Stage 2

- Pad locations marked out and confirmed by engineer
- Pad locations excavated by hand and manipulated in position in the event any root >25mm is encountered.
- Garden room constructed.

Stage 3

- Service trench hand dug as required retaining tree roots >25mm, services fed below H1 as required.
- Ground protection remains in place for duration of all works and is removed upon completion.

- 5.4.3 T1 and T3 will be basally shuttered with bespoke plywood frames given branch heights and space does not allow for panel (herras) fencing. Please refer to the plan at Appendix 6 for further information on locations.

Tree Protection



Overview

- *Tree protection required internally to site (T1 & T3).*
- *Installed prior to any onsite works.*
- *Note: To be marked with signs (inset) and purpose to be briefed to all ground workers.*
- *Maintained for duration of the build.*
- *Bespoke plywood frames as indicated at Appendix 6.*

Threat Level to Retained Trees

LOW

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



e: info@tamlatrees.com w: tamlatrees.com o: 01252 811 233
Tamla Trees Registered England & Wales Companies Act 2006 Reg No: 08815629

Fig 7 – 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

5.3.2 **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 Pad footings will be utilised.

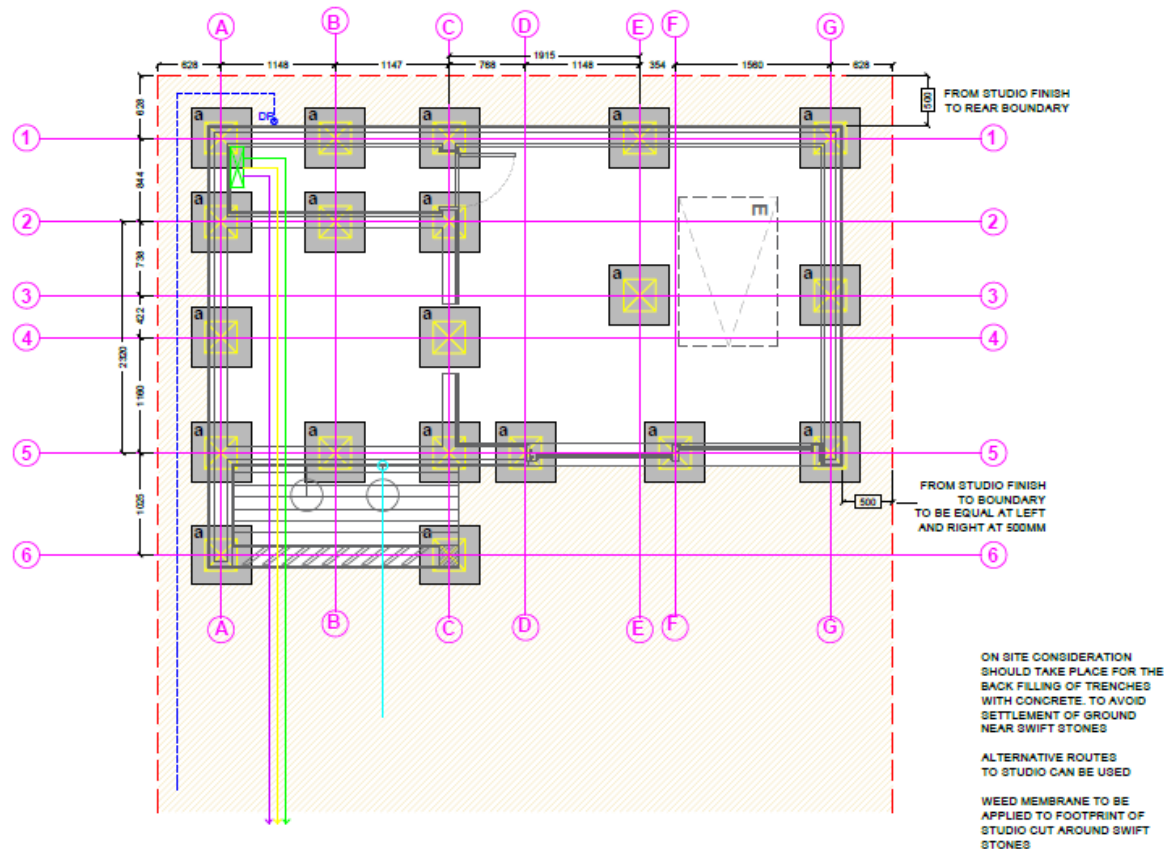
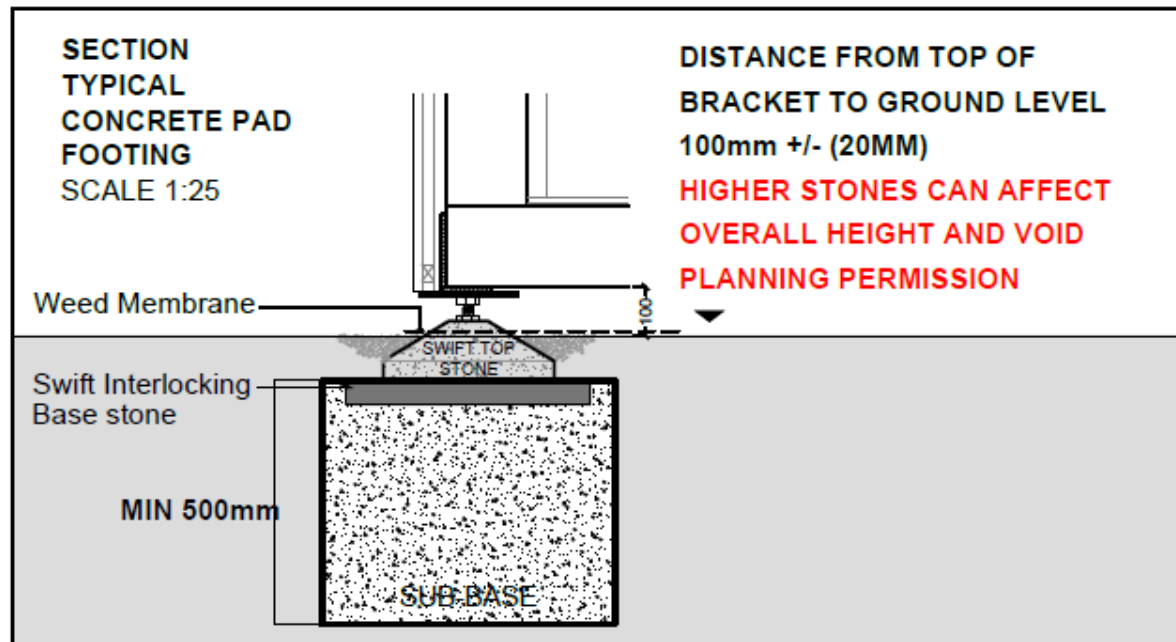


Fig 8 – Foundation overview.

- Pad footing arrangement shown left.
- The level of works is such that no special foundation measures other than careful hand digging are proposed.
- In summary at this level and in these locations, we believe there will be no discernible impact on the health or stability of retained trees subject to localised manipulations to avoid any roots >25mm.

5.4.6 Pad footing is precast and located within hand dug hole manipulated in position to retain any root >25mm encountered on site.

Pad Footing (cross section)



Overview

- *Marked out on site.*
- *Carefully hand dug.*
- *Any root over 25mm in size retained and pad location repositioned to accommodate retention.*
- *Competence and understanding of ground workers key to successful delivery.*

Threat Level to Retained Trees

LOW

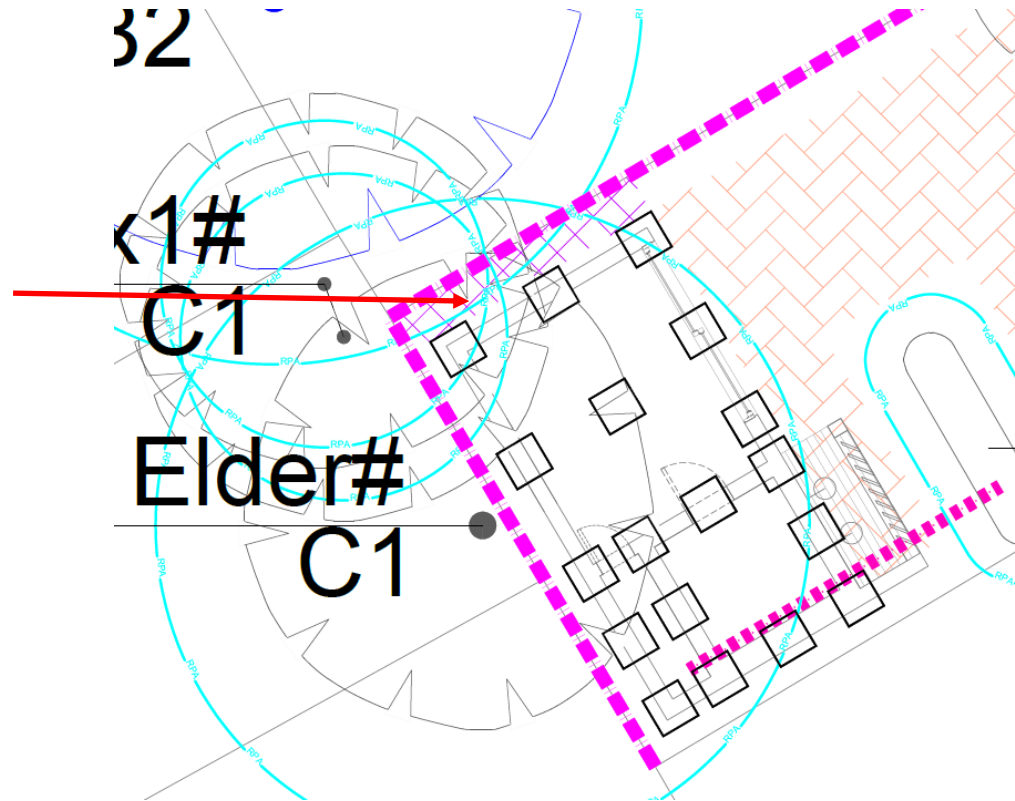
5.4.7 Pad locations are hand dug and repositioned in the event roots >25mm are encountered:



Fig 9 – Sample excavations for similar projects where careful hand digging is used and pad locations manipulated to reflect the presence of any root >25mm in diameter.

5.5 Surfaces near Trees

- 5.5.1 Temporary ground protection will be laid to the north of the proposal to allow access. Access is through the existing garden which already benefits from hard standing.



- Existing site access away from retained trees. Access through property garden limits size of machinery and materials which can be brought on to the site. This access route is already hard standing.
- Ground protection laid prior to any on site works (north of the proposal).
- Manipulated on site to reflect existing flower beds/ shrubs and trees as appropriate.

Fig 10 – Temporary ground protection will be installed in the small area to the north of the proposal.

5.5.2 Tree protection measures are presented in Appendix 6. The structure itself is a prefabricated building carried to position in premade panels by hand.



		VEHICLE WEIGHT (TONNES)															
		5	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
LiteTrack THE BEST VALUE ON SITE	PEDESTRIAN	COMFORTABLE	CAUTION														
	VEHICLE																
ZappMat CORPORATE BRANDED GROUND MATS	PEDESTRIAN	COMFORTABLE		CAUTION	BETTER TO USE MULTI TRACK												
	VEHICLE																
TrakMat THE BEST KNOWN NAME IN MATS	PEDESTRIAN	COMFORTABLE		CAUTION	BETTER TO USE MAXITRACK												
	VEHICLE																
MultiTrack THE UNBREAKABLE ORIGINAL	PEDESTRIAN	COMFORTABLE		CAUTION	BETTER TO USE MAXITRACK OR XTREMEMAT												
	VEHICLE																
MaxiTrack THE WORLD'S MOST HEAVY DUTY NON-SKIDABLE TRACKING MAT	PEDESTRIAN	COMFORTABLE			CAUTION	BETTER TO USE XTREMEMAT											
	VEHICLE																
XtremeMats THE ULTIMATE MATTING AND CONTAINMENT SYSTEM	PEDESTRIAN	COMFORTABLE								CAUTION							
	VEHICLE																

These loading guides are for firm, dry ground. If the weather is likely to turn wet, or the job duration is in excess of a week, please ask for advice about using a stronger product.

LITETRACK ZAPPMAT TRAKMAT MULTITRACK MAXITRACK XTREMEMAT

Fig 11 – An assessment of what type of tracking material is required will be relative to the form of access. In this instance only pedestrian/ access within the surface area appears to be required but this should be confirmed with the construction firm prior to any on site works.



Fig 12 – Temporary ground protection is an effective way of allowing access through the RPA of retained trees. It must be installed prior to any on site activity and maintained for the duration of all works to be effective. Above left Tamla Trees project ground protection in place and above right being removed following the completion of site works. (Note: depending on the length of time it is in place it will adversely affect underlying grass ground cover which will need reseeded/ turfed accordingly)

5.6 Site Service Provision

5.6.1 The new garden room requires a service connection to the main property and this will be hand dug:

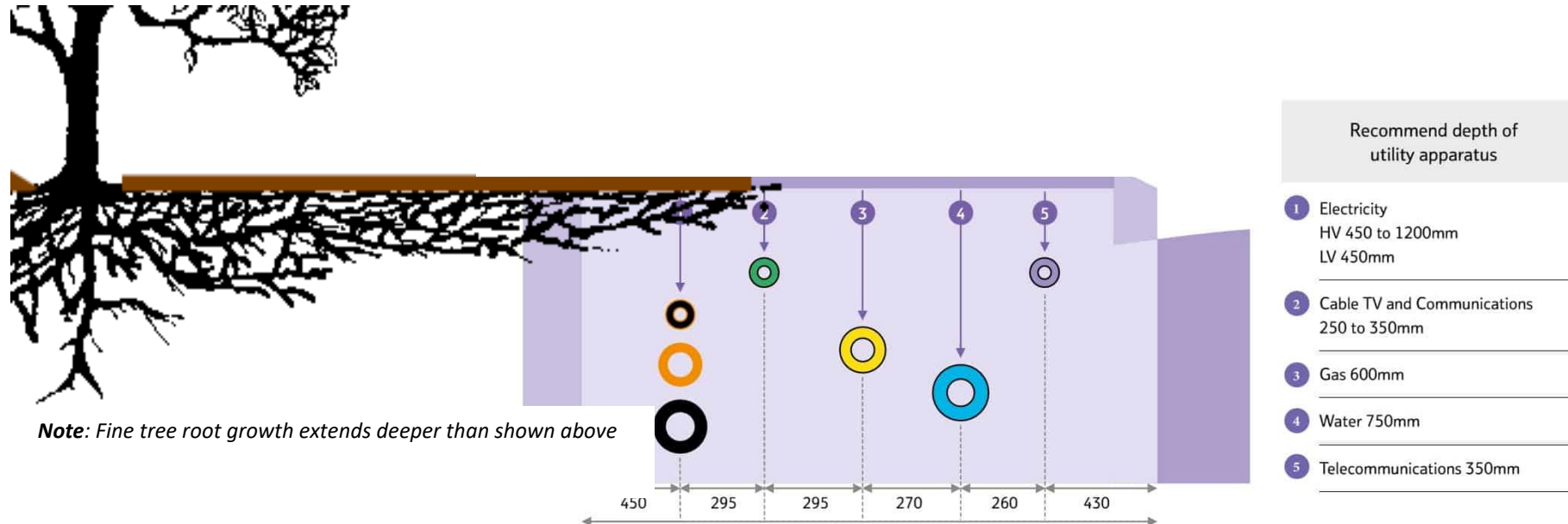


Fig 13 – Annotated service installation depth drawing (source: Thorne & Derrick). Service installations occupy the same soil volume/ depth where the greatest level of tree roots will likely be found but on this project, none are proposed.

5.6.2 The new service trench will be hand dug (mainly due to access issues as it will not adversely affect retained tree RPA). utilising the hand digging principles detailed within this report where it is within the RPA of retained trees. All roots >25mm in diameter will be retained with service fed below them where relevant.

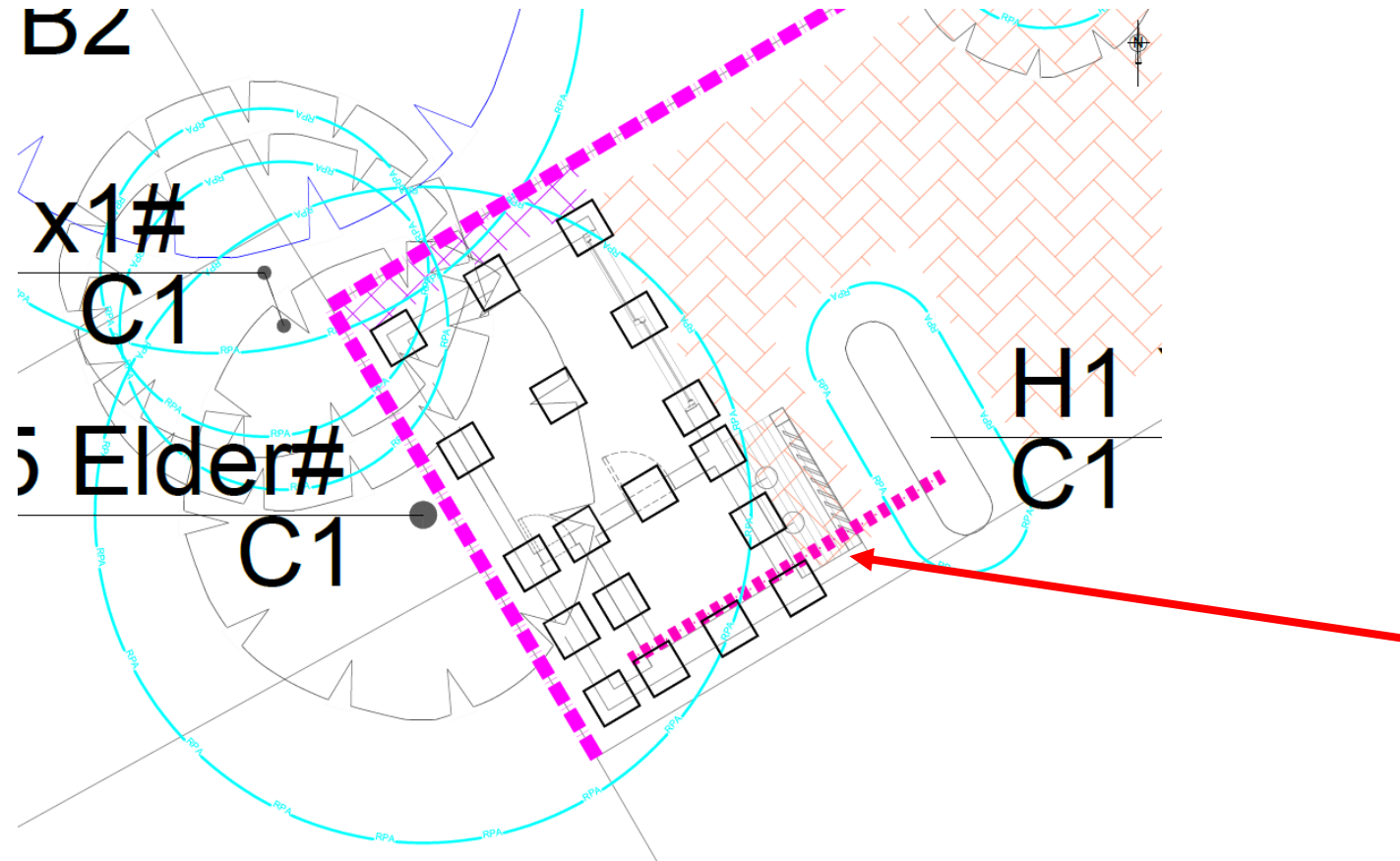


Fig 14 –Any services that pass through the RPA of trees will be hand dug. Note: roots may be encountered outside of RPA's and should be retained. Scope exists to feed below H1.

- 5.6.3 **Planning the excavation:** Mark out proposed excavation area and have toolbox talk.
- 5.6.4 Digging around tree roots is a skill and operatives must proceed with caution. Once (and if) 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.
- 5.6.5 **How deep:** The excavation need only be as deep and wide for the relevant service. Any exposed roots must be covered/ wrapped in hessian if being left uncovered for longer than 12 hours.

 <p>Narrow Face Spade & Hand Trowel</p>	 <p>Stiff Hand Brush</p>	 <p>Hi Vis Paint (for spot marking roots)</p>	 <p>Hessian (to wrap exposed roots)</p>	 <p>Duct Tape (to secure hessian)</p>
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Fig 15 – Advised tools for any hand digging activity

5.6.6 To limit maintenance impact to the garden room from leaf drop given the proximity/ overhang of trees it is proposed that [gutter guards](#) be installed.



Fig 16 - Suitable gutter guards (2 types shown above) should be fitted to ensure that leaf drop from adjacent trees does not block new guttering leading to potential pressure for tree works.

5.7 Ground Level Changes

- 5.7.1 No ground level changes within the RPA areas of retained trees are proposed other than pad stone footings detailed elsewhere. Following completion of the project any '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. We encourage the use of composted bark mulch below tree canopies where possible to aid water retention and increase soil microbial activity.



Fig 17 – In the event of 'making good' topsoil will be BS3882 compliant and raked out by hand to no greater depth than 100mm

5.7.2 We recommend the use of composted bark mulch where possible within the retained tree RPA's. As well as aiding water retention and increase soil microbial activity it can design out issues associated with leaf and needle drop or lawns not establishing close to mature 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

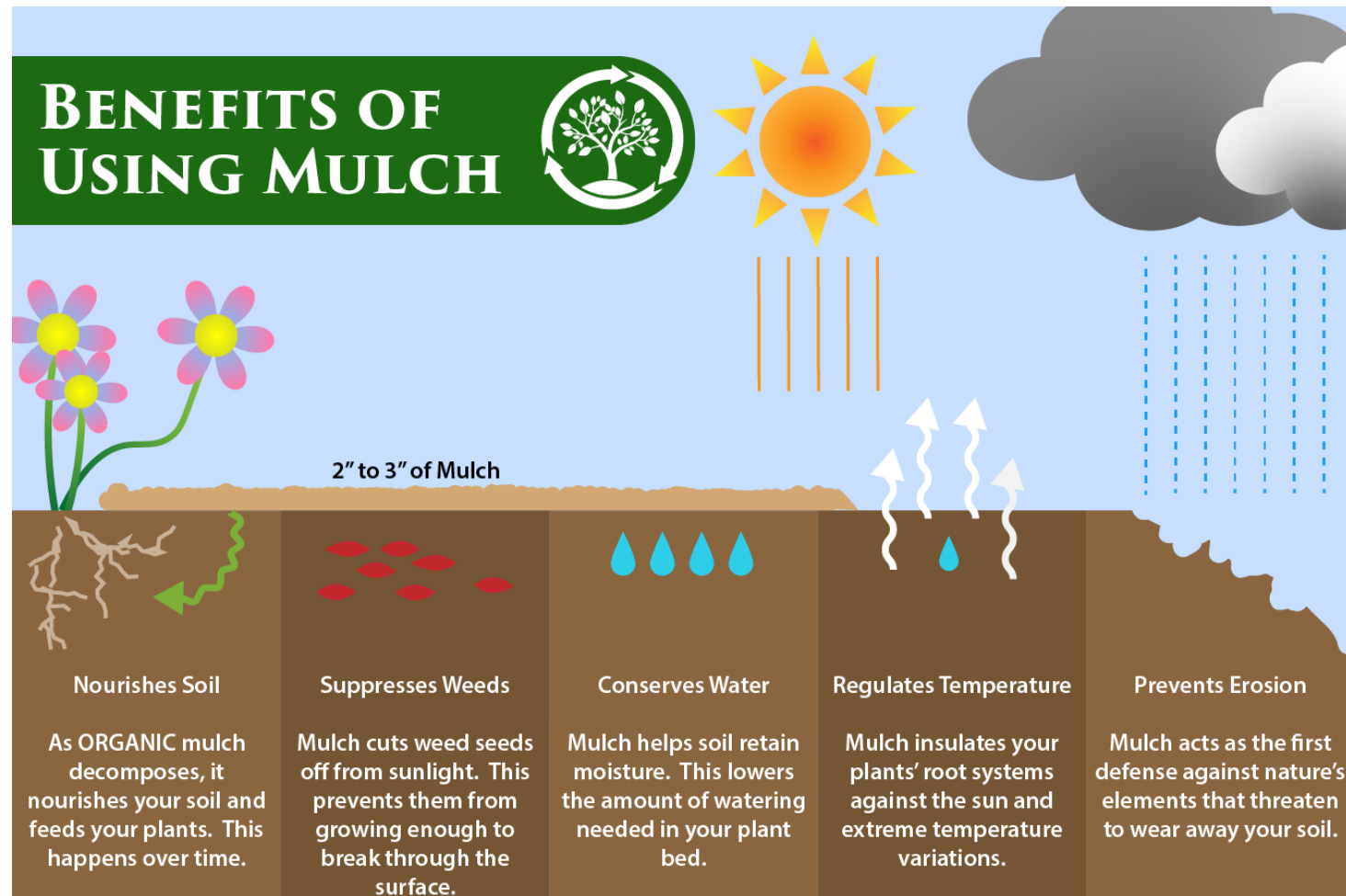



Fig 18 – Benefits of Mulch (Image Source 1st Stop Landscape Supply (US))

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 <ul style="list-style-type: none"> • 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 The nature of the design is such that it benefits from large, glazed areas maximizing light penetration. It is also not part of the permanent residential property. Shading is therefore not considered of issue.

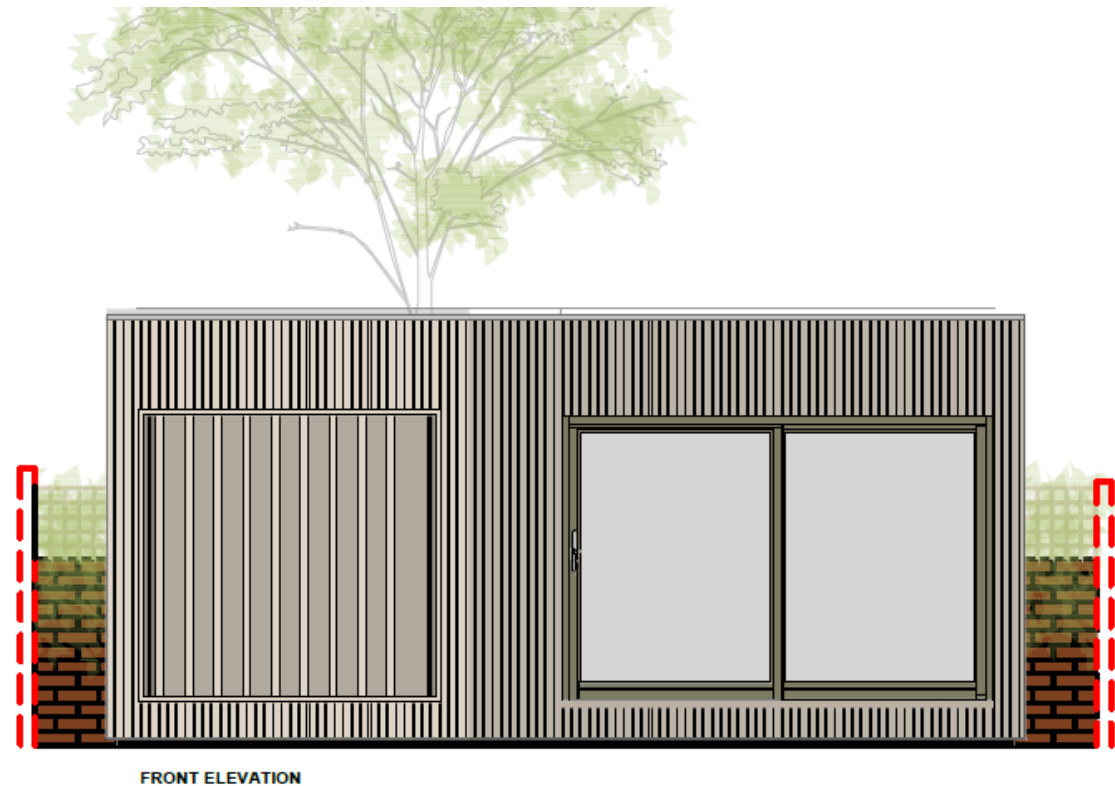


Fig 19 – The extent of glazing maximizes light penetration

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. However, the minimal issues associated with these projects is such that a scheme of site inspections is considered disproportionate to the risks posed. On this basis no supervision is proposed.

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	<ul style="list-style-type: none">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 declineTrees 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 <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			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	Lime	0.42	1	15	3.6	4.5	4	5	B2	Mature	> 40	3	Some localised stem decay around pruning wounds. Hard standing at base. Historically managed as pollard.	No works but repeat crown reduction/ pollarding advised at 5–7-year intervals.	5
T2	Lime	0.45	1	15	3.8	3.2	4	4.6	B2	Mature	> 40	3	Some localised stem decay around pruning wounds. Hard standing at base (partial). Historically managed as pollard. 3rd party tree with no access to inspect.	No works but repeat crown reduction/ pollarding advised at 5–7-year intervals.	5.4
T3	Apple	0.14	1	4	1.8	1.9	2.4	2.2	C1	Early mature	20 to 40	1.6	Establishing fruit tree.	No works	1.7
T4	Lime	0.45	1	16	4.5	4.5	4	4.5	B2	Mature	> 40	3	3rd party tree with no access to inspect. Limited visibility.	No works	5.4

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							
T5	Elder	0.4	M/S	8	4	3.7	3	4.4	C1	Mature	10 to 20	4	High clearance over site. 3rd party tree with no access to inspect. Some decay visible. Thinning canopy.	No works	4.8
TG 1	Lime x 1, Elder x 1	0.2	1	6.5	2.8	3	2.7	3	C1	Semi-mature	20 to 40	1.8	Close grown small 3rd party trees with no access to inspect. Wall between site and trees.	No works	2.4
H1	Yew	0.08	M/S	2	0.4	0.4	0.4	0.4	C1	Early mature	> 40	0	Small hedge.	No works	1

Appendix 4 – Tree Works Schedule

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

Tree Surgery

Tree No.	Species	Proposed Tree Works	BS Cat

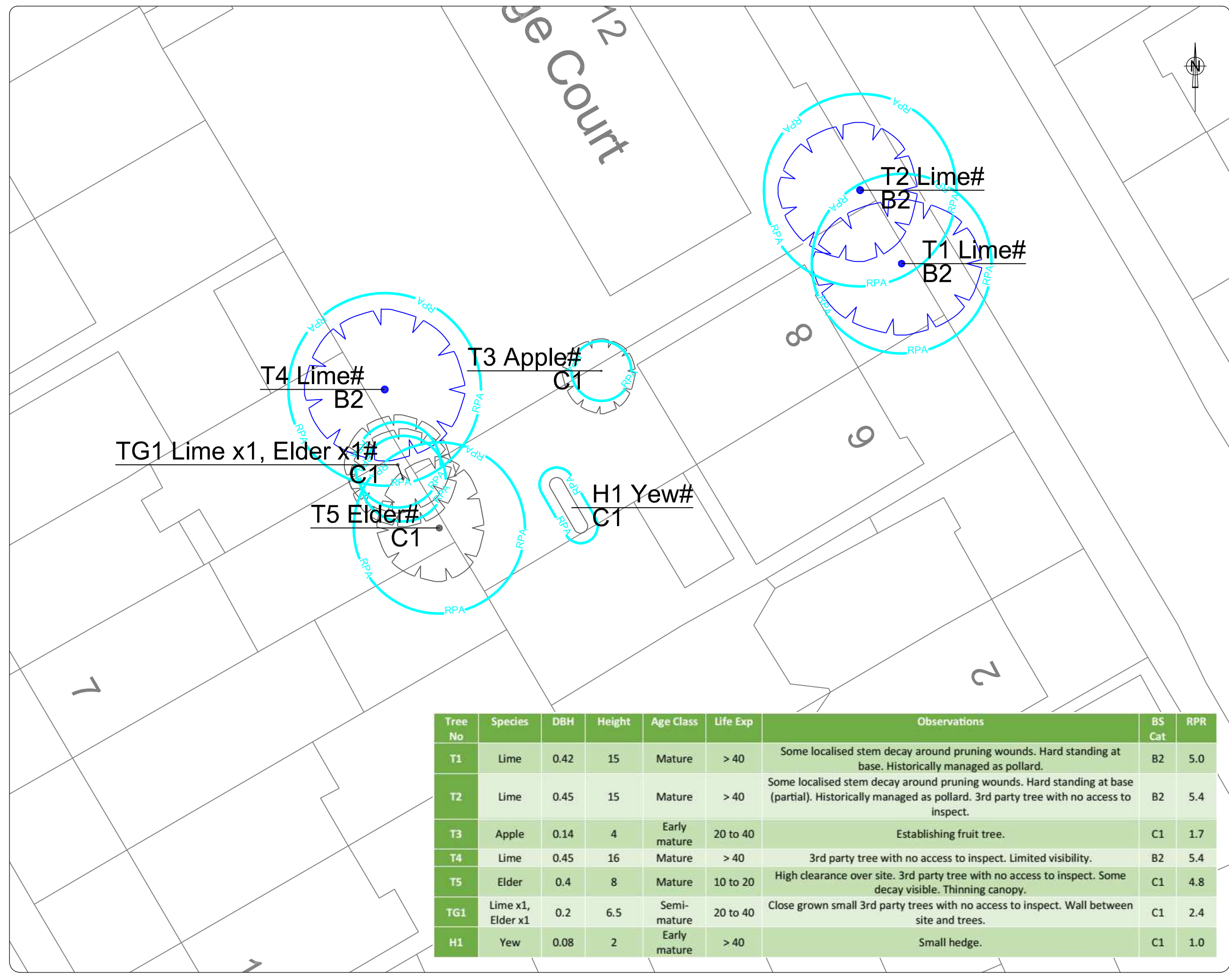
Proposed Removal

Tree No.	Species	Proposed Tree Works	BS Cat

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



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Tree Survey Drawing Key

Root Protection Area m2
Tree Canopy Extent
Stem Location / Coloured disc denotes BS: 5837 Category
Tree Number

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

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

REV	AMENDMENTS	DRAWN DATE	AUTH'D

PROJECT

8 Aldridge Road Villas, London, W11 1BP

CLIENT

J Arbutnot

TITLE

Tree Constraint Plan (TCP)

Job	Scale	DRG NO	Revision
03661R	1:200 @ A3	03661P_TCP_01	-
Date	Type		
07/10/2021	a		

Tel: 01252 811 233

Email: Info@tamlatrees.com

Web: www.tamlatrees.com

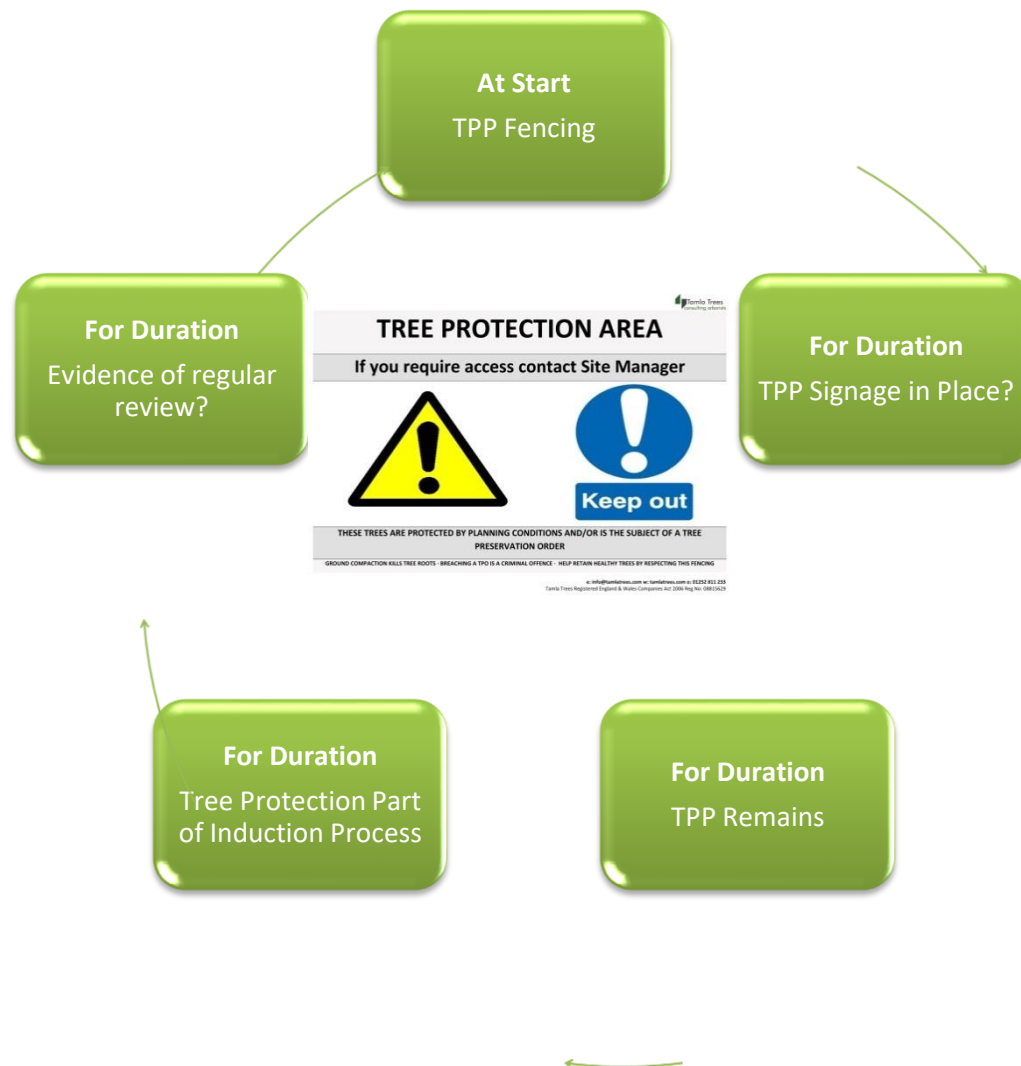
Appendix 6 - Tree Protection Plan

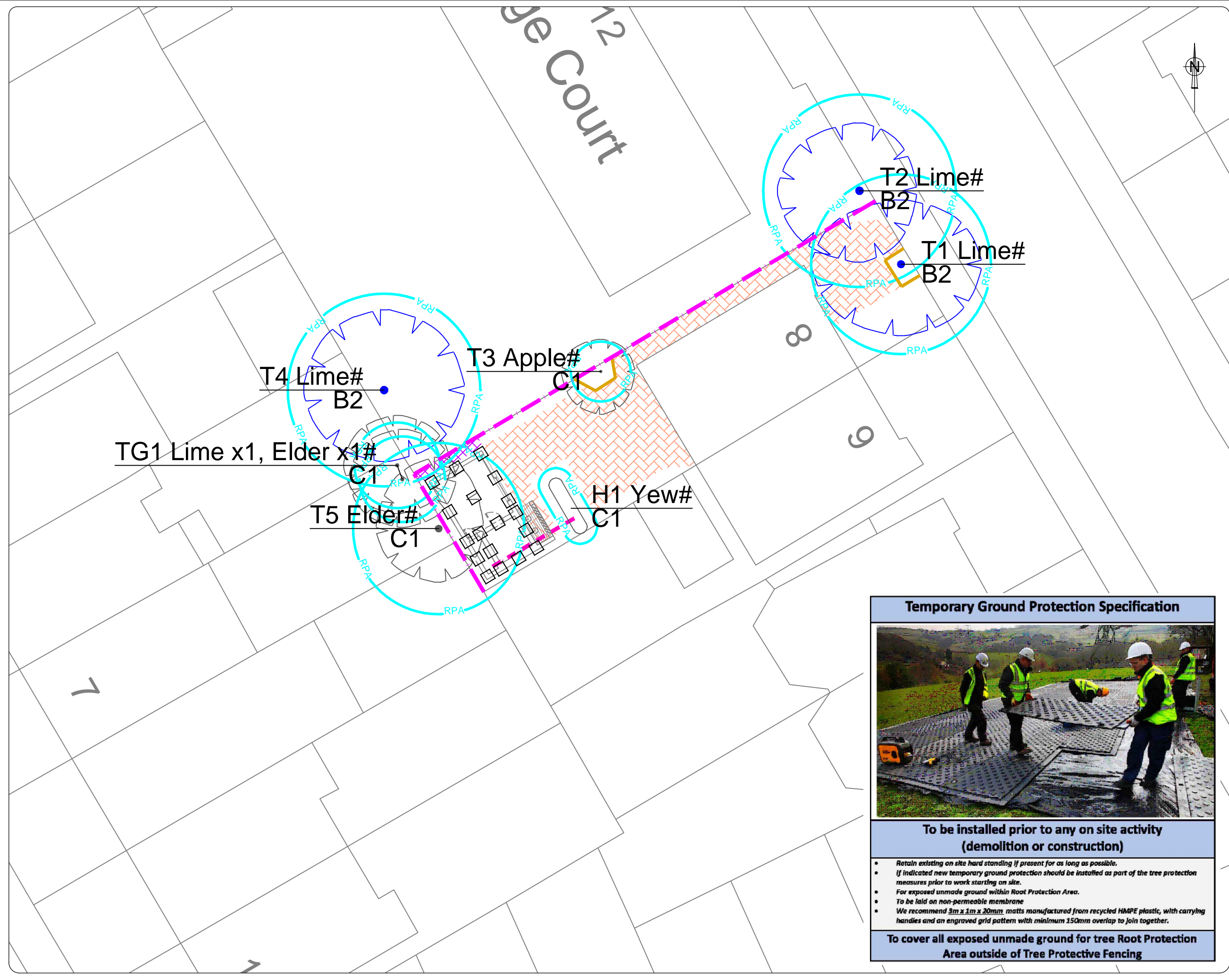
Tree protection is essential to successfully integrate the proposal into the surrounding trees. It is designed to manage the impact on the underlying soil and rooting environment. It must therefore be installed prior to any further site activity. Even apparently minimal tracking of the soil near trees 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.
- Site operatives to be briefed on ground protection prior to work commencing.
- Physical tree protection provided by bespoke plywood frames.







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Tree Survey Drawing Key

Root Protection Area m2
Tree Canopy Extent
Stem Location / Coloured disc denotes BS: 5837 Category
Tree Number

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

Piles to support suspended floor slab

Services

Tree protection - Plywood Frame 1.2m tall

Existing boundary acting as protective fencing

Temporary ground protection

Existing hard surface

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

REV AMENDMENTS DRAWN DATE AUTH'D

PROJECT
**8 Aldridge Road Villas,
London,
W11 1BP**

CLIENT
J Arbutnot

TITLE
Tree Protection Plan (TPP)

Job	03661R	Scale	1:200 @ A3	DRG NO		Revision	
Date	08/10/2021	Type	a	03661P_TPP_01		-	

Tel: 01252 811 233
Email: info@tamlatrees.com
Web: www.tamlatrees.com

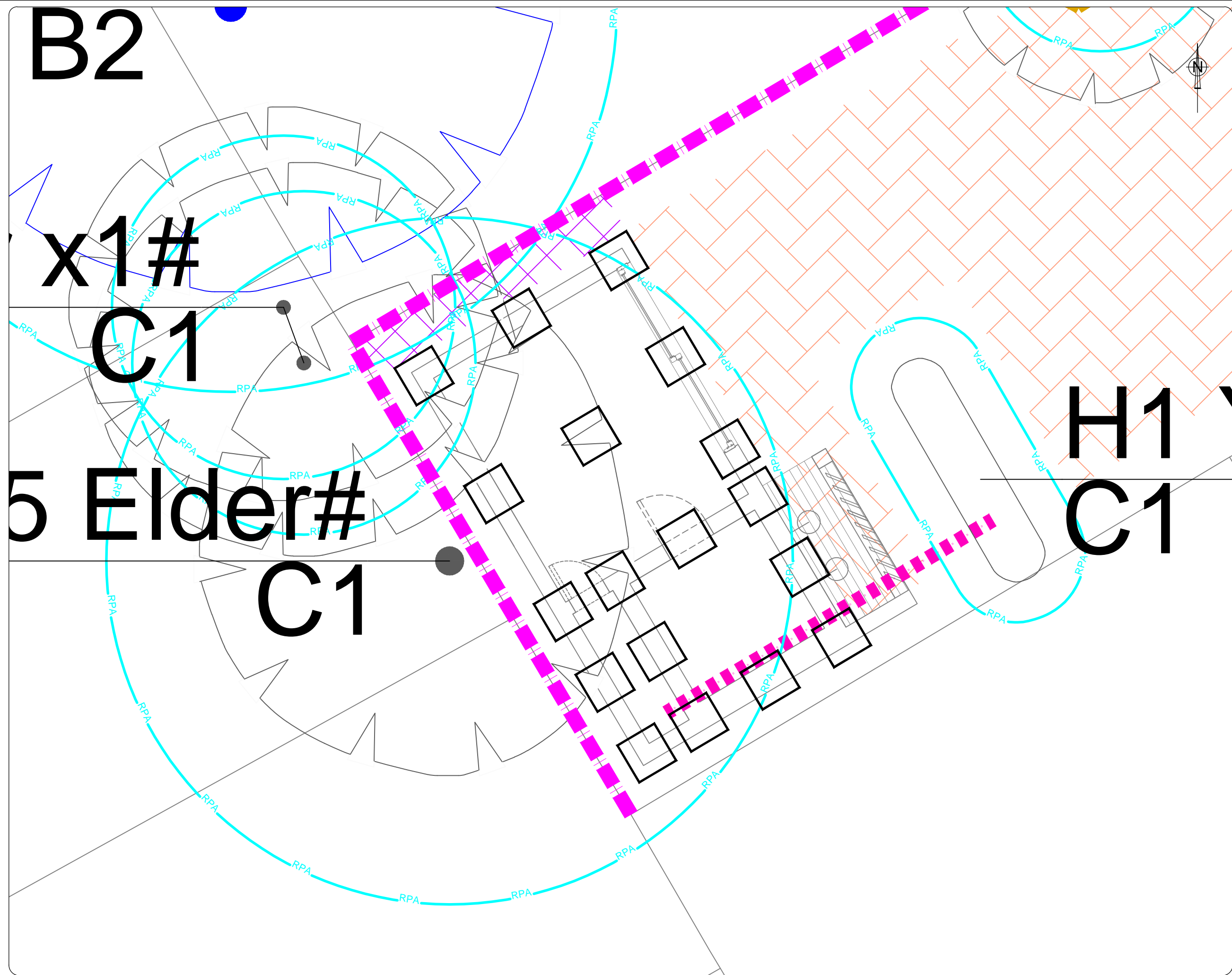
Tamla Trees
consulting arborists

Temporary Ground Protection Specification

To be installed prior to any on site activity (demolition or construction)

- Retain existing on site hard standing if present for as long as possible.
- If indicated new temporary ground protection should be installed as part of the tree protection measures prior to work starting on site.
- For exposed unmade ground within Root Protection Area.
- To be laid on non-permeable membrane
- We recommend 3m x 1m x 20mm mats manufactured from recycled HDPE plastic, with carrying handles and an engraved grid pattern with minimum 150mm overlap to join together.

To cover all exposed unmade ground for tree Root Protection Area outside of Tree Protective Fencing



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Tree Survey Drawing Key

Root Protection Area m2
Tree Canopy Extent
Stem Location / Coloured disc denotes BS: 5837 Category
Tree Number

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

Piles to support suspended floor slab

Services

Existing boundary acting as protective fencing

Temporary ground protection

Existing hard surface

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

REV	AMENDMENTS	DRAWN DATE	AUTH'D
-----	------------	------------	--------

PROJECT
**8 Aldridge Road Villas,
London,
W11 1BP**

CLIENT
J Arbutnot

TITLE
Tree Protection Plan (TPP)

Job 03661R	Scale 1:50 @ A3	DRG NO 03661P_TPP_02	Revision -
Date 08/10/2021	Type a		

Appendix 7 – Site Photographs



Image 1 – Proposal area with T5 visible



Image 2 – Existing hard standing

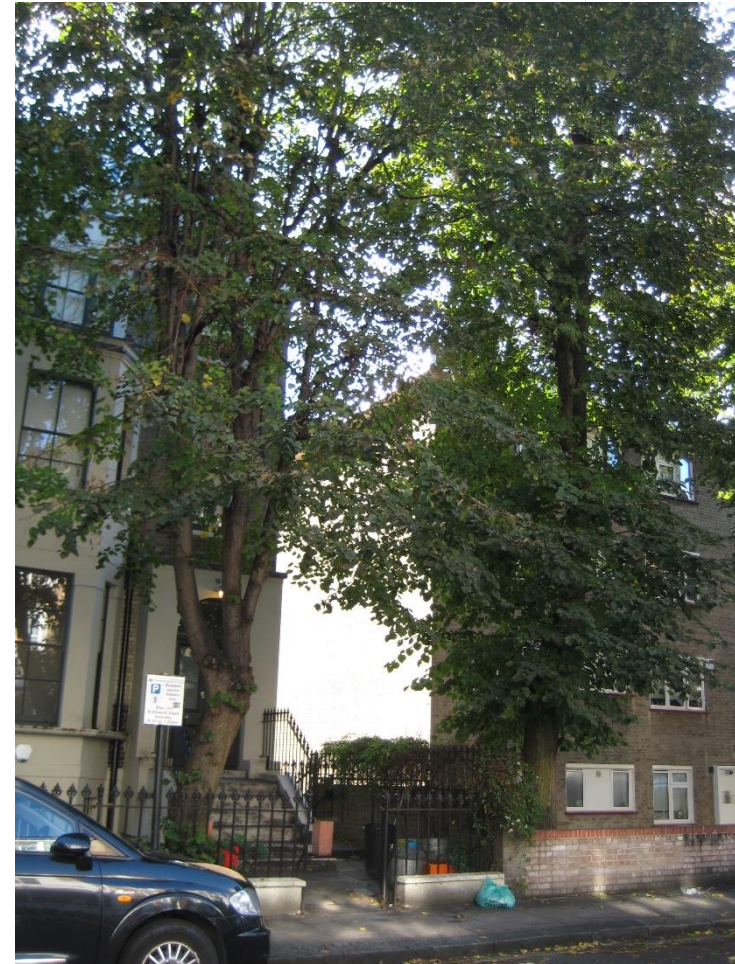


Image 3 –Front access with T1 (left) and T2 (right)

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.