Arboricultural Report

Planning and Development

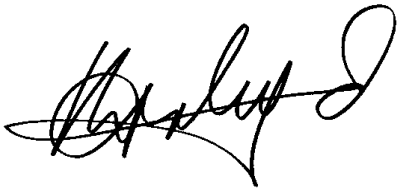
Arboricultural Appraisal and Impact Assessment

Project Name and Address	**47a Lower Mortlake Road, Richmond TW9 2LW**		
Prepared for	DP9 Planning	**Project Ref**	-
ACS Ref	ha/aiams2/20/47aLMR	**Client**	Westlake Property Ltd
Prepared by	Hal Appleyard Dip. Arb (RFS), F.Arbor. A. MICFor RCArborA		
Report Date	7th February 2020		

Tree Tops | 2 Redwood Mount | Reigate | Surrey | RH2 9NB

T: 01737 244819

London – Office Eighty-Five | 272 Kensington High Street | London | W8 6ND



Hal Appleyard is an Arboricultural Association Registered Consultant and a Chartered Forester

ACS (TREES) Consulting

List of Contents

Part One – Impact Assessment
1.0 Introduction & Scope
2.0 Site, Trees and Implications
3.0 Summary and Conclusions

Part Two – Tree Protection Methods
4.0 Tree Protection Methods & Site Monitoring
5.0 Precautions during Landscaping
6.0 General Site care (tree protection)

Appendices

1. Tree Survey Schedule (BS5837:2012)
2. Tree Protection Plan TPP1_LMR_47a
3. Recommended tree and ground protection
4. Example of a site monitoring record
5. Manual digging near trees – methods of tree protection

Executive Summary
The proposed development involves the construction of 16 co-living units and associated works in a vacant storage yard. Although there are no trees on the site, three lie within the sites vicinity. Two of the trees in question are located within the pavement of Lower Mortlake Road and one in the front garden area of a neighbouring property to the rear of the site.
This report assesses the impact of the proposals upon the trees as neutral. It is however recommended to implement standard tree protection measures, including barriers and root/ground protection as a sensible precaution during construction work.

PART ONE

1.0 Introduction and Scope

1.1 A planning application described as 'Construction of a part 2/3 storey building to provide 16 co-living units (sui generis), associated internal and external communal facilities, and bicycle parking spacing'
is to be submitted for consideration by the Local Planning Authority.

1.2 The proposed construction is to be undertaken in the vicinity of trees. The implications upon the trees and the methods for tree protection and preservation during ground works, demolition and construction are set out in this report and which includes a requisite a tree protection plan.

1.3 I have been appointed on behalf of the site owners as a competent and qualified arboricultural consultant to provide this report and to supervise any works that may have the potential to affect the protected and retained trees.

1.4 The trees have been inspected on 28th January 2020. The details are provided in accordance with the guidance set out in BS 5837:2012 'Trees in relation to design, demolition and construction- Recommendations' (the BS) and an extract from that guidance is appended herewith. The root protection areas (RPAs) of the relevant trees are indicated upon the plans.

2.0 The Site, Trees and Implications of Proposals

2.1 The site currently comprises a vacant plot of land supporting only a low level out building. Much of the land has a covering of concrete. The site is accessible via a vehicular gate and a crossover the pavement of Lower Mortlake Road. A public pedestrian path runs adjacent to the site's western boundary and residential houses adjoin the eastern and northern sides, with Lower Mortlake Road to the south. The site is bound by high brick walls.

Fig. 1
Looking North into the site.

2.2 The BS details of the trees are provided within the tree survey schedule at **Appendix 1** and their corresponding positions are shown on the tree protection plan included at **Appendix 2**.

2.3 The trees, which are most relevant to this project include T1 and T2 a London Plane and a Whitebeam respectively. Both trees are growing within the pavement of Lower Mortlake Road and are under the management of the Richmond Council.

2.4 T1 is a pollarded London Plane and is in its early stages of maturity. The tree leans slightly to the west and minor lifting of shallow roots is present at the base. The tree is typically vigorous, with normal long new shoots having developed following pruning to pollard the tree at around 7m from the ground. Some low, young shoots grow out over the access crossover to the site. It is possible that roots from this tree have extended into the parking bay directly to its south and under the surfaces of the crossover to the site.

2.5 The Whitebeam T2 is carries a dense canopy of shoots, which have been darkened by general atmospheric particulates. The tree is growing normally but such species often suffer from road salt and are generally stressed. The roots of this tree will be growing under the surfaces of the pavement but are unlikely to extend to a significant degree under the crossover.

Fig. 2 Whitebeam in the foreground and the London Plan flanking the cross over to the site.

2.6 The BS at para. 5.3 recommends that applicants should provide justification for conducting construction works within the BS root protection area (RPA) of trees to be retained. The extent of proposed works within the BS root protection areas and the justification for same, is set out in Table 1 below:.

Table 1 Construction Activities within RPAs of trees

Tree Ident.*	Maturity	Vitality	% of RPA*	Tolerance** Acceptability	Justification/Recommendation
1 London Plane	Middle Aged	Normal	0	High	Root spread unlikely to extend into the proposed construction site
			20	High	Installation of additional ground cover to protect crossover and potentially underlying roots
			5	High	Installation of utility trench retaining roots over 25mm diameter and excavating manually within RPA
2 Whitebeam	Middle Aged	Normal	0	High	Remote from construction area
3 Silver Birch	Mature	Normal	0	High	Remote from construction area Foundations of boundary wall restrict root spread into site

* % of BS RPA used for construction or construction traffic
** Tolerance to construction activities is described as High (no adverse effects); Medium (potential for temporary stress, mitigation recommended) and Low (Potentially unsustainable adverse impacts, tree replacement to be considered)

2.7 Subject to the implementation of the tree protection measures from the outset of construction, the trees will not be adversely affected by the proposals.

Table 2 **Proposed/Recommended Tree Works**

Tree Works (Spec.)	Tree Nos	Visual Landscape Impact of Works*	Space Available for Replacement Planting(Y/N)	Comments
Crown lift to 3.0m (Sp4 & 10)	T1	None	-	Minor over-hang of minor shoots over current vehicular access
Total		None		

*This is a preliminary visual appraisal based upon the opinion of the author having inspected the trees in the context of their current surroundings. – None (no change or beneficial impact) Negligible or indiscernible difference to treed landscape; Low – Noticeable but mitigated by retention of other landscape trees and features; Medium – Obvious but temporary alteration to the treed landscape; High – Obvious and permanent alteration to the landscape.
Visual receptors include the public or community at large, residents, visitors or other groups of viewers together with the visual amenity of potentially affected people.

Specifications for recommended tree works:

General

All work is to conform to BS 3998:2010 'Tree work – Recommendations' and with current arboricultural best practice. Tree works are to be undertaken by a professional and specialist arboricultural contractor, who carries the appropriate experience and insurance cover, equipment and PPE. All works and processes are to comply with all relevant Planning, Wildlife, Environmental, Conservation and Health and Safety legislation.

Sp4.Crown lifting includes the removal of the lowest lateral branches and shoots, (which would not result in irrevocable tree injury), to a specific height above ground level measured in metres.

Sp.10 Removal of Epicormic Growth and Suckers (Brashing). Epicormic growth is any amount of shoots arising from activated buds situated at bole of the tree and on the main stem(s), the base of the crown. Sucker growth is shoots arising either from the bole of the tree or from roots belonging to a tree. Epicormic Growth, Suckers and low branches shall be removed by use of a hand saw or secateurs to a height above ground level of no less than 2.5m.

Table 3 Summary of Implications of Construction on Trees*

Tree Ident.*	Landscape Contribution	Implications /Impact	Mitigation measures	***Tolerance[1,2]	Impact Assessment**
T1	Medium	Construction vehicles passing over potential rooting area Utility installations	1. Erect tree protection hoarding 2. Install ground protection over crossover 3. Manual installation of utility trenches within RPAs 3. Monitor tree protection during construction	High	Neutral
T2	Low	Remote from construction	1. Erect tree protection hoarding 2. Install ground protection over crossover	High	Neutral
T3	Medium	Remote from construction	1. No tree protection required	High	Neutral

* Main trees selected for comment included above. Refer to previous notes on other trees.
** Negative – adverse impact upon trees and landscape; Neutral – no material impact (negative or positive); Positive – improvement (potential) to tree quality and landscape
*** Tolerance to proposed work within extent of RPA, in association with proposed tree protection – High - No adverse impacts; Medium - Temporary reduction in vitality only; Low - Susceptible to longer-term reduction in vitality and likely to require follow-up management.

3.0 Summary and Conclusions

3.1 The proposed construction project is mostly remote from the position of the trees associated with the site although it is possible some roots from the London Plane T1 may have grown beneath the surfaces of the crossover.

3.2 It will be prudent and reasonable tree protection to erect standard tree protection hoarding around the two street trees T1 and T2 and to install some ground protection over the crossover to offer reasonable protection to the surface and to any tree roots which may have grown beneath.

3.3 Subject to the implementation of these standard tree protection measures from the outset of the project, the impact of the construction works upon the trees will be neutral.

PART TWO – Trees and their Protection

4.0 Recommended Tree Protection Methods

4.1 In order to afford protection from general construction processes associated with the building works, robust tree protection barriers (normally OSB hoarding) will be erected in the position indicated on the Tree Protection Plan at **Appendix 2** (TPP1_LMR_47a). An example of the type BS grade tree protection is included at **Appendix 3**.

4.2 Following erection of the tree protection barriers and following the completion of the tree light works set out in Table 2 (with appropriate authority), I recommend installing the solid ground protection (refer to the TPP), such as steel or aluminium ground plates, to ensure that roots under the surfaces are not damaged by compaction during regular passing by construction traffic. I have included a recommended example of ground protection at **Appendix 3** also.

4.3 The route of new services is indicated upon the TPP however, if utility authorities dictate that the path must pass through the RPA of any retained tree, the following precautions must be adopted:

- Ensure the greatest separation between the service route and the tree's trunk as possible
- Manually dig out the service trench within the tree's RPA following NJUG Volume 4 guidelines (See **Appendix 5**)
- Retain all roots of 25mm diameter and over

NOTE: THE APPOINTED ARBORICULTURAL SUPERVISOR IS TO BE CONSULTED BEFORE ANY WORK, EITHER SCHEDULED OR UNSCHEDULED, IS CONSIDERED WITHIN THE EXCLUSION ZONE OR ROOT PROTECTION AREAS OF ANY RETAINED TREE. FAILURE TO DO SO MAY LEAD TO ENFORCEMENT ACTION BY THE LPA.

4.4 In order to ensure that the tree protection measures are implemented effectively, a site monitoring exercise will be undertaken to confirm:

i) The efficacy and accuracy of the tree and ground protection
ii) Effective maintenance of tree and ground protection

An example of a site record (tree protection) is provided at **Appendix 4**. In this case, the form will be used as confirmation that all practical precautions have been undertaken in accordance with this method statement.

4.5 A copy of this method statement is to be retained on site for the duration of the build process together with a scaled, colour copy of the Tree Protection Plan.

4.6 The details pertaining to tree protection as set out in this method statement, specifically include:
i) erection of tree protection barriers:
ii) the installation of ground protection;
iii) lines of communication and incident reporting,
are to be explained to the Site Agent at the pre-commencement site meeting. It will be the responsibility of the Site Agent to ensure that all personnel working on site are aware to the tree protection measures processes. A copy of this method statement is to be retained on site for the duration of the build process together with a scaled, colour copy of the Tree Protection Plan.

4.7 Key times for site supervision include:

1. Completion of agreed/necessary tree works
2. Erection of tree protection barriers
3. Installation of ground protection
4. Works within RPAs of retained trees
5. Landscaping

4.8 Effective site monitoring will be undertaken from the outset of the project and at agreed intervals thereafter. The frequency of monitoring may well decrease following the proper installation of all tree protection measures. Below is a recommended programme of arboricultural supervision. (This programme may alter dependent upon site circumstances or by agreement.)

4.9 The process for recording the tree protection measures will involve:

i) Site Agent to contact Arboricultural Supervisor with a minimum of 5 days' notice of any site work commencement.
ii) Arboricultural Supervisor to monitor site to agree tree protection fencing
iii) When all tree protection is installed in accordance with the tree protection plan, the Arboricultural Supervisor is to arrange with LPA tree officer and relevant contractors **the pre-commencement site meeting** in order to agree the tree protection and subsequent works within RPAs of retained trees and importantly the lines of communication between the on-site contractors, the Arboricultural Supervisor and the LPA tree officer and incident reporting,
iv)Arboricultural Supervisor to record all site visits and distribute reports to LPA tree officer and contractors for their records
v)Subsequent to completion, Arboricultural Supervisor to sign-off and complete.
vi) Any incidents resulting in potential tree damage are to be reported in line with the 'Incident Reporting Flow Chart in **Appendix 4**.

Table 4 Preliminary site supervision schedule

Stage	Action	Arboricultural Supervisor (AS) (Required – Y/N)	Notes
1	Pre-commencement meeting*	Y	Site Agent(SA) and LPA tree officer, contractor to attend
2	Tree works	Y	Following completion of tree works
3	Installation of tree protection and ground protection	Y	PRIOR to ground/demolition works
4	Ground works and Construction phase	Y	AS to monitor tree protection at agreed and suitable intervals

Contd.			
5	Remove tree/ground protection	N	No tree protection to be removed without prior agreement with the AS
6	Tree planting/landscaping	Y	Brief landscape company & sign off

4.10 The frequency of tree protection monitoring depends upon the nature of the project. In this case, it will be appropriate for the SA to organise with the AS monitoring visits to be twice in the initial 28 days from commencement and thereafter by agreement with the local planning authority tree officer.

Table 5 Contact List (to be completed **PRIOR** to commencement)

Interested Party	Name	Company/LPA	Contact Number(s)	Comment/ Responsibilities
Planning Consultant(s)	Mr B Murphy	DP9	020 7004 1703	Planning submissions & Conditions
Site Agent	TBA			Day to day site management; co-ordination of timings; **contact with project Arboriculturist**
Main Contractor	TBA			Legal and administrative running of the project; finance; appointment of and liaison with all project consultants
Arb. Supervisor	TBA			Tree protection and management; dissemination of tree-related information
LPA Tree Officer	Mr C Ruddick	LBRuT	020 8487 5358	Tree protection and enforcement
Site Engineers	TBA			Technical advice and design
Architects	Mr C O'Keefe	Lynas Smith	020 8985 0492	Design

TBA – to be advised

***Pre-commencement means i) before any works including tree felling or pruning and ii) before any ground works or demolition commences and upon completion of the initial installation of the tree protection, including ground protection.**

5.0 General site care (trees)

5.1 No fires will be lit on site.

5.2 No access will be permitted to within the fenced or otherwise protected areas (unless for site accommodation or Authorised agreement) at any stage during construction.

5.3 No materials, equipment or debris will be stored within the fenced areas unless agreed with the arboricultural supervisor.

5.4 Areas for mixing are to be located beyond RPAs of trees and contained to prevent leaching into the soil.

5.5 A copy of this report and the Tree Protection Plan is to remain on site at all times.

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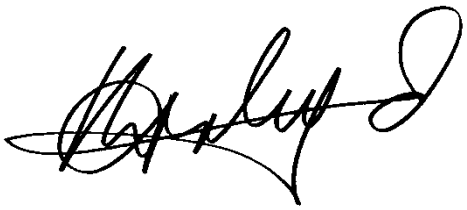

Hal Appleyard
Date: 7th February 2020

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6. Watson, G.W., Costello, L., Scharenbroch, B. & Gilman, E. 2008 The landscape below ground III The international society of arboriculture

APPENDIX 1

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E:info@acstrees.co.uk

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Struct. Condition	Landscape Value	Est. Years	Cate-gory	Comments	RPA Radius	RPA m2
T1	London plane *(Platanus X acerifolia)*	10m	300mm	N4m E4m S4m W3m	2m	2m E	EM	Good	Fair	Medium	40+	B (12)	Street tree; base paved; some slight root plate lifting; pollarded at 7m; adjacent to street lamp.	3.6m	40.7m²
T2	Whitebeam *(Sorbus aria)*	6m	170mm	3m	3m	3m N	EM	Fair	Fair	Low	20+	C (2)	Street tree; dense canopy; typically darkened by pollution; leans East slightly.	2.0m	13.1m²
T3	Silver birch *(Betula pendula)*	9m	250mm(e)	3m	3m	3m N	M	Good	Fair	Medium	20+	C (12)	Off site tree; topped in past with dense re-growth; 3m brick wall to its south.	3.0m	28.3m²

Note: Trunk Diameter (e) = Estimated

Refer also to 'Notes to the Schedules'

Notes to the tree survey schedule

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Notes:

1. No refers to the tree identification number e.g. T1, T2 etc. numbers preceded by 'G' refer to Groups and 'H' refer to Hedges
2. Species refers to the tree name as an English and botanical. (Sometimes the botanical name will not be included)
3. Height describes the approximate height of the tree in meters from ground level.
4. Trunk Diameter is the diameter of the stem/trunk measured in millimetres at 1.5m from ground level. The diameter may be estimated (e), where access is restricted. An average (a) may be taken for tree groups. A full inspection is always recommended.
5. Radial Crown Spread refers to the crown's radius in meters from the stem centre. This dimension is estimated.
6. Crown Clearance is the height in meters of crown clearance above ground level together with the height and direction of the lowest branch
7. Height to first branch is the height in metres from ground level to the first main branch
8. Life stage is the tree's maturity **Y**oung; **S**emi **M**ature, **E**arly **M**ature, **M**ature, **O**ver **M**ature, **V**eteran
6. Physiology describes the tree's general vitality as **Good** (normal), **Fair** (sub normal), **Poor** (weak), **Dead**.
8. Structural Condition - **Good** (no or only minor defects), **Fair** (remediable defects), **Poor** - Major defects present or suspected.
9. Landscape Value (Contribution) - **High** (prominent landscape feature), **Medium** (visible in landscape), **Low** (secluded/among other trees).
10. Estimated Years – Estimated remaining useful years: **10yrs+**, **20yrs+**, **40yrs+**
11. Category - refers to the British Standard 5837:2012 Table 1 Category and refers to the tree/group quality and value; **'A'** - **High**, **'B'** - **Moderate**, **'C'** - **Low**, **'U'** - **Remove or very poor quality**. The sub-category in brackets refers to the retention criteria values where **1** is **Arboricultural**, **2** is **Landscape** and **3** is **Cultural** including **Conservation/ecological, historic and commemorative**.
12. Comments include observations regarding tree condition, setting and function/properties and characteristics
13. RPA radius refers to the radial distance measured in metres from the trunk centre. It is a function of the tree's diameter (s). RPA means root protection area
14. RPA m^2 means the area of the BS standard root protection area derived from the RPA radius.

NB: Column headings may alter and some of the above notes are not applicable to the schedule in question.

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 2

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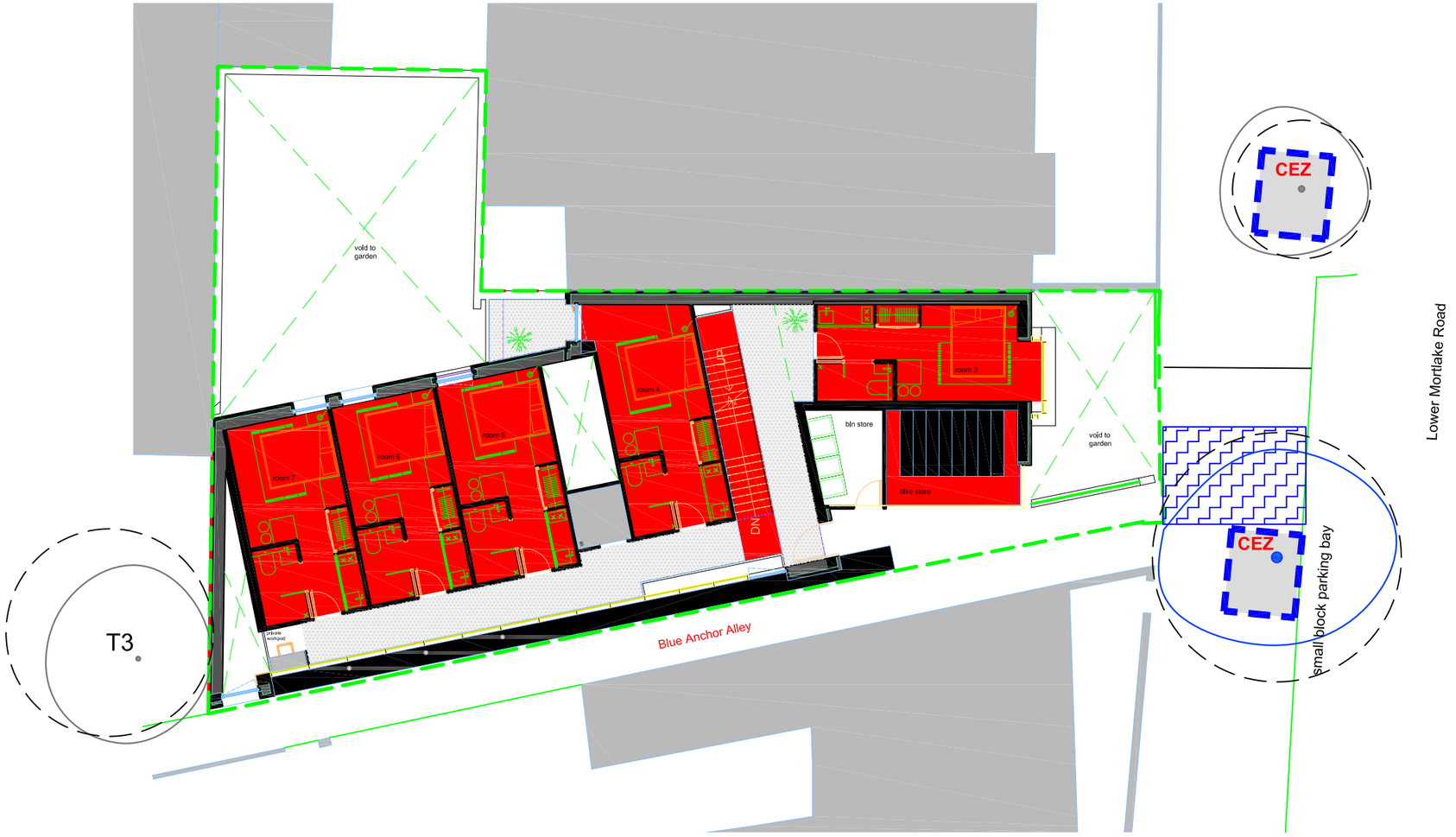
E:info@acstrees.co.uk



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BS Root Protection Area, (RPA) shown uniform (above left) but site features such as roadways, retaining walls and foundations, may modify root patterns and therefore the RPA shape.

Indicative

A grade trees

C grade trees

B grade trees

U grade trees

CEZ — Position of tree protection barriers; denotes Construction Exclusion Zone for the duration of the project.

Area for effective ground protection suitable for the project

Tree Management Methods to be adopted on site.

1. Undertake pre-commencement site meeting to agree tree protection methods and timings.
2. Carry out any permitted tree pruning - ask before beginning.
3. Install all tree and ground protection (see Appendix 3).
4. Undertake demolition and ground works, including installation of new services.
5. Construction phase.
6. Remove tree protection and carry out landscaping.

0 5 m 10 m 15 m

Scale: 1:150

Client : Westlake Property Ltd

Project : 47a Lower Mortlake Road, Richmond, Surrey TW9 2LW

Title : Tree Protection Plan

Scale : 1:150 A3

Date : Feb. 2020

Dwg No : TPP1_LMR_47a

Rev : -

Do not scale from this drawing. Any discrepancies are to be reported to ACS (Trees) Consulting.
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ACS (Trees) Consulting
Consultants in the Management of Trees and Woodlands
Tree Tops | Redwood Mount | Reigate | Surrey | RH2 9NB
TEL: 01737 244819 | 07770 820105
ALSO At:
Office Eighty Five | 272 Kensington High Street | London | W8 6ND
E: Info@acstrees.co.uk
www.acstrees.co.uk

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APPENDIX 3

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E:info@acstrees.co.uk

Tree Protection Barriers

Specifications (specifically identified by outline box and shading)

2.4m Hoarding

3.0m 100 X 100mm square wooden posts
3 X 38 X 87mm wooden rails affixed to posts
2.4m X 1200 outside grade ply panels (12mm) affixed to rails/posts.
50 X 100mm angled supporting struts affixed internally (quantity as required).

Supporting posts fixed into position using concrete. All post holes to be manually excavated, retaining all roots of protected trees of 25mm diameter and above. All post holes are to be lined with 1mm gauge polythene before pouring concrete (heavy-duty rubble bags are suitable liners).
Post holes to be no larger than 300 X 300mm.

'Heras' (Style) Fencing

'Heras' fencing describes the 2.4m galvanised steel mesh panelled fencing normally supplied with block bases and block trays. Block bases are to be used in conjunction with angled scaffold struts only. The use of blocks only is not effective. For extra barrier vertical stability, scaffold poles set at a 45^0 angle upon the 'tree-side' of the barrier and fixed to the ground at the end of each panel. Up-right supporting posts will be braced at the top and the base for added support.

Tree Protection - Hoarding-Style

Example of Tree Protection Box Frame

Designed to provide immediate protection from impacts and damage to the trunk and root crown.

Specification:

Uprights x 4, min. 100 X 100 treated wood

Batons top, middle and base min. 25mm x 75mm

45^{o} angled batons to and base for rigidity 25mm x 75mm

Fix 12mm OSB sheeting to framework

Affix ‘Tree Protection’ signage.

Ground Protection using heavy-duty ground plates.

(Courtesy of Eve Trackway UK – Tel: 08700 767676)

Robust aluminum, interlocking plates deflect heavy loads and prevent soil compaction beneath.

Effective use of X Trackpanel for site access.

Suitable for

- Heavy Duty Roadway
- Medium Duty Roadway
- Light Duty Roadway
- Walkway
- Eve Install

Specification

- Width: 3m
- Length: 2.5m
- Height: 50mm
- Weight: 254kg

1. Lay min. 75m depth of sharp sand/wood chip over identified ground area
2. Lay 15mm aluminium road plates over sand/wood chip
3. Fix ground protection cover into place with road pins or similar
4. Erect protection fence as per BS grade.
5. Monitor condition and efficacy and maintain as appropriate.
6. Remove ground protection upon completion/landscaping only.

Tree Management Consultants
T: 020 8687 1214
www.acstrees.co.uk

APPENDIX 4

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E:info@acstrees.co.uk

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T: 020 8687 1214

Arboricultural Site Supervision

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Site:	Project Site Address/Name
Inspected By:	Arboricultural Supervisor (AS)
Client:	Client
Site Agent:	Site Agent's Name (SA)
Date of Inspection:	24/02/2017
Time of Inspection:	8:15:00

Tree Protective Fencing

Tree protection in correct location

Comments/Action

Ground protection - temporary concrete and existing paving

Agreed Construction Exclusion Zone

No debris within construction exclusion zone

Comments/Action

Robust hoarding and temporary concrete ground protection

Amendments to Documentation Required

No amendments required

Comments/Action

Tree protection Hoarding and ground protection over sharp sand.

Remedial Works

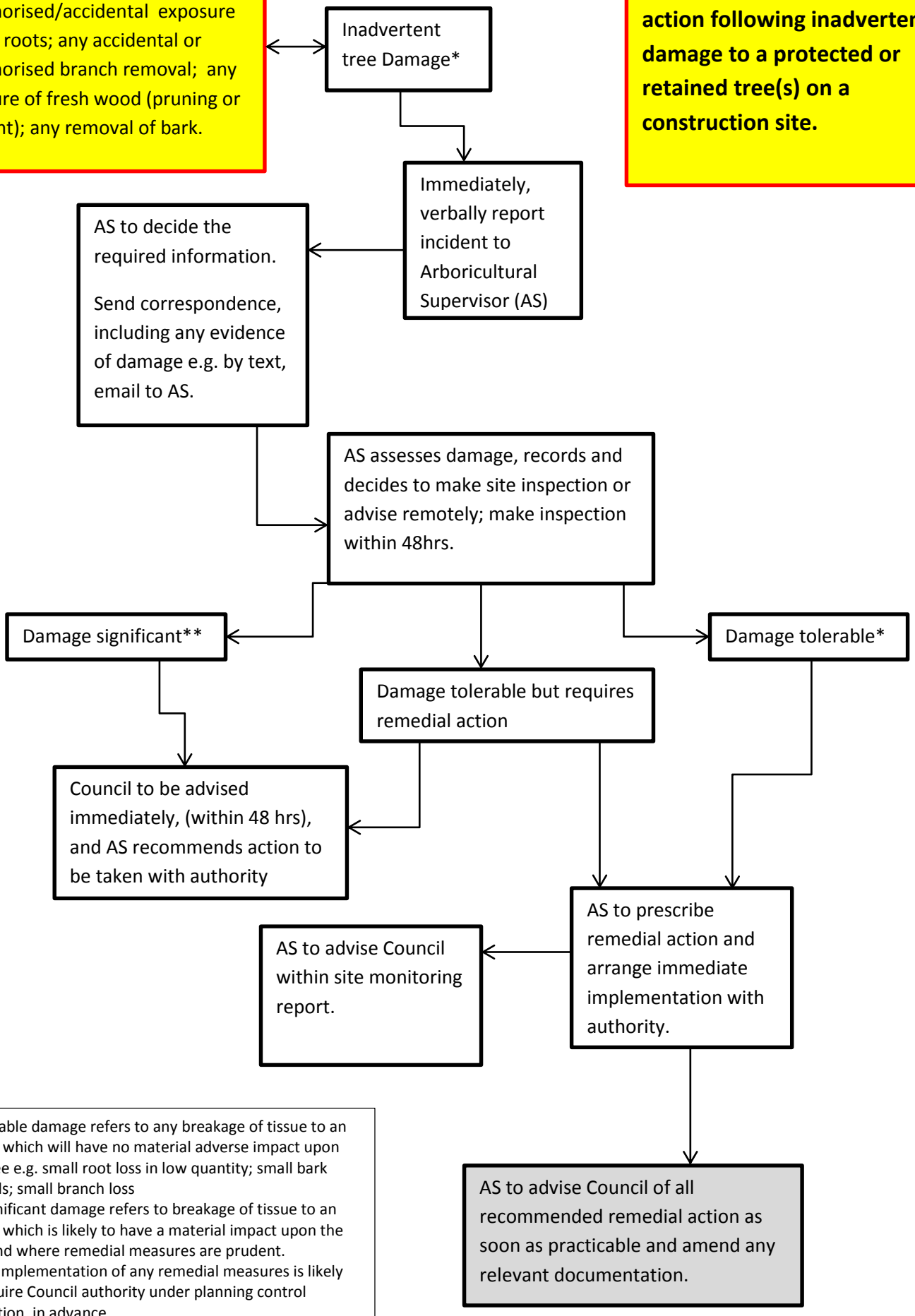
General Comments

1. Tree protection in position and effective
2. Position of site huts used as tree protection for T7 and T10
3. Temporary concrete used for ground protection for T10
4. Hoarding style tree and ground protection effective and in position

Next Inspection April 2017

*Tree Damage is defined as: any unauthorised/accidental exposure of tree roots; any accidental or unauthorised branch removal; any exposure of fresh wood (pruning or accident); any removal of bark.

Procedure for reporting and action following inadvertent damage to a protected or retained tree(s) on a construction site.



*Tolerable damage refers to any breakage of tissue to an extent which will have no material adverse impact upon the tree e.g. small root loss in low quantity; small bark wounds; small branch loss
** Significant damage refers to breakage of tissue to an extent which is likely to have a material impact upon the tree and where remedial measures are prudent.
Note: Implementation of any remedial measures is likely to require Council authority under planning control legislation, in advance.

ACS (Trees) Consulting | Head: Pilgrims Court, 15-17 West Street, Reigate, Surrey RH2 9BL | Tel: 01737 249351
Also at: Office Eighty Five, 272 Kensington High Street, London W8 6ND | Tel: 0208 687 1214
E: hal@acstrees.co.uk | Partners: H.Appleyard and A. Appleyard

APPENDIX 5

ACS (Trees) Consulting
Tree Management Consultants
E:info@acstrees.co.uk

Manual Digging in the Vicinity of Trees - Method Statement

1.0 Introduction

1.1 Within and adjacent to areas of construction, trees valued as important landscape assets may exist. It is possible such trees are protected by legislation in the form of a Tree Preservation Order, conservation area or by planning conditions. In either case, disregard of the tree's well being by causing damage to the roots, trunk or branches may be an offence. Consent from the Local Planning Authority may be required to undertake works that may have an impact on the tree prior to commencement.

1.2 Whilst the trunk and branches of a tree can be seen and therefore more easily avoided, tree roots are concealed beneath the ground. Their hidden nature can lead to inadvertent damage from construction processes. Dependant upon the extent of any root damage, the whole tree can be adversely affected. It is for this reason that it is necessary to ensure adequate precautions are adopted when considering construction in the vicinity of trees.

1.3 Hand digging rather than excavation by mechanical means has proved to be an effective way of limiting the effects of construction on nearby trees. It is often considered impractical, time consuming and costly to excavate by hand when machinery exists specifically for the purpose of digging. However, avoidance of unsustainable damage being caused to important trees through hand digging may far out weigh subsequent costs associated with legal penalties and loss of amenity.

1.4 Below are detailed the basic principles to acknowledge in respect of tree roots and the practical steps that can be taken to effectively avoid causing unsustainable damage to trees.

1.5 It is assumed that all operations are commenced only AFTER having undertaken and recorded appropriate risk assessments in line with current and relevant Health & Safety legislation, common industry practice and guidance.

2.0 Tree/Root Damage – How it can occur

2.1 The majority of tree roots exist in the upper **600mm to 1000mm** of soil. Excavations of the soil in the vicinity of trees, to this depth, can be harmful to tree roots and consequently the tree.

2.2.1 Tree root systems comprise two main root types, those that **anchor** the tree in the ground and those that **supply** the tree with water and elements. Roots that support the tree are woody and those that are involved with the **conduction** of water and nutrients are non-woody or fibrous. Both types of roots can be damaged directly by severing or crushing.

Fibrous roots can die from asphyxiation by **soil compaction** and/or soil contamination. Trees differ in their tolerance of root loss or disturbance, according to their species and condition or both.

2.2.2 Normally, the greater the diameter of the damaged root, the greater the adverse impact upon the tree.

Fig. 1 Damage to roots can both kill and destabilise a tree. Planning work and care can avoid root damage

3.0 Hand Digging in the Vicinity of Trees – The Process

3.1 First it is necessary to consider all available options to construct beyond the likely range of influence on the tree's condition – always beyond 1m from the tree's trunk an by referring to an area (distance) calculated using the formulae at para 4.6.1 of BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'. The simple calculation is 12 x the trunk diameter at 1.5m above ground level. The NJUG Volume 4 Issue 2 method is 4 x the trunk circumference/girth. The resulting area is called the Root Protection Area or Precautionary Zone. **When it is established that no options are available other than to construct within this zone, hand digging will be needed.** When considering hand digging, an appointed specialist supervisor/consultant will be able to advise during construction and must be on site at the commencement of works.

3.2 Before beginning to dig, mark out the tree's precautionary area with ground marker paint, clearly on the ground. This will identify the area within which hand digging must take

place. **For safety and before beginning to dig, ensure there are no underground services or objects that may cause injury if damaged**. Any existing protection fencing is to be located to the nearest position of construction and fixed in place, between the tree and area of construction. It will be clearly visible to operators thereafter where hand digging will need to be undertaken. The use of mechanical digging equipment to remove the top surface layer (50-100mm) is to be avoided and hand tools are required for this exercise too.

3.3 When hand digging, using typical hand tools, carefully work around roots, retaining as many as possible. Using a brush or compressed air will expose roots cleanly before deciding whether it will be necessary to prune. Care must be taken not to damage roots including the roots' bark.

Fig. 2 Roots exposed, retained and protected during manual digging exercise

3.4 Retain all roots with a diameter greater than 25mm. Where such roots must be removed, after consulting a trained arboriculturalist (e.g. Local Authority Tree Officer or the appointed Arboricultural Consultant), these roots must be pruned with sharp cutting tools such as a handsaw, secateurs or pruners. The cut must leave the smallest wound possible and the root must be left as long as practicably possible. Roots in excess of 50mm diameter are to be retained and protected by surrounding the root with uncompacted sharp sand, void-formers or other compressible materials.

3.5 Where roots do not exist, e.g. beyond the depth of the rooting area, mechanical excavation should not be considered without specialist supervision.

3.6 All spoil is to be deposited beyond the precautionary zone. Soil build-up can cause roots to die.

3.7 As soon as practicable, exposed roots are to be covered with loose backfill material such as soil/sand mix or a hessian-type material to offer immediate protection from drying winds and desiccation. When excavating for the introduction of posts, pads or piles, the sides of the pits should be lined with a geotextile material to prevent the potential for lime scorching of small diameter roots.

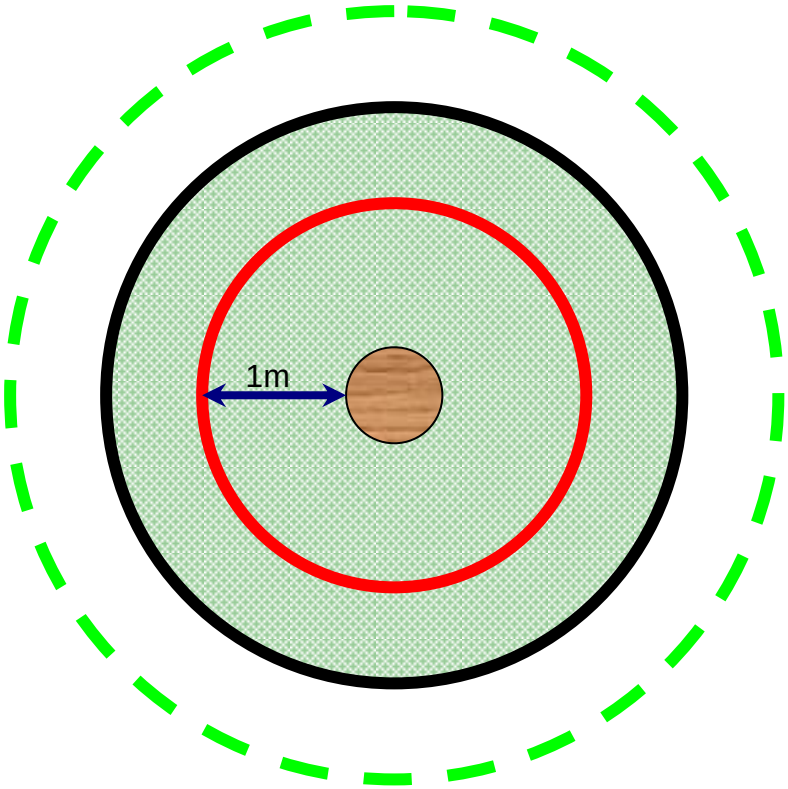
3.8 Where it is impossible to avoid completing the construction in one day for example, any exposed roots or their cut ends are to be covered with sacking material over night to prevent drying out and to add protection. This is particularly important in winter months, where frost can cause further damage to roots.

3.9 Upon completion of the hand digging, where appropriate protection fences are to be re-located and fixed in their original position.

Attached is an extract from the National Joint Utilities Group publication V4 2007, 'Guidelines for the planning installation and maintenance of utility services in proximity to trees'.

Before considering hand digging and determining precautionary zones or root protection areas, specialist arboricultural advice should be sought.

Fig. 3 Trees can be destabilised by poor planning and root damage



TREE PROTECTION ZONE

Key to Diagram

Trunk of Tree

Spread of canopy or branches

PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with Local Authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.

PRECAUTIONARY ZONE – 4 x trunk circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with Local Authority Tree Officer if in any doubt.

PERMITTED ZONE – outside of precautionary zone. Excavation works may be undertaken within this zone however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

DAMAGE TO TREES

Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil and often grow out further than the tree's height. The majority of these roots are very fine; even close to a tree few will be thicker than a pencil. Most street tree roots grow under the footway but may also extend under the carriageway. If roots are damaged the tree may suffer irreversible harm and eventually die.

PROTECTING ROOTS - DO'S and DON'TS

There are three designated zones around a tree each of which has its own criteria for working practices.

THE PROHIBITED ZONE

Don't excavate within this zone.

Don't use any form of mechanical plant within this zone

Don't store materials, plant or equipment within this zone.

Don't move plant or vehicles within this zone.

Don't lean materials against, or chain plant to, the trunk.

Do contact the local authority tree officer or owner of the tree if excavation within this zone is unavoidable.

Do protect any exposed roots uncovered within this zone with dry sacking.

Do backfill with a suitable inert granular and top soil material mix as soon as possible on completion of works.

Do notify the local authority tree officer or the tree's owner of any damage.

THE PRECAUTIONARY ZONE

Don't excavate with machinery. Where excavation is unavoidable within this zone excavate only by hand or use trenchless techniques.

Don't cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.

Don't repeatedly move / use heavy mechanical plant except on hard standing.

Don't store spoil or building material, including chemicals and fuels, within this zone.

Do prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

Do backfill the trench with an inert granular material and top soil mix. Compact the backfill with care around the retained roots. On non highway sites backfill only with excavated soil.

Do protect any exposed roots with dry sacking ensuring this is removed before backfilling.

Do notify the local authority tree officer or the tree's owner of any damage.

THE PERMITTED ZONE

Don't cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.

Do use caution if it is absolutely necessary to operate mechanical plant within this zone.

Do prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

Do protect any exposed roots with dry sacking ensuring this is removed before backfilling.

Do notify the local authority tree officer or the tree's owner of any damage.