Arboricultural Report

Planning and Development

Arboricultural Appraisal and Impact Assessment

Project Name and Address	**Strathmore Centre, Strathmore Road, Teddington**		
Prepared for	Mr R Harper	**Planning Ref**	20/0539/FUL
ACS Ref	ha/aiams3/20/sc	**Client**	P A Housing
Prepared by	Hal Appleyard Dip. Arb (RFS), F.Arbor. A. MICFor RCArborA		
Report Date	14th September 2020		

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List of Contents

Appendices

Executive Summary

Demolition work, of the existing empty school building and the construction of new residential dwellings and a child nursery facility is proposed in the vicinity of retained trees. Although 4 groups of trees and 15 individuals are to be removed as part of the project, landscaping work includes the provision of 27 newly-planted trees around the site together with low-level landscaping and improved open grassed areas.

The retained trees can be protected effectively during the demolition and construction work using standard, non-specific methods, which are set out in this report in a preliminary manner. The impact of the proposal upon the treed landscape is assessed as being negative following immediate tree works, however, by implementation of proposed tree planting and their subsequent growth positive impacts to the treed landscape are realised by the development project.

PART ONE

1.0 Introduction and Scope

1.1 A planning application has been submitted to Richmond Council for consideration. It has requested that this arboricultural impact assessment report is provided. The description of the application is provided as follows:

'Demolition of all existing buildings; erection of two 3-storey buildings comprising 30 residential dwellings in total (6 x1 bedroom, 17 x 2 bedroom & 7 x 3 bedroom); erection of single storey nursery building (294 sqm in total) alterations to existing access road and formation of 36 no. car parking spaces at grade; landscaping including communal amenity space and ecological enhancement area; secure cycle and refuse storage structures'

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 24th August 2018. 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 comprises existing but no longer used school buildings and an operational children's nursery facility.

Fig. 1

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 identified for removal are shown outlined in red upon the tree protection plan at Appendix 2. The groups of trees to be removed are Leyland Cypress species. All contain dead branches caused by a bark cambial disorder Seiridium Canker, which ultimately causes the branches to break and the tree to die off.

Fig. 2 Leyland Cypress trees of G16 with quite extensive die-back caused by Seiridium Canker

2.4 A Horse Chestnut, T11 contains trunk decay and the common leaf disorder caused by a leaf mining insect, which causes the leaves to brown and fall prematurely. Indeed, of the trees to be removed and replaced, three are a quality worthy of BS 'B' grading, all others are of low quality and landscape contribution 'C' grade trees and groups.

2.5 The three 'B'-grade trees include a Walnut T1 and Holly T2. These two trees grow mutually, which is to say that the removal of one necessitates the removal of the

other owing to their canopy forms. Leaving one of these trees would render the remaining tree weak and exposed, with a poor form and aesthetic. T23 is a Silver Birch with reasonable form but which is a short-lived species and probably within the last 20-30% of its life expectancy.

Fig. 3 G15 (left) and T11 (arrowed) with folia disorders turning their canopies brown prematurely

2.6 The proposed scheme seeks to retain trees where this is feasible. Construction of new foundations is planned within 6% of the RPA of T8, a mature Fig. It will be important for the preservation of this tree to first carryout coppicing, which involves pruning out the stems back down to above ground level, which will regenerate a new canopy in a manner which can be controlled. The coppicing work will compensate for some root loss but manual digging to afford as much protection to the tree's roots as possible will assist.

2.7 Following arboricultural feedback from Richmond Council, a number of additional trees have been identified for replacement. T4 a Hazel and T18 a Red oak are to be removed and replaced with new trees as part of the overall re-landscaping of the site as set out and described fully by ACD Environmental (refer to their plans).

2.8 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
T6	Mature	Normal	40%	High	1. Existing soil levels to be retained 2. Permeable wearing course to be used for play area over RPA 3. Tree and root protection to be installed during project
T8	Mature	Normal	6%	High	4. 94% of RPA retained unaffected 5. Species produces vigorous regrowth from any pruning, roots or shoots 6. Tree and ground protection installed prior to demolition and maintained for duration through supervision
T19	Mature	Moderate	27%	Medium	1. Permeable footpath to be installed over root system, retaining roots important to the tree's anchorage and condition 2. Supervised dig within RPA 3. Footpaths necessary to connect building and amenity space 4. Mitigation of root/soil zone with mulch
31, 32	Mature	Normal	13%	High	1. 87% of RPA retained undisturbed and protected 2. Supervised manual dig for footpath, to protect roots important to tree growth 3. Mitigation of root/soil zone with mulch

* % of BS RPA used for construction
** 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)

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 Clean (Sp3)	T19, T21	None	-	General tree husbandry
Fell (Sp6)	T4, G10, T11-T17, 1 of G7, G28 and 1 of G29	Medium	Y	Weak trees and tree groups
Fell (Sp6)	T1,T2,T18 T23-T27, 33	Medium	Y	Replace with trees of minimum size 18-20cm girth for immediate visual and environmental contribution
Crown reduce by 3-4m (Sp1)	G28	Low	-	Improve canopy form and reduce dominance
Coppice to 400mm above ground level (Sp9)	T8	Low	-	Pruning to enable construction; regrowth expected to be vigorous
Total		Medium		

*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.

Sp1. Crown reduction will include reducing the height and spread of a tree's canopy (branching structure) whilst retaining the tree's natural tree form (species determined). The amount of reduction is described in linear metres e.g. 2m (from 6m to 4m radial spread) or 3m (from 15m to 12m tree height). Crown reduction work will be undertaken for a specific purpose, which may include containing tree growth in a given location or reducing wind purchase and stress.
NOTE: Crown Reduction via thinning ('drop-crotching') work will reduce the overall height and spread of the tree crown by specified linear metres and will not equate to exceeding 30%, and more generally not exceeding 20% of the overall height and spread of the tree. This will be carried out by shortening selected leading branches by pruning back to suitable growing point, (which will be a subordinate side branch not less than 30% the diameter of the leading branch). The pruning will be undertaken in a way to preserve the natural form and the proportion of the tree species. Much of the work will be undertaken using specialised hand saws rather than motorised chain saws because it is to be recognised that this type of crown pruning is a delicate and sympathetic operation. The operation of crown reduction via thinning is a matter of judicious pruning and will not be construed as 'lopping or topping'.

Sp2. Part reduction (selective pruning) includes pruning back from structures or boundaries and which is normally applied to no more than two sides of a tree's canopy. The amount of pruning is specified in metres. The result form will be even and provide a framework for re-growth in an even form. The extent of pruning will not impinge upon tree condition and seek to preserve so far as possible, the natural outline of the tree, which is species determined. All pruning cuts are to be made to a suitable growing point (secondary shoot) or removed from the parent branch or stem and no inter-nodal cuts are to occur.

Sp2.1 Any branch shortening work, (including as part of crown reduction work) will be conducted by pruning back to a suitable growing point, e.g. a shoot or smaller branch, which can continue to support branch growth.

Sp3.Crown Cleaning involves the removal of all dead wood small and large diameter, stubs and broken branches. Some small, densely arranged shoots (including epicormic shoots) will be thinned out or removed as recommended.

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.

Sp5.Crown thinning involves the removal of sub-lateral (secondary) branches to appropriate branch/shoot unions, removal of dead and damaged (crossing branches) with a view to reducing the crown density by a specified %, normally no higher than 30%.

Sp6.Felling involves the careful removal of a tree to ground level (or other specified height), either in sections or in one unit (straight felling). The method of felling will be suited to the constraints of the site and judged by the competent operator undertaking the task. Removing the stump may be part of the requirements and this will be carried out using a mechanical stump grinder where accessible.

Sp9. Coppicing involves cutting trees close to the ground in order to encourage re-growth of multiple shoots.

Table 3 Summary of Implications of Construction on Trees*

Tree Ident.*	Landscape Contribution	Implications /Impact	Mitigation measures	***Tolerance[1,2]	Impact Assessment**
T1,T2, T4,T18 T23-T27, G28, 33	Medium	Fell to enable construction	1. Replacement tree planting with trees of a size to make a visual impact (e.g. >18cm girth)	-	Negative to Neutral: following replanting and growth
T19, T20, T31, T32	High	New footpath over RPAs (13%)	1. Supervised manual dig and root protection 2. Erect tree protection and install permeable wearing course 3. Soil improvement measures 4. Tree protection maintained	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 demolition and construction work will involve the removal of trees some of which are obvious to the wider public. Their removal will have a negative visual impact at the out-set of the project but which will be mitigated by the construction of new and modern buildings coupled with the establishment and growth of new trees planted around the site with the provision of other soft amenity landscaping.

3.2 Subject to the implementation of standard tree and root protection work, the proposed development scheme will have an ultimately neutral impact upon the trees and the landscape to which they contribute. The scheme provides an opportunity for new and diverse tree planting, which will be to the benefit of the local environment for the future.

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 demolition and construction works proposed, it will be necessary to erect robust tree protection fences/barriers (normally wire mesh panels) in the position indicated on the Tree Protection Plan at **Appendix 2** (TPP1_SC Rev B). A recommended 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 works, I recommend installing the ground protection (refer to the TPP for its location), to ensure that roots under the surface are not damaged by compaction during regular passing by operatives and light machinery. **Note**: where ground protection is to be installed, no excavations are to take place in this location. I have included recommended examples of suitable ground protection at **Appendix 3** also.

4.3 The soil level within the RPA of T6 is to be retained although a permeable covering is to be used for the proposed play area. Within the RPAs of T8, T19, T20, T31 and T32, I recommend carrying out an initial manual dig exercise, which is to be supervised by the appointed arboriculturist, prior to the construction of foundations or creating the subbase for the new footpaths. The methods of manual digging near trees is described with **Appendix 5** but for clarity I have set out the procedure below, which is to be overseen by the appointed arboricultural consultant:

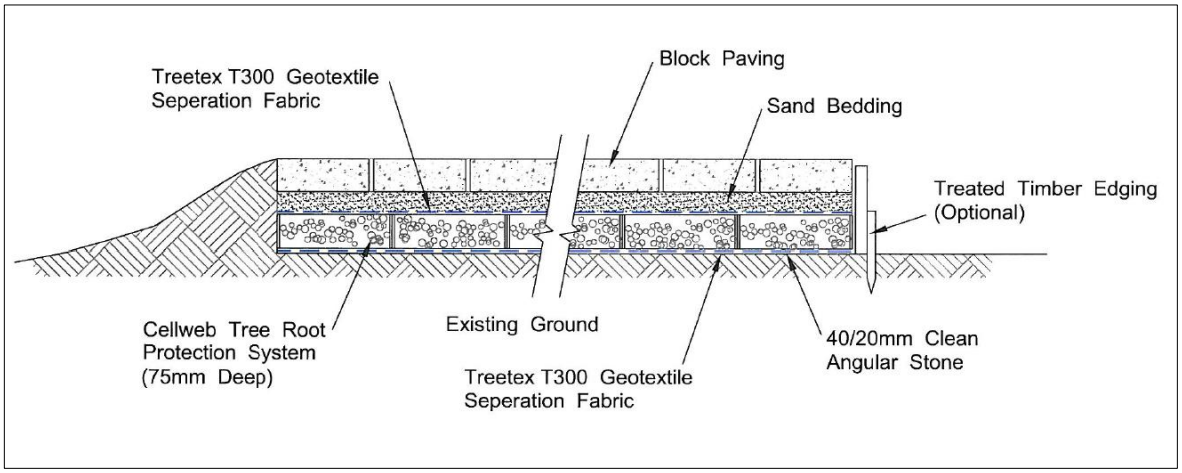
i) Clearly mark out the area for hand dig (using biodegradable marker paint) (see TPP)
ii) Use hand tools (forks and spades) to remove the spoil and deposit beyond RPA.
iii) Identify roots to be retained by brushing or the use of compressed air
iv) Unless after professional assessment permits pruning, roots in excess of 25mm Ø are to be retained in-situ by manually clearing around (with compressed air for example), wrapping with non-woven geotextile (e.g.Terram), covering with a void former e.g. split, rigid polythene piping.
v) Unless after professional assessment permits pruning, retention of roots 50mm Ø or more will be by the use of void-formers (see **Appendix 5**).
vi) Roots <25mm Ø will be pruned using sharp pruning tools ensuring that no splits or tears occur and that the pruning wound is made as small as possible. Roots will be pruned back to a side shoot where possible or to a suitable position.

4.4 Footpaths over rooting areas of trees will be light-weight construction. It is recognised the Council has requested a continuous footpath on the western side of the road between the proposed properties and Strathmore Road. It will be prudent for the project arborist to be appointed to oversee the construction work within the RPAs of T31 and T32 to ensure roots no larger than 25mm diameter are pruned back in the process. This similarly applies to construction of footpaths within the RPAS of T19 and T20. A suggested specification for a permeable, low invasive surface in the RPAs of retained trees is as follows (other materials can be suitable):

- Within the identified RPAs manually excavate out the soft top soil (max 150mm depth)
- Lay no less than 500 micron gauge/78grams per sqm woven geotextile membrane (e.g. Terram 1000 Multitrack or Fastrack G90)
- Compound MOT type 3 or similar into position as a sub base material
- Load-spreading material (for pedestrians) 100mm depth of Cellweb, Duobloc or similar cellular confinement system
- Backfill with 50 graded to 10 washed stone (MOT Type 3)

- Retain using 100-150mm mild steel band with steel road-pin style supports at no less than 1000mm spacing (haunched with lean mix concrete).
- Wearing course seated on a 25mm blinding layer of sharp sand. Blocks to be 60mm Marshalls Priora blocks or similar with lugs.

Fig. 4 Cellweb option for small block paving wearing course (Courtesy Geosynthetics)



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.

4.5 With regard to the route of new underground services, it will be important for the appointed engineers to i) recognise the trees which are to be retained and ii) to recognise the trees' root protection areas and iii) recognise the Construction Exclusion Zones, when planning the routes of the new services. I have included in at **Appendix 7** a planning process.

4.6 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 fencing and ground protection
ii) The root inspection and treatment exercise
iii) 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.

4.7 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.

4.8 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.

4.9 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. Hard and soft landscaping

4.10 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.)

4.11 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	Initial manual dig exercise and any root treatment	Y	SA to advise AS prior to commencement
5	Ground works and Construction phase	Y	AS to monitor tree protection at agreed and suitable intervals
6	Remove tree/ground protection	N	No tree protection to be removed without prior agreement with the AS
7	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 once every 28 days for two months.

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

Interested Party	Name	Company/LPA	Contact Number(s)	Comment/ Responsibilities
Planning Consultant(s)	Mr R Harper	Harper Planning	020 8973 0063	Planning submissions & Conditions
Site Agent	To Be Advised			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	TBA			Tree protection and enforcement
Site Engineers	TBA			Technical advice and design
Architects	Mr M Gray	Living Architects	020 8962 6660	Design

***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 Precautions during Landscape Work

4.1 The following steps (both general and site specific), are advisable in relation to implementing any landscape works, which may have the potential to affect retained and or protected trees:

1. Advise arboricultural supervisor of intended time frame of landscape work in advance of commencement.
2. Re-locate existing tree protection fencing/ground protection to enable landscape work to proceed.
3. With bio-degradable spray paint or site pins with plastic tape, mark out the position of the relevant tree root protection areas (RPA) as per the tree protection plan.
4. Within the RPAs, avoid using any mechanical tools or vehicles (e.g. tracked or wheeled machinery).
5. Spread any mulch or top soil manually, with the use of wheel barrows and hand tools. It will be acceptable to use of the back actor of a tracked excavator to spread piled top soil or mulch into the RPAs of protected trees provided the bucket does not come in contact with the ground and that the power unit is positioned outside of the RPAs at all times.
6. Any planting pits are to be excavated manually within the RPAs of any retained trees.
7. Multiple passes within the RPAs along one route, pedestrian and with wheel barrows will require some ground protection to be installed prior to working. Ground protection can be scaffold boards over wood chip for example.
8. A record of the landscape working method is to be made and provided to the Council for their file.
9. Hard landscaping features will be constructed under supervision within the RPA of retained trees and will avoid, where possible, the re-grading of soil.

6.0 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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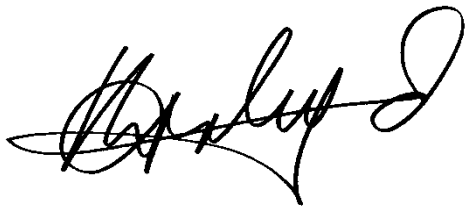

Hal Appleyard
Date: 14th September 2020

References:

1. Matheny. N, Clark. J. R, 1998. 'Trees and development; A technical guide to the preservation of trees during land development'. ISA
2. Costello, L.R, Jones. K. S, 2003. 'Reducing infrastructure damage by roots: A compendium of strategies.' ISA Western Chapter.
3. Roberts. J, Jackson. N, Smith. M, 2006. 'Tree roots in the built environment.' TSO DCLG
4. Lindsey, P. Bassuk, N. 1991 'Specifying soil volumes to meet the water needs of mature urban street trees and trees in containers'. Journal of Arboriculture vol. 17 No 6.
5. Harris et al, 1999 'Arboriculture, Integrated Management of Trees, Shrubs and Vines' Third Edition Prentice Hall
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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Tree Survey Schedule

ACS CONSULTING

Site: Strathmore Centre, Strathmore Road, Teddington

Surveyor:H. Appleyard

Date: 24th August 2018

Ref:ts1/strathmore

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
T1	Walnut, Common	10	4 5 5 5	3/S2	Mature	520	12	6.2	Normal	Good	Medium	B	1,2	20-40	Leaning (slightly) east Decay at trunk base
T2	Holly, Common	10	3 3 3 3	2/N2	Mature	440	12	5.3	Normal	Good	Medium	B	1,2	20-40	One of a pair Multi stem 25 x 2, 10
T3	Hornbeam	10	4 4 4 4	3/N3	Mature	300	12	3.6	Normal	Good	Medium	B	1,2	20-40	Boundary screen tree High pruned; possible root compaction
T4	Hazel	6	3 3 3 3	1/N1	Mature	250	12	3.0	Normal	Good	Medium	C	1,2	20-40	Coppice stool with some basal decay Dense canopy
T5	Beech, Copper	10	6 6 6 6	2/N2	Mature	450	12	5.4	Normal	Fair	Medium	B	1,2	20-40	Decay at trunk base Even form
T6	Oak, Common	18	7 7 7 7	3/N4	Mature	640	12	7.7	Normal	Good	High	B	1,2	>40	Some decay and swellings at trunk base Drawn branches/end-heavy Landscape tree
G7	Hornbeam x 4	12	4 4 4 4	2/N2	Mature	300a	12	3.6	Normal	Good	Medium	B	1,2	20-40	Boundary screen tree group 1 x tree reduced

Notes:

1. Height describes the approximate height of the tree in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is shown above on each of the four compass points (i.e. N, E, S, W) clockwise.
3. Ground Clearance is the height in meters of crown clearance above adjacent ground level together with the height and direction of the lowest branch
4. Stem Diameter is the diameter of the stem 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. Protection Multiplier is 12 for single-stemmed trees; for multi-stemmed a cross-sectional area is calculated to derive the DBH, which in turn is multiplied by 12.
6. Protection Radius is a radial distance measured from the trunk centre and is used to calculate the BS RPA.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present or suspected.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat. refers to British Standard 5837:2012 Table 1 category and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Remove or very poor quality.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservation/ecological, historic and commemorative.
12. Useful Life is the tree's estimated remaining effective contribution in years.

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Tree Survey Schedule

ACS CONSULTING

Site: Strathmore Centre, Strathmore Road, Teddington

Surveyor:H. Appleyard

Date: 24th August 2018

Ref:ts1/strathmore

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
T8	Fig	7	4 4 4 4	0	Mature	410	12	4.9	Normal	Good	Low	C	2	10-20	Sprawling habit Topped in past; dense epicormic shoots
T9	Bay Laurel	9	4 4 4 4	3/E3	Mature	360	12	4.3	Normal	Good	Low	C	1,2	20-40	Reduced in past to reduce weight Decay present on branches
G10	Cypress, Leyland	9	3 3 3 3	2/E2	Middle Aged	250a	12	3.0	Moderate	Fair	Low	C	2	10-20	A sparser than normal canopy Chlorotic foliage (yellowed) Weak trees with die-back
T11	Chestnut, Horse	9	3 4 4 3	2/N2	Mature	490	12	5.9	Moderate	Fair	Low	C	1,2	10-20	Leaf/shoot disorders Decay in trunk Suppressed form
T12	Sycamore	8	3 3 3 3	2/N2	Young	150	12	1.8	Normal	Good	Low	C	1	>40	Self sown
T13	Walnut, Common Willow, Goat	8	4 4 4 4	2/E2	Middle Aged	250a	12	3.0	Normal	Good	Low	C	1,2	20-40	Boundary self-set trees Over hanging branches
T14	Walnut, Common	9	4 4 4 4	3/N3	Middle Aged	290	12	3.5	Normal	Good	Low	C	1,2	20-40	Ivy covered trunk and branches Self sown

Notes:

1. Height describes the approximate height of the tree in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is shown above on each of the four compass points (i.e. N, E, S, W) clockwise.
3. Ground Clearance is the height in meters of crown clearance above adjacent ground level together with the height and direction of the lowest branch
4. Stem Diameter is the diameter of the stem 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. Protection Multiplier is 12 for single-stemmed trees; for multi-stemmed a cross-sectional area is calculated to derive the DBH, which in turn is multiplied by 12.
6. Protection Radius is a radial distance measured from the trunk centre and is used to calculate the BS RPA.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present or suspected.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat. refers to British Standard 5837:2012 Table 1 category and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Remove or very poor quality.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservation/ecological, historic and commemorative.
12. Useful Life is the tree's estimated remaining effective contribution in years.

ACS (Trees) Consulting
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Tree Survey Schedule

ACS CONSULTING

Site: Strathmore Centre, Strathmore Road, Teddington

Surveyor:H. Appleyard

Date: 24th August 2018

Ref:ts1/strathmore

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
G15	Cypress, Leyland x 2	12	3 3 3 3	2/N2	Mature	350ae	12	4.2	Moderate	Fair	Low	C	2	10-20	A sparser than normal canopy Chlorotic foliage (yellowed), patches Drawn form: Inspection limited by restricted access
G16	Cypress, Leyland	11	3 3 3 3	1.5/N1.5	Mature	250a	12	3.0	Moderate	Fair	Low	C	2	10-20	Dead branches through out, with dead foliage Broken branches Neglected screen hedge; tight forks
T17	Sycamore	8	2 2 2 2	0	Young	100	12	1.2	Normal	Good	Low	C	1	20-40	Wrong location (best removed) Self sown
T18	Oak, Red	14	6 8 8 7	2/E2	Mature	550e	12	6.6	Normal	Good	Medium	B	1,2	>40	Drawn branches/end-heavy Open crown form Inspection limited by restricted access
T19	Cherry, Flowering	9	6 6 6 6	2/N3	Mature	400e	12	4.8	Moderate	Fair	Medium	C	1,2	10-20	A sparser than normal canopy Sprawling, elongated branches and shoots Inspection limited by restricted access
T20	Birch, Silver	9	4 4 4 4	2/N2	Mature	200e	12	2.4	Normal	Good	Medium	B	1,2	20-40	Reduced in past Inspection limited by restricted access

Notes:

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3. Ground Clearance is the height in meters of crown clearance above adjacent ground level together with the height and direction of the lowest branch
4. Stem Diameter is the diameter of the stem 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. Protection Multiplier is 12 for single-stemmed trees; for multi-stemmed a cross-sectional area is calculated to derive the DBH, which in turn is multiplied by 12.
6. Protection Radius is a radial distance measured from the trunk centre and is used to calculate the BS RPA.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present or suspected.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat. refers to British Standard 5837:2012 Table 1 category and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Remove or very poor quality.
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12. Useful Life is the tree's estimated remaining effective contribution in years.

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Tree Survey Schedule

ACS CONSULTING

Site: Strathmore Centre, Strathmore Road, Teddington

Surveyor:H. Appleyard

Date: 24th August 2018

Ref:ts1/strathmore

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
T21	Beech, Common	14	7 7 7 7	2/E3	Mature	540	12	6.5	Moderate	Good	Medium	B	1,2	20-40	A sparser than normal canopy at top; small leaves Die-back (minor) Insects (*Cryptococcus*) on trunk
G22	Cypress, Lawson	11	2 2 2 2	2/N2	Mature	250a	12	3.0	Normal	Good	Medium	C	1,2	20-40	Off-site tree group; screen trees
T23	Birch, Silver	12	3 5 5 5	2/S2	Mature	430	12	5.2	Normal	Good	Medium	B	2	20-40	One of a group One-sided form/suppressed
T24	Birch, Silver	12	3 3 3 3	2/E2	Mature	250	12	3.0	Moderate	Fair	Low	C	2	10-20	One of a group One-sided form/suppressed Some die-back; stressed
T25	Birch, Silver	12	3 4 2 4	2/E2	Mature	250	12	3.0	Normal	Good	Medium	C	2	10-20	One of a group One-sided form/suppressed
T26	Cypress, Lawson	9	2 2 2 2	1.5/S1	Mature	250	12	3.0	Normal	Fair	Medium	C	1,2	20-40	Garden ornamental Boundary screen tree
T27	Elder	5	2 2 2 2	1.5/N2	Mature	230	12	2.8	Moderate	Fair	Low	C	1	10-20	Boundary self-set tree Wrong location (best removed)

Notes:

1. Height describes the approximate height of the tree in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is shown above on each of the four compass points (i.e. N, E, S, W) clockwise.
3. Ground Clearance is the height in meters of crown clearance above adjacent ground level together with the height and direction of the lowest branch
4. Stem Diameter is the diameter of the stem 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. Protection Multiplier is 12 for single-stemmed trees; for multi-stemmed a cross-sectional area is calculated to derive the DBH, which in turn is multiplied by 12.
6. Protection Radius is a radial distance measured from the trunk centre and is used to calculate the BS RPA.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present or suspected.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat. refers to British Standard 5837:2012 Table 1 category and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Remove or very poor quality.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservation/ecological, historic and commemorative.
12. Useful Life is the tree's estimated remaining effective contribution in years.

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

Tree Survey Schedule

ACS CONSULTING

Site: Strathmore Centre, Strathmore Road, Teddington

Surveyor:H. Appleyard

Date: 24th August 2018

Ref:ts1/strathmore

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
G28	Cypress, Leyland	12	2 2 2 2	2/N2	Mature	250a	12	3.0	Normal	Fair	Medium	C	1,2	10-20	Included bark in main stem unions Reduced in past to 3m Some die-back and branch death
G29	Ginkgo (Maidenhair Tree) x 3	12	2 2 2 2	1/S3	Mature	150	12	1.8	Moderate	Fair	Low	C	2	10-20	Drawn habit Slender, secluded trees of low merit
T30	Maple, Norway	14	7 7 4 7	1/S3	Mature	520	12	6.2	Normal	Good	Medium	B	1,2	20-40	Dead wood east side One of a group
T31	Maple, Norway	14	7 7 4 7	1/E3	Mature	440	12	5.3	Normal	Good	Medium	B	1,2	20-40	Dense canopy; one of a group Deadwood thoughout crown Included bark union (main stems)
T32	Maple, Norway	14	6 3 6 3	1/E3	Mature	420	12	5.0	Normal	Good	Medium	B	2	20-40	Dense canopy; one of a group Low branches Included bark union (main stems)
T33	Apple, Crab	5	2 2 2 2	2/N2	Middle Aged	100	12	1.2	Moderate	Fair	Low	C	1,2	10-20	Garden ornamental Dense epicormic at base

Notes:

1. Height describes the approximate height of the tree in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is shown above on each of the four compass points (i.e. N, E, S, W) clockwise.
3. Ground Clearance is the height in meters of crown clearance above adjacent ground level together with the height and direction of the lowest branch
4. Stem Diameter is the diameter of the stem 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. Protection Multiplier is 12 for single-stemmed trees; for multi-stemmed a cross-sectional area is calculated to derive the DBH, which in turn is multiplied by 12.
6. Protection Radius is a radial distance measured from the trunk centre and is used to calculate the BS RPA.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present or suspected.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat. refers to British Standard 5837:2012 Table 1 category and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Remove or very poor quality.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservation/ecological, historic and commemorative.
12. Useful Life is the tree's estimated remaining effective contribution in years.

Notes to the tree survey schedule

ACS (TREES) Consulting

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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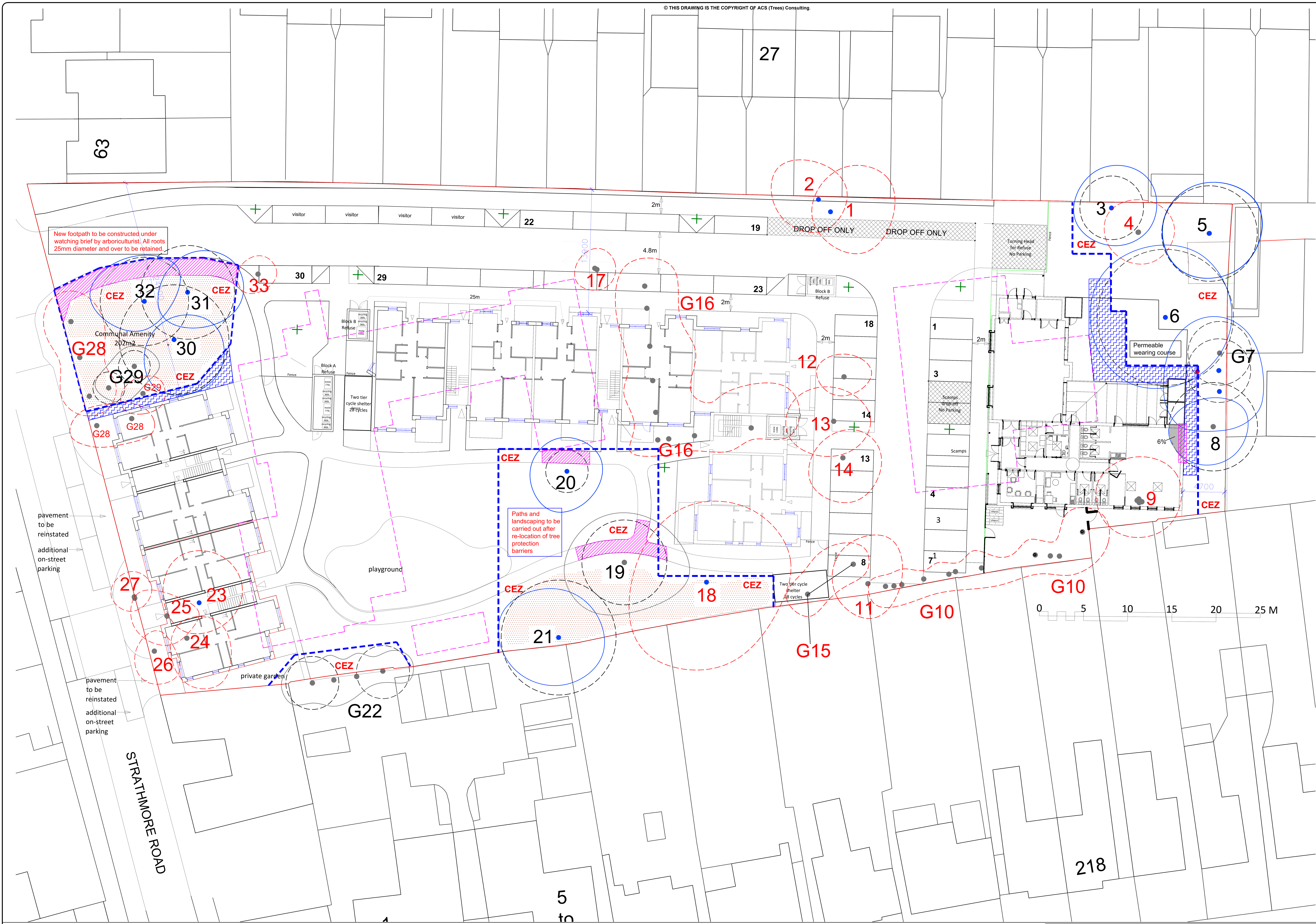

0 5 m 10 m 20 m

Scale: 1:200

ACS (Trees) Consulting LEGEND

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 N

- A grade trees
- C grade trees
- B grade trees
- U grade trees
- Trees to be removed. Refer to ACD landscape plans for replacements
- 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
- Area identified for supervised, manual excavations, all roots over 25mm diam. to be retained and protected.
- Area of BS RPA used for construction.
- Recommended area for max. 75mm depth of wel-rotted woodchip mulch or similar.

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 works - ask before beginning.
3. Install all tree and ground protection (see Appendix 3).
4. Undertake demolition and ground works.
5. Construction phase.
6. Remove tree protection and carry out landscaping.

Client : PA Housing

Project : Strathmore Centre, Strathmore Road, Teddington

Title : Tree Protection Plan

Scale : 1: 200 A1

Date : Sept. 2020

Dwg No : TPP1_SC

Rev : B

ACS (Trees) Consulting

Consultants in the Management of Trees and Woodlands

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TEL: 01737 244819 | 07770 820105

ALSO At:

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

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www.acstrees.co.uk

Do not scale from this drawing. Any discrepancies are to be reported to ACS (Trees) Consulting.
This drawing is to be used when printed to scale & in colour.

APPENDIX 3

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Tree Protection Barriers

Specifications (specifically identified by outline box and shading)

2.4m Hoarding

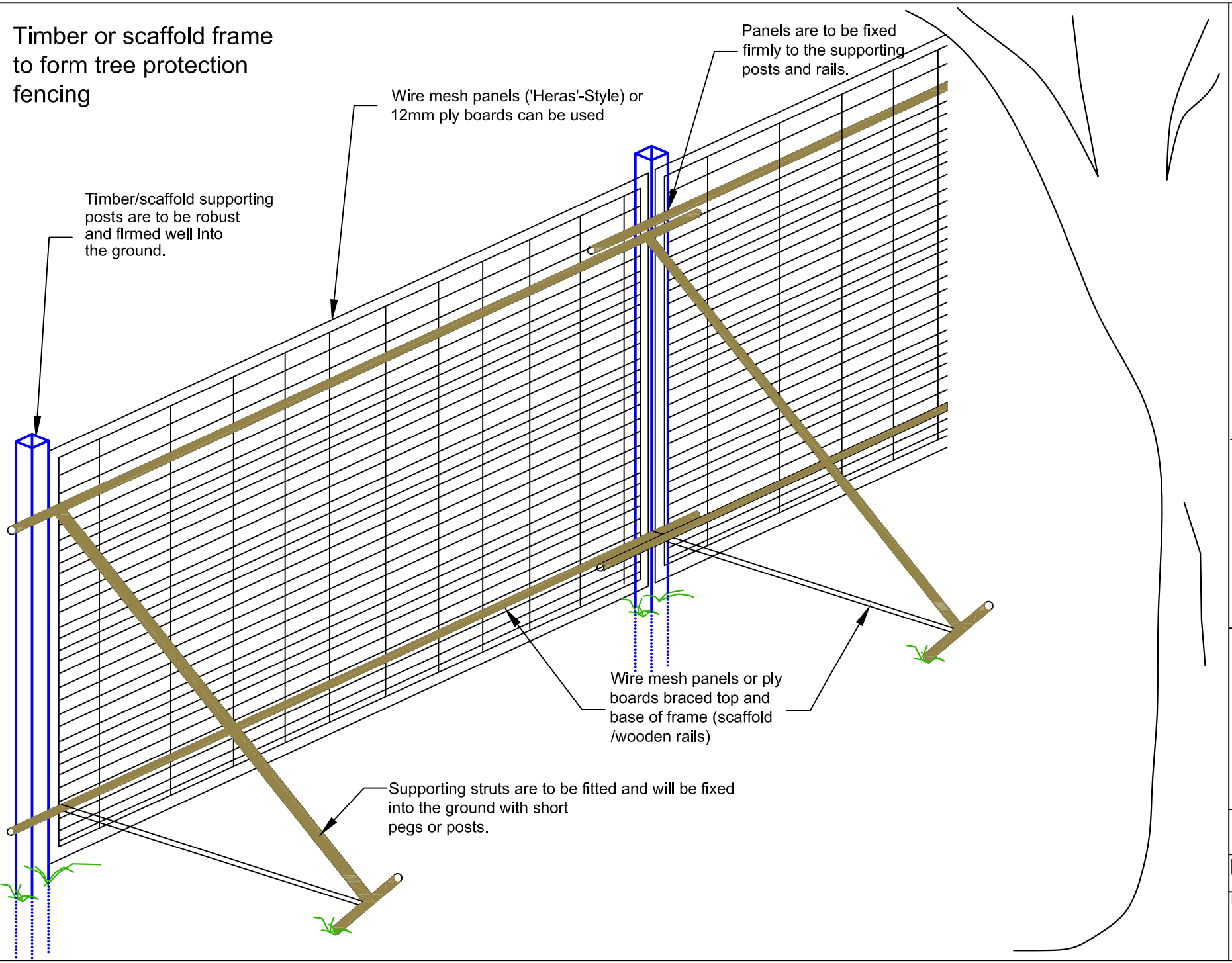
3.0m 100 X 100mm square wooden posts
3 X 38 X 87mm wooden rails affixed to posts
2.4m X 1200 outside grade ply panels (12mm) affixed to rails.
50 X 100mm angled supporting struts affixed internally (quantity as required).

(Supporting posts fixed into position using concrete. All post holes to be hand excavated. 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.

Timber or scaffold frame to form tree protection fencing



ACS Consulting (London)

Tree Management Consultants

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E: info@treebiz.co.uk

Title:

Example of Tree Protection Fencing

Note:

Steel scaffold or timber can be used to support boards or wire mesh panels

Date: Jan. 07

Ref:

Note: Sketch Plan Only - Not to Scale

Tree Protection Fencing

Scaffold Framework supporting ‘Heras’ type panels with signs attached.

Wooden Framework with ‘Heras’ type panels attached.

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www.treebiz.co.uk

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.

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Example of a suspended work platform - ground/root protection.

Note:
Effective for confined work areas

Do not drive scaffold poles through roots

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Tree protection fencing or frame

TREE

Work platform

Scaffold poles supporting work platfrom of OSB boarding

existing ground level

scaffold clamp

Root zone

Root zone

Short scaffold driven firmly into the ground

APPENDIX 4

ACS (Trees) Consulting
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ACS (Trees) Consulting
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Arboricultural Site Supervision

ACS CONSULTING

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

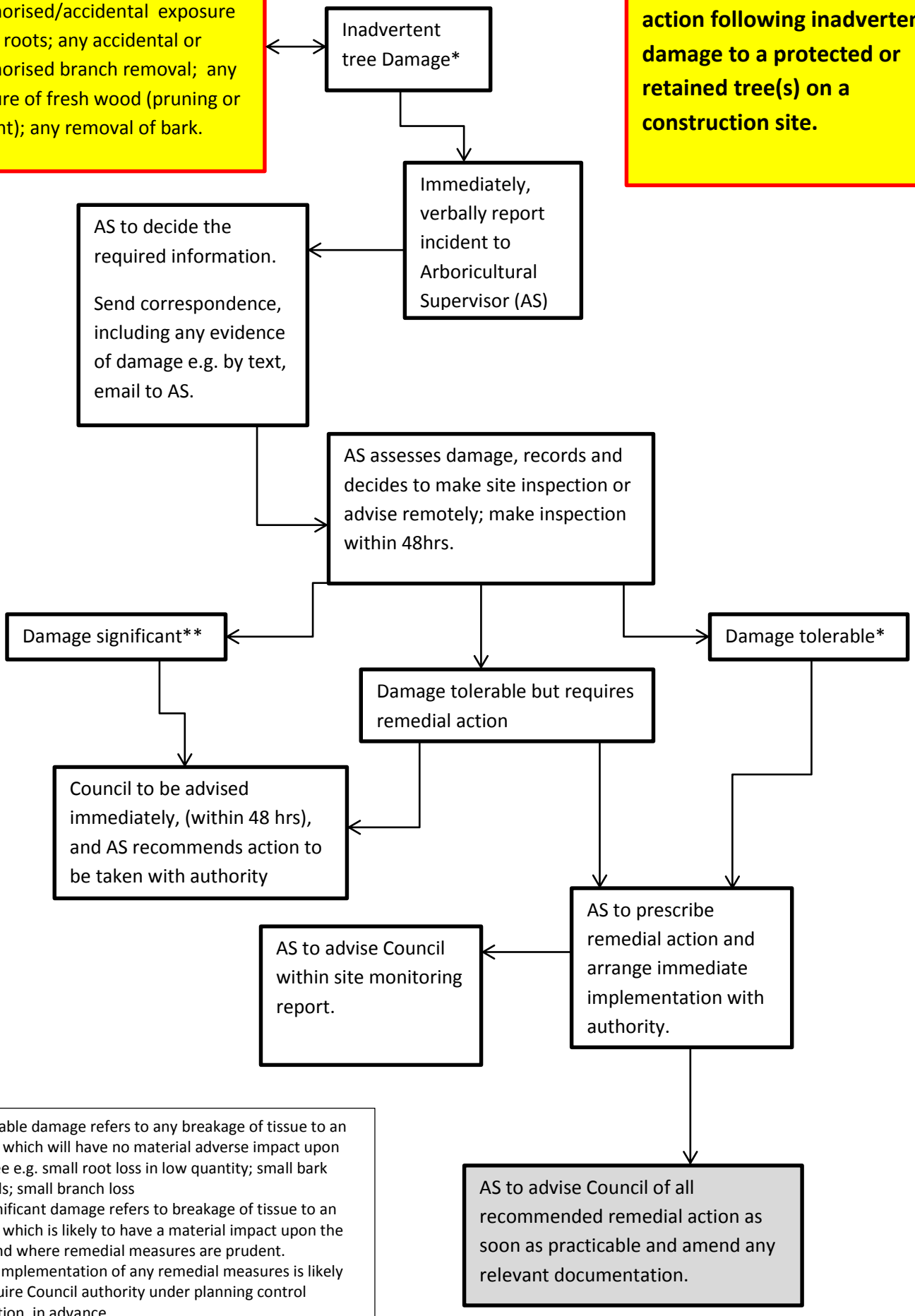
General Comments

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.

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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
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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.

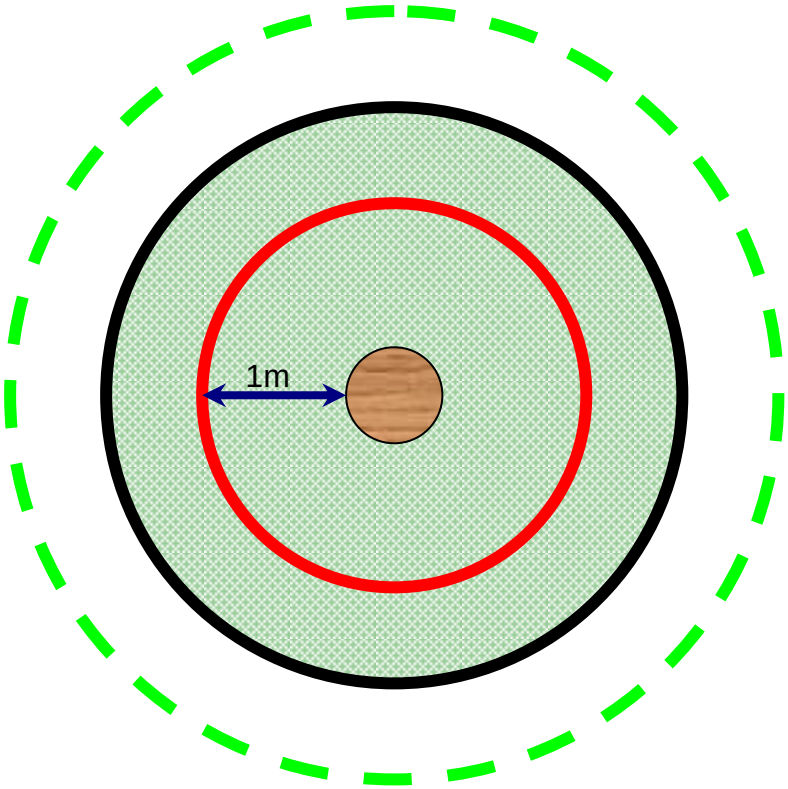
3.8 Where it is impossible to avoid completing the construction in one day for example, any exposed roots or their cut ends are to be covered with sacking material over night to prevent drying out and to add protection. This is particularly important in winter months, where frost can cause further damage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

Brief for Hand-excavated tree root investigation trial pits/trenches

1. Obtain any necessary licences/authorisation for excavation works from the appropriate agency or land owner.

2. Undertake Health and Safety risk assessments **before** proceeding with any excavation e.g. use of Cable Avoidance Tool; reference to utility maps.

3. Obtain details (plan) of exact dimensions and location of proposed trial pits, site access details and existing surface types. Trial pits are to be no less than 1.2m deep unless otherwise agreed.

4. Subject to written agreement, arrange access, protect the work area(s) with barriers and commence excavation works.

5. Mark out the area to be excavated with biodegradable spray paint. Where soft landscaping (lawn, planted areas), lay ground protection (e.g. 25mm OSB boards over 50mm wood chip mulch), alongside the proposed work area.

6. Within the identified area, carefully lift existing surfaces and place stones, paving or flagstones, where possible in a retrievable location. Where turf or grass is the surface, cut the turf out for the entire trial pit area and store in a retrievable location for re-instatement when appropriate.

(Note: where it is necessary to remove concrete or other very hard surfaces, the use of light mechanical or hydraulic hand machinery would normally be acceptable. Provisions for making good of all hard and soft surfaces will be required and agreed prior to commencement).

7. With the use of hand tools in combination with specialised pneumatic tools (e.g. 'Air Spade' or 'Air Knife'), manually remove the soil, preferably using an industrial soil vacuum, to expose roots to the agreed depth of the trial pit. **All roots in excess of 25mm diameter are to be retained for specialist assessment**.

8. Use a hand brush (or compressed air) or similar to clear excess soil away from encountered roots before proceeding to use spades, forks and trowels to remove further soil. **Note: Hand excavations must avoid, so far as reasonably practicable, damage to the root bark or root wood or retained roots.**

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9. The exposed roots are to be wrapped for easy identification with a material. To prevent desiccation (drying out) of all roots, the trial pit and retained roots should be covered with a damp material e.g. hessian or similar. **No roots are to be left exposed for more than four hours**. All exposed trial pits must be covered with robust boarding overnight for safety reasons.

Fig. 1 Protect the site (left) and mark out the area for excavation and lay ground protection

Fig. 2 Use compressed air to remove soil from roots

Fig. 3 Lift pavings and use boards to cover pits and trenches for safety

10. All spoil is to be placed upon boards, paving or sheeting in an agreed location, ready for backfilling when appropriate.

11. Exposed trial pits are to be fenced off and covered for safety reasons. All site users are to be made aware of their precise location.

12. Following root exposure – obtain expert advice on any root treatments (e.g. pruning or the use of void formers).

Fig. 4 Roots wrapped for identification and assessment by the appointed arboricultural consultant

APPENDIX 6

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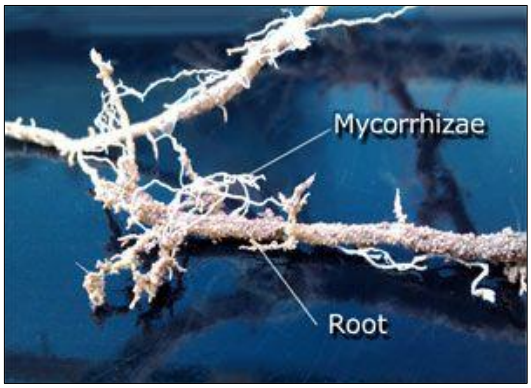
Tree rooting zone improvement

- Aeration
- Improve soil biosphere (microbial/mycorrhizal content and function)
- Improve soil structure, moisture content and fertility

Aeration of the soil improves soil structure and irrigation



Soil ameliorates can be added such as Organic Matter and Mycorrhizae (specialised fungi)

Simple applications of decomposed woodchip mulch over the bare earth under the canopy spread helps to retain moisture, suppress weed and grass competition and improve soil flora and fauna.

APPENDIX 7

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A decision-making aid to planning the location of new underground services near trees

Trenching for services (or utilities) near to trees can be damaging to trees and cause their instability. The National joint Utilities Group (NJUG) Volume 4 – 'Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees' covers utility installation planning and methods and is to be read in conjunction with this concise decision-making aid.

The following process should be applied when designing routes of new service trenches near to retained trees.
The land surrounding the base/trunk of a tree is divided into three Zones: **Prohibited** (other than exceptional circumstances), **Precautionary** (permitted with care) and **Permitted** (no restrictions to construction). See Fig. 1. Green shading is tree canopy spread.