PRELIMINARY TREE SURVEY IN CONTEMPLATION OF DEVELOPMENT

Title:	**Arboricultural Tree Report**
Instructed by:	**Mr Byron Airey** **BA Surveys Ltd** **Stourhead Drive** **East Hunsbury** **Northampton** **NN4 0UH**
Site Address:	**94 Hillway, Highgate, N6.**
Date of Site Visit:	**3rd September 2009**
Prepared by:	**Andrew Phelps**
Ref:	**PA S495**
Date	**3rd November 2009**

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Report Contents

BRIEF

A Detailed tree survey of all standing trees on the site to the following specification

- Species name, Estimated height, Age Class, Condition key, General arboricultural comments and recommendations
- Comments relating to the retention value of individual trees and tree groups within the delineated area to allow an assessment of development constraints
- All information is to comply with BS 5837 – A guide to trees in relation to construction and BS 3998 – Tree works

B Production of an accompanying tree constraints plan in PDF format / AutoCad (on supplied topographical drawing) detailing; tree numbers, protected areas, special measure areas and protective fencing requirements, in order to allow an assessment of relevant constraints.

C Consideration of the quality of the tree stock, their contribution to public amenity and the suitability of the trees in the context of proposed development.

1 Scope of the Report / Instructions

1.1 My name is Andrew Phelps. I am an associate consultant with Phelps Associates., Arboricultural Consultants, of Bank Chambers, 64 High Street, Epsom, KT19 8AJ. I am instructed by Mr Byron Airey of BA Surveys Ltd to determine a preliminary tree survey for future development of land at 94 Hillway, Highgate.

1.2 The main concerns of this report are to establish tree conditions and suitability to the site and landscape. Both general and specific tree management requirements are presented along with a tree/construction works specification. I am also asked to assess the likely impact of the proposed development on the surrounding trees, and have included details of the working methods to be employed before and during construction.

1.3 The site was visited on Wednesday 5th September 2009 and a total of 15 trees and groups of trees within potential influence on and off site were assessed visually in accordance with Visual Tree Assessment (VTA) and compiled in the following survey sheets as numbered individuals. Trees have been inspected from ground level only, and no decay detection equipment has been used.

1.4 No tissue samples were taken nor was any internal investigations of the subject trees undertaken.

1.5 No soil samples were taken.

1.6 The crown spreads were estimated by pacing.

1.7 Each individual tree has been assessed with general regard to condition, health and amenity, development context, retention value and commented upon in the following manner:

- Tree Number
- Tree Species
- Estimated height
- Estimated crown spread
- Diameter at breast height
- Vigour
- Retention value
- Arboricultural condition and recommendations for remedial works

1.8 Comments relate to species content, retention and amenity value, and have been provided with recommendations.

1.9 The trees have been classified according to their "desirability to retain". This rates the amenity conferred by each tree and is based on the assumption that development will occur on the site and having given consideration to the recommendations of this report and BS 5837: 2005 – Table One.
For clarification – the grading system can be summarised as follows:
A – high quality & value, effective for more than 40 years
B – moderate quality & value, effective for more than 20 years
C – low quality & value , effective for 10 years
R – trees for removal (effective for less than 10 years)

1.10 To ascertain the overall condition of a given tree, the survey sheets should be used in conjunction with the condition key (4.1)

1.11 To ascertain the age class of a given tree, the survey sheets should be used in conjunction with the age class key (4.2)

1.12 The trees on the site are subject to a general re-inspection schedule of six months from which a requirement for further monitoring or assessments will be judged.

1.13 Any specified remedial work recommendation is regardless of development plans and is based on current tree condition. Therefore the start date for the implementation of remedial works is as specified and from the date of survey.

2 Tree Works

2.1 All tree pruning and felling identified within the pruning regime shall be carried out in accordance with BS 3998 Recommendations for tree work and The International Society of Arboriculture Tree Pruning Guideline 1995.

2.2 All tree work should be undertaken by a suitably qualified Arboricultural Contractor. No works shall be carried out until permission has been granted by the relevant Local Planning Authority. The Forestry Authority should be contacted to check as to whether a Felling License is required.

3 Limitations

3.1 No assessment has been made of soil conditions/implications of soil conditions and root extent is indeterminate from this survey. We would urge that soil type is ascertained and tree related implications are assessed such as foundation type/depth in accordance with N.H.B.C. guidelines.

3.2 An Ordnance Survey drawing has been provided showing a sketch drawing of the proposal which includes detail of tree position and root protection areas.

3.3 I am not aware that any trees growing on site are the subject of any 'Tree Preservation Order'.

3.4 No liability can be assumed to rest with Phelps Associates should conditions alter following our inspection of the site. Therefore we must be informed immediately of any alterations to plans upon which our assessments and conclusions/recommendations have been based.

4 CONDITION, AGE, VIGOUR, AMENITY & RETENTION VALUE KEYS

Condition Key

4.1 For the purposes of ascertaining the general overall arboricultural condition of the trees / compartments referred to in the survey sheets the following key should be used.

Good	Generally classed as having good overall structural and physiological condition. Specimens in good/excellent condition. They generally have few and less significant arboricultural defects than those trees classed as "B" or "C". Usually contribute significantly to the local or site amenity.
Moderate	Generally classed as having reasonable structural and physiological condition. They may contain smaller areas of included bark within either major or minor fork junctions. They may be subject to single or multiple fungal invasions, bacteria or virus. In the case of fungal invasion or bacteria the Latin name of the species has been stated. They may be subject to minor crown dieback, unusually pale or smaller foliage or have been subjected to outside influences such as restriction of rooting spread, vandalism or mechanical damage, but should be viewed as in generally good overall condition.
Poor	Generally classed as having poor overall structural or physiological condition. They may contain large areas of included bark either within major or minor fork junctions. They may be subject to single or multiple fungal invasions, bacteria or virus. In the case of fungal invasion or bacteria the Latin name has been stated. They may contain splits or cracks throughout the branching structure. They may be subject to significant crown dieback or exhibit unusually pale or small foliage, be defoliated or dead. They may be subject to outside influences such as restriction of rooting spread, vandalism or mechanical damage and costly to retain.

4.2 Age Class Key

NP	Newly planted
Y	Young - Tree/shrub in first third of life expectancy
MM	Middle Mature – Tree in 2nd third of life expectancy
M	Mature - In final third of life expectancy
OM	Over Mature – Declining in physiological functions

4.3 Amenity Value Classifications

High (`A`)	Significant contribution to either local landscape, landscape within site or both. Tree cover in this category should be carefully managed to ensure that the contribution played by the tree within the landscape is not compromised.
Moderate (`B`)	Indicates that the tree provides some contribution to the local landscape or landscape within site. Consideration should be given to enhancing the landscape with planting if required and management should aim to further enhance the local landscape.
Low (`C`)	Indicates little, no or a negative contribution to the local landscape.

4.4 Growth Vitality Key

N	Normal
M	Moderate (below normal)
P	Poor (sparse, weak)
D	Dead

4.5 Retention Value Key

The trees have been classified according to a desirability to retain. This rates the amenity conferred on each tree / tree group and is based on the assumption that development will occur and given consideration to the main report findings. The categories are contained in the table - Table 1: Retention Value Key found in Appendix 3 of this report.

5 General Description of Site and Surroundings.

5.1 A privately owned site currently occupied by a residential property.

Proposed Development

5.2 Information recorded in the tree survey has being used to assist with the site layout design and to ensure all trees survive throughout all construction works within the development proposal. The redevelopment for this site proposes the provision of the new side extension within the footprint of the existing property, and a small rear extension and terrace area.

6 Arboricultural Survey – Tree Details & Observations.

6.1 The attached Tree Survey Schedule (see Appendix 1) details the significant trees in respect of their dimensions and quality in accordance with the methodology set out in the British Standard BS 5837:2005 'Trees in relation to Construction-Recommendations'. Appropriate and relevant comments are also provided. The removal of dead, dying and dangerous trees is considered to be appropriate tree management irrespective of development. The proposed tree works are to be considered in conjunction with the development application.

6.2 In the following paragraphs I have provided further information relating to specific trees and their management in the context of any proposed development.

6.3 Trees growing in the front garden area are all of moderate or low value. Trees 1 & 6 have been categorised as being Category 'B' trees, that of moderate quality and value. It can be seen on the tree constraints plan that T.1 has a root protection radius of over 8m. This may be seen as the only real constraint in this area. All trees are currently in good condition with no evidence of any structural or physiological defects which would forseeably reduce life expectancy or pose any risks to safety.

6.4 T.9 London Plane (rear garden) With a root protection radius of 14m has been categorised as being a Category 'A' tree that of high quality and value. This tree is clearly the most significant constraint to development in the rear garden area. However it may be possible to build within the root protection area to some extent.

6.5 The remaining trees in the rear garden are all a significant distance from the property, with trees 13 & 14 (high value trees) standing over 25m from the nearest elevation.

6.6 T.10 & T.11 (Yew & Bay) These trees are growing under the canopies of the surrounding Plane trees.

6.7 T.15 Lime. Growing off site, an important tree in the landscape can easily be protected throughout any proposed development.

6.8 T.8 Fruit. Growing in a poor position its removal is required to allow development. This tree can be lost without a significant landscape impact.

6.9 **A summary table of tree quality is provided:**

	A Grade	B Grade	C Grade	R Grade
No. of trees/groups	4	5	5	1
% of total	27	33	33	7 (stump)

7 Assessment of Proposed Development – Implications for Roots.

7.1 The British standard recommends a minimum area around retained trees which should be protected from disturbance "in order to avoid damage to the roots or rooting environment." This 'Root Protection Area' (RPA) is calculated, using Table 2 of the British Standard, as an area equivalent to that of a circle with a radius 12 times the stem diameter for single-stemmed trees, and 10 times the basal diameter for trees with more than one stem arising below 1.5m above ground level. The root protection area (m^2) (RPA) for individual trees to be retained has been calculated using the tree survey data (page 6 BS5837) in conjunction with Clause 5.2 'Root protection area' of the standard. This prescribes the minimum area (m^2) that should be left undisturbed around each individual or group of retained trees. As recommended by the Standard, the RPA has been plotted as a circle or a polygon on the attached tree protection plan (TPP). As permitted by Clause 5.2.4 of the Standard, for open grown trees the RPA may be offset by up to 20% or the shape of the RPA may have been changed, but not its area (m^2), whilst still providing adequate protection for the root system.

7.2 Paragraph 5.2.4 of the British Standard states that the RPA for each tree should be assessed taking account of factors such as the likely tolerance of a tree to root disturbance or damage, the morphology and disposition of roots when these are known to be influenced by existing site conditions, including the presence of existing roads or structures, as well as soil type, topography and drainage. The shape of the RPA (although not its area) may be modified as a result of these considerations.

7.3 The redevelopment for this site proposes the provision of a new side and rear extension to the existing property.

7.4 T.9 Plane. Standing at approximately 14m in height and clearly a valuable tree in the landscape, with a root protection radius of over 13m and a root protection area of 547m². On the plan the closest new elevation is approximately 8.7m away from the trunk. Therefore the proposed new development falls within the recommended 13m radius for this tree. However, it is largely within the footprint of the existing property/garage and the existing foundations for this structure will have provided a barrier to roots in this area, along with the existing ground features, contouring and hard landscaping the proposed new extension could be provided without detriment to the root mass of T.9. (This area is marked in Cyan blue stripes on the TPP)

7.5 The proposed rear extension would occupy a further 3% of the RPA (marked on the TPP in red stripes) which will require new foundations and should be viewed in the context of the ground conditions, features and potential for root damage. Therefore this small area to be excavated will not in my view affect the trees (T.9) good health.

7.6 Following demolition of the existing building which extends into the rear garden it is possible to erect tree protective fencing at the edge of the proposed build footprint as seen on the TPP (TPF 2). Details of demolition works should be carried out as set out below.

8 Demolition of Building within Root Protection Areas

- 'Tree Protective Fencing' TPF 1 to be installed as per approved tree protection plan prior to any plant arriving on site.
- Sensitive demolition will occur to structures within RPA's as indicated on TPP. (blue cyan stripe)
- Demolition will be by folding buildings in on themselves, and the removal of debris and slab/concrete floors must be removed where possible by hand.
- Where this is not possible the use of low impact pneumatic tools may be used to break up the surface before debris removed by hand.
- Following the successful removal of slab/concrete floor there will be no reduction in levels of the underlying soil surface.
- The underlying soil may then be levelled by the addition of up to 100mm of good quality soil to BS3882:1984.
- The 'Tree Protective Fencing' (TPF 1) should then be relocated to just outside the proposed new foundation footprint (TPF 2)
- This fencing should now remain in situ until building works have been completed and only be moved to allow construction of the terrace area.
- The 'Tree Protective Fencing' TPF 3 should now be erected at the edge of the area proposed for new terrace as seen on the TPP.

9 Instillation of Low Invasive (no dig) Surfacing Using a Cellular Confinement System Within Root Protection Areas

- The following design criteria for low-invasive surfaces (LIS) will need to be considered when installing new hard surfacing within the RPA of T.9:
- Maintain oxygen diffusion through new surface to rooting area (15-12% by volume)
- Maintain sufficient passage of water to rooting area (12-40% by volume)
- Avoid compaction by maintaining a soil structure sufficient to sustain root growth (soil bulk density below 1.4g/cc)
- The depth of the product for the LIS in this instance will be between 150-200mm and will be installed above the existing soil level to tie into the threshold level of the existing building.
- This can be achieved by using geotextile membranes and the introduction of the three dimensional cellular confinement system. (CCS).
- If ground levels are to be raised more than 150mm as in this case this should be achieved by the use of granular material which does not inhibit wertical gaseous diffusion e.g. no fines gravel, washed aggregate, structural soil (min 20% sand content) or cobbles.
- The approved wearing course to be laid over the CCS.
- The CCS should be filled with no-fines stone in the 20-40mm range.
- The minimum system thickness available for CCS material is 75mm and is available up to 300mm thickness; the material required is dependant on the load bearing capacity of the final surface.
- A structural engineer should design all engineering solutions to surfaces.

10 Stages for Instillation;

Stage 1:erection of TPF 3 at terrace edge (see TPP)

Stage 2:remove existing vegetation by using a specific herbicide or manual removal with hand tools only. Agreed removal of trees, saplings or shrubs within the RPA's of retained trees are to be cut to or just below ground level, rather than grubbed or ground out which can damage roots of retained trees.

Stage 3:remove any existing hard surfaces. The sub base of existing surfaces or foundations should be left in situ where possible to avoid unnecessary root disturbance and provide a base for a new LIS.

Stage 4:install the non woven geotextile directly over soil grade level (levelled where necessary by the infill of no fines gravel, washed aggregate or structural soil) and fix in place.

Stage 5:lay the CCS over the geotextile which is secured open under tension during the infill process with steel staples or wooden pegs

Stage 6:install curbs and edgings directly on top of existing soil grade level. Railway sleepers, haunched concrete with road pins, drilled curb stones, gabions or cast in situ curbs will be appropriate.

Stage 7:fill the CCS. Typical infill consists of no fines angular granular material 20-40mm which will remain un-compacted.

Stage 8:install surface options
Small block paving

- Lay a second layer of geotextile separation fabric over the infill CCS
- Lay a sharp sand bedding layer to recommended depth
- Place block paviers as per manufactures' instructions

Further details, specification and typical cross sections for CCS are contained in appendix 5 of this report.

10.1 The remaining trees in the rear garden can be protected with the use of 'Tree Protective Fencing'.

10.2 Trees growing in the front garden area are all regarded as moderate or low value and can be protected with fencing.

11 Recommended Schedule of Tree works

11.1 T.8 Fruit: Fell to ground level.

12 Conclusions

12.1 The layout has been designed to reflect the building use and to minimise future pressure on trees.

12.2 T.9 London Plane. Clearly an important tree growing in the rear garden of the property. If it is decided to develop within the back garden area then I feel the limited incursion into the trees RPA could be achieved without affecting the good health of T.9. London Plane trees are hardy species and I feel the proposal can be achieved without detriment to the retained tree providing protective fencing is installed and ground protection measures are employed in full accordance with this document.

12.3 The design of the scheme accords with the relevant BS for trees and development (5837:2005) and for the vast bulk of the proposal exceeds the guidelines produced in this document.

12.4 Subject to proper and normal tree protection measures, the proposed development will not impinge adversely on the effects of the trees in the landscape.

12.5 Type 1 TPF, which is suitable for areas of high intensity development, shall comprise interlocked Heras panels, well braced to resist impacts by attachment to a scaffold framework that has been set firmly into the ground. The scaffold framework shall comprise top and bottom horizontal bars, with uprights set firmly into the ground at no less interval than one per panel. Sloping bars as braces, perpendicular to the line of the fence, shall be fixed to the top rail and set into the ground; these shall be spaced at no less an interval than one brace per two panels.

12.6 Landscaping works will be implemented in accordance with a scheme approved by the Council and following removal of the temporary fencing.

I hope that you find this report satisfactory, please do not hesitate to contact me if I can be of further assistance.

Signed ..... Date.....

13 General Arboricultural Method Statement (Outline)

13.1 This document sets out the methodology for all proposed works that affect trees on and adjacent to the site.

13.2 Compliance with this method statement will be a requirement of all relevant contracts associated with the development including initial groundwork's and landscaping.

13.3 Before construction work begins and in order to ensure that all protective measures are enforced, a pre-construction site meeting with the design team and the LPA is usually required to achieve this. The following issues should be addressed:

Issue	*Details required for Method Statement*
Access	Protection of all trees and timing of works
Fencing	Erection of protective fencing during demolition and construction phases
Felling & pruning	Schedule and methods
Landscape	Provision of a landscape planting plan and schedule of works
General	Phasing/Timing of works
Services	Review of proposal

Protective Fencing

13.4 Before materials or machinery are brought onto site and before any development, demolition, soil stripping or other site work commences(other than those set out in the schedule of tree works set out in this document), vertical barriers and ground protection will be installed in the positions and to the specification set out in the TPP. The local planning authority should be notified when the fencing is in position.

13.5 The fencing will comprise a 2.4 metre high scaffold framework supporting weldmesh panels fixed together with wire or scaffold clamps. The fencing will remain in place until completion of the main construction phase and then only removed with the consent of the local planning authority to permit completion of the scheme.

General Precautions

13.6 Other than works detailed within this method statement or approved in writing by the local authority, no works including storage or dumping of materials shall take place within the exclusion zones defined in the tree protection plan.

13.7 All materials for construction purposes, such as oil, bitumen, cement or petrol, should be carefully stored outside of the tree protection areas. All toxic substances such as oils, bitumen's and residues from concrete mixing should be retained by effective catchment areas such as the use of 'walk-in' refuse containers. These areas should be at least 10m from any tree trunk. No fires will be lit within 20m of the trunk of any tree that is to be retained.

13.8 All relevant construction and development personnel should be informed with respect to the Arboricultural Method Statement and the information contained therein made available to them.

13.9 Site supervision should be carried out by both site agent and/or Arboriculturalist to ensure that protective measures are used and protective distances are strictly enforced. A reporting procedure should also be implemented and agreed.

13.10 All landscaping works should avoid soil re-grading and disturbance within the tree protective areas. If cultivation of the soil within the protective distances set out in the Tree Survey Schedule is unavoidable as part of any landscaping proposal, cultivation should not exceed 100mm depth. All landscaping works, soft and hard, should be carried out as the last process of development.

13.11 There shall be no lowering or stripping of soil levels within the exclusion zones other than the removal of surface debris such as leaves, deadwood. Any levelling shall consist of the introduction of sharp sand to create a level surface ready for the finishing treatment.

Appendix 1 – Tree Survey Schedule

4.1 Tree Survey Schedule

Site:	94 Hillway, Highgate, N6.	Surveyor:	Andrew Phelps
Date of Survey:	5th September 2009	Ref:	PA S495

Tree No	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter (mm)	Protection Multiplier	Protection Radius	Vigour (Growth Vitality)	Structural Condition	Amenity Landscape Contribution	B.S Cat Ret Value	Sub Cat	Useful Life	Structural Condition/Observations
T.1	Conifer	10	3	4	Mature	830	10	8.3	Normal	Good	Medium	B	1/2	<40	Visible in landscape
T.2	Pear	6	3	2	Mature	180	12	2.2	Moderate	Good	Low	C	2	<20	I would suggest a life expectancy of 5 years
T.3	Holly	8	3	3	Mature	190	12	2.3	Normal	Good	Medium	C	1/2	20	Providing some screening benefits
T.4	Conifer	8	2	4	Mature	220	12	2.6	Normal	Good	Medium	C	1/2	20	Growing at significant angle
T.5	Stump	-	-	-	-	-	-	-	-	-	-	-	-	-	Can Remove if required

Notes:

1. Height describes the approx. height of the tree in metres from ground level.
2. Crown spread refers to the crown radius in metres from the stem centre and is expressed as an average of NESW if symmetrical
3. Ground Clearance is the height in metres of crown clearance above adjacent ground level.
4. Diameter Breast Height (DBH) is the diameter of the stem measured in mm at 1.5m from ground level for single stemmed trees or at ground level for multi-stemmed trees. DBH may be estimated where access is restricted.
5. Age Class is the tree's relative age to its species and is expressed as Newly planted (NP) Young (Y), Middle Mature (MM), Mature (M) and Over Mature (OM).
6. Protection Multiplier is 12 for single stemmed and 10 for multi-stemmed trees and is the number used to calculate the trees protection radius and area.
7. Protection Radius is a radial distance in metres measured from the trunk centre.
8. Growth Vitality - Normal ; Moderate (below normal); Poor (sparse, weak); Dead (dead or dying tree)
9. Structural/Arboricultural Condition – Good (no or only minor defects); Moderate (remediable defects); Poor (major defects present). See Condition Key (4.1) for detail
10. Landscape Contribution – High (prominent landscape feature); Medium (visible in landscape); Low (secluded/among other trees)
11. B.S Cat refers to (BS 5837:2005 Table 1) and refers to tree/group quality and value; 'A' – High; 'B' – Moderate; 'C' – Low; 'R' – Remove. **See Table 1 - Retention Value Key**
12. Sub Cat refers to the retention criteria values where 1 is arboricultural, 2 is landscape and 3 is cultural including conservational, historic and commemorative.
13. Useful Life is the tree's estimated remaining contribution in years.

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T.6	Bay	10	3	3	Mature	240	12	2.9	Normal	Good	Medium	B	1/2	40	No visual defects
T7G	Acer/Prunus	5	3	1	Middle Mature	Less 150	10	1.5	Normal	Good	Medium	B	1	<40	Attractive trees
T.8	Fruit	7	3	2	Mature	180	12	2.2	Poor	Good	Low	C	1	<10	Growing in poor position, recommend removal
T.9	London Plane	18	10	4	Mature	1100	12	13.2	Normal	Good	High	A	1/2	>40	Valuable tree
T.10	Yew	6	4	3	Mature	210	12	2.5	Normal	Good	Medium	B	1	>40	Suppressed under Plane

Notes:

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T.11	Bay	9	4	4	Mature	400	12	4.8	Normal	Good	Medium	B	2	40	Somewhat suppressed
T.12	Laurel	6	5	4	Mature	500	10	5.0	Normal	Good	Medium	B	2	40	No visible defects
T.13	London Plane	20	10	9	Mature	1000	12	12	Normal	Good	High	A	1/2	>40	Good example of species
T.14	London Plane	20	10	9	Mature	950	12	12	Normal	Good	High	A	1/2	40	No visible defects
T.15	Lime (LPA owned)	15	6	4	Mature	700	12	12	Normal	Good	High	A	1/2	40	LPA owned tree

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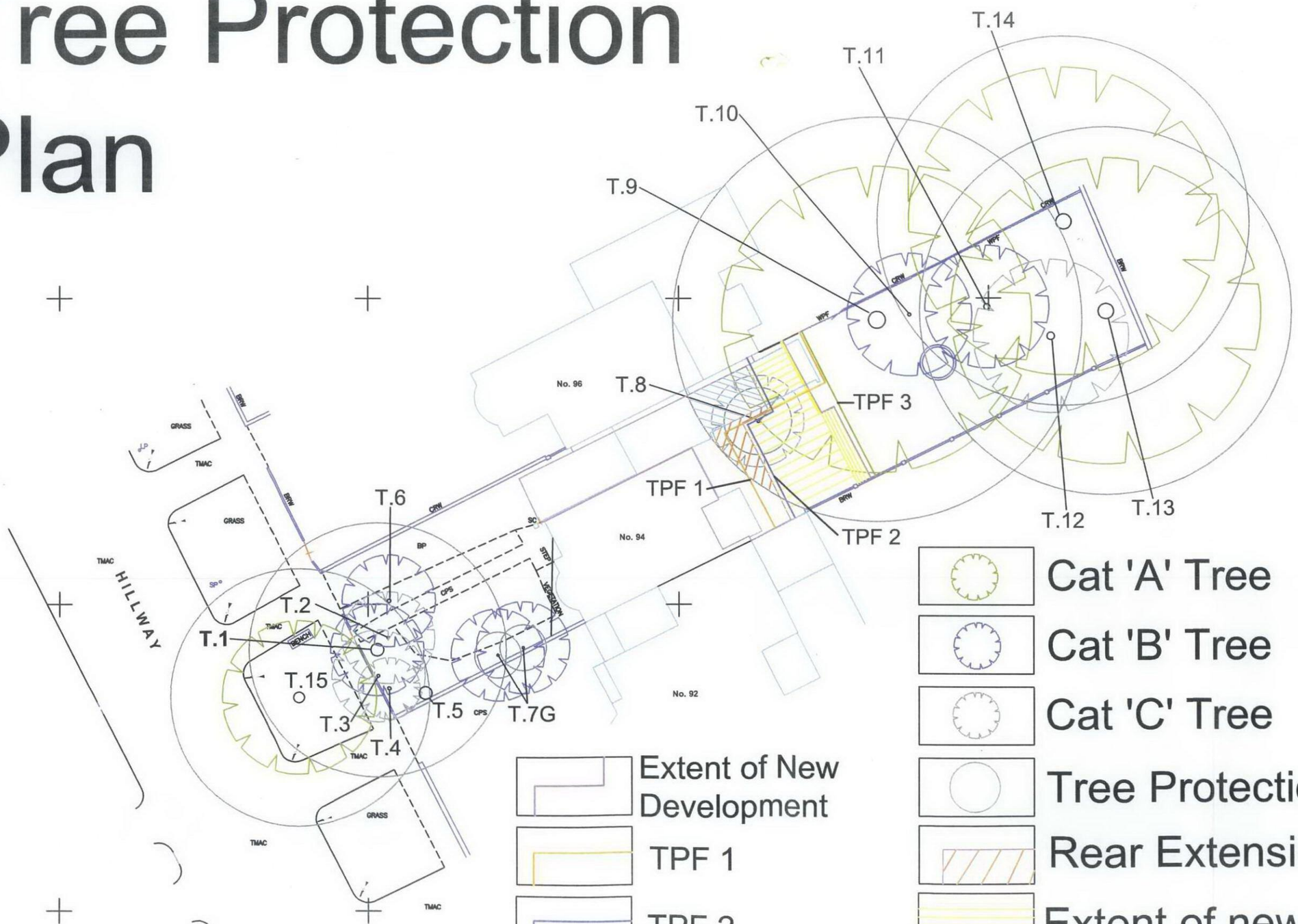
Appendix 2 – Tree Protection Plan

Appendix 3 – Retention Value Key

TREES FOR REMOVAL				
Category and definition	**Criteria**			**Identification on Plan**
Category R Those I such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management	• 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 R category trees (i.e. 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 (e.g. Dutch Elm Disease) or very low quality trees suppressing adjacent trees of better quality **NOTE:** Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).			Dark Red 1
TREES TO BE CONSIDERED FOR RETENTION				
	Criteria – Subcategories			
Category and definition	**1. Mainly arboricultural values**	**2. Mainly landscape values**	**3. Mainly cultural values (including conservation)**	
Category A **Those of high quality and value:** in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light Green 4
Category B **Those of moderate quality and value:** those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)	Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens) or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	Mid Blue 5
Category C **Those of low quality and value:** currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested) or young trees with a stem diameter below 150mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	Grey 5
	NOTE: Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation			

Appendix 4 – Protective Fencing

Tree Protection Plan



Extent of New Development

TPF 1

TPF 2

TPF 3

Cat 'A' Tree

Cat 'B' Tree

Cat 'C' Tree

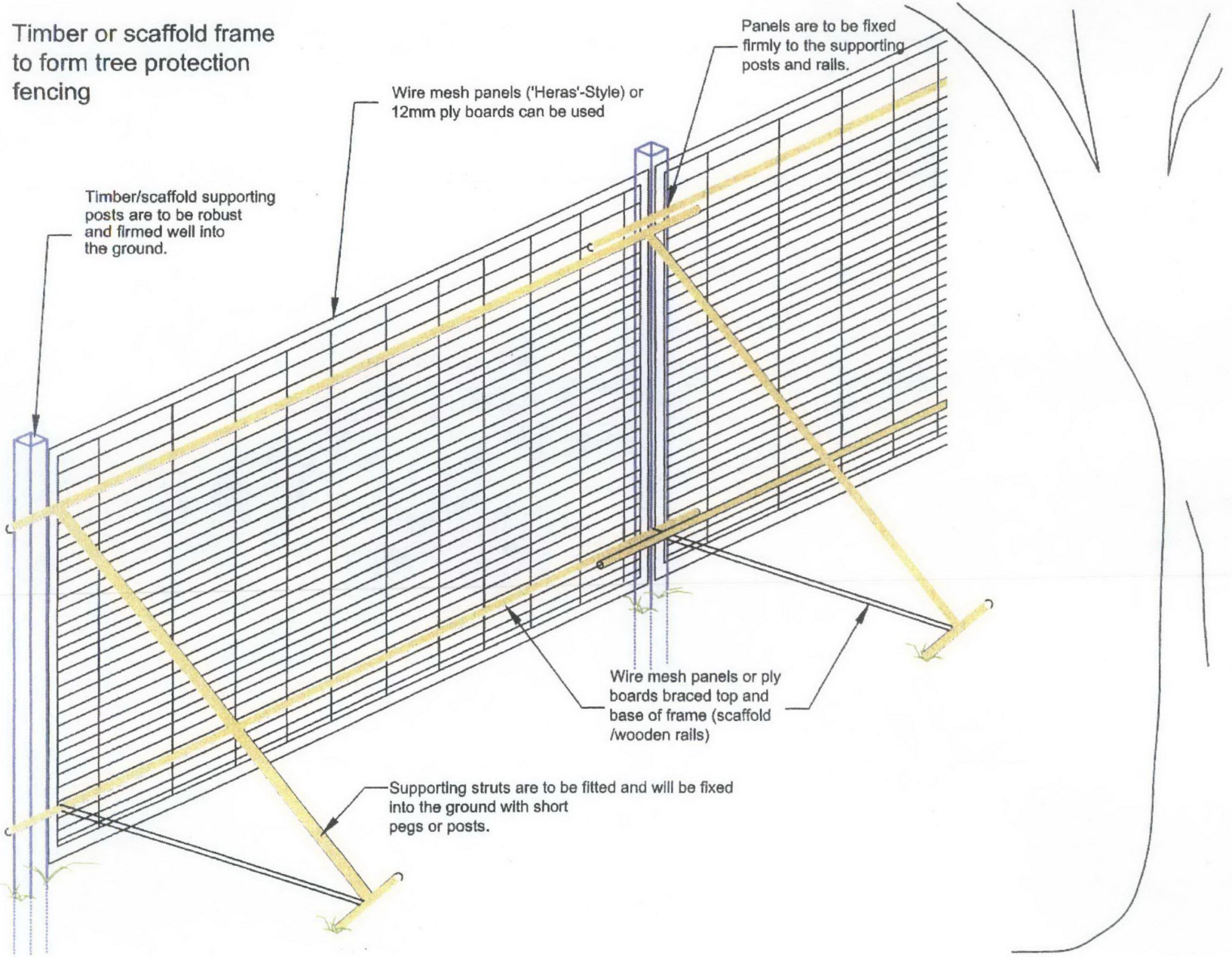
Tree Protection Area

Rear Extension Incursion

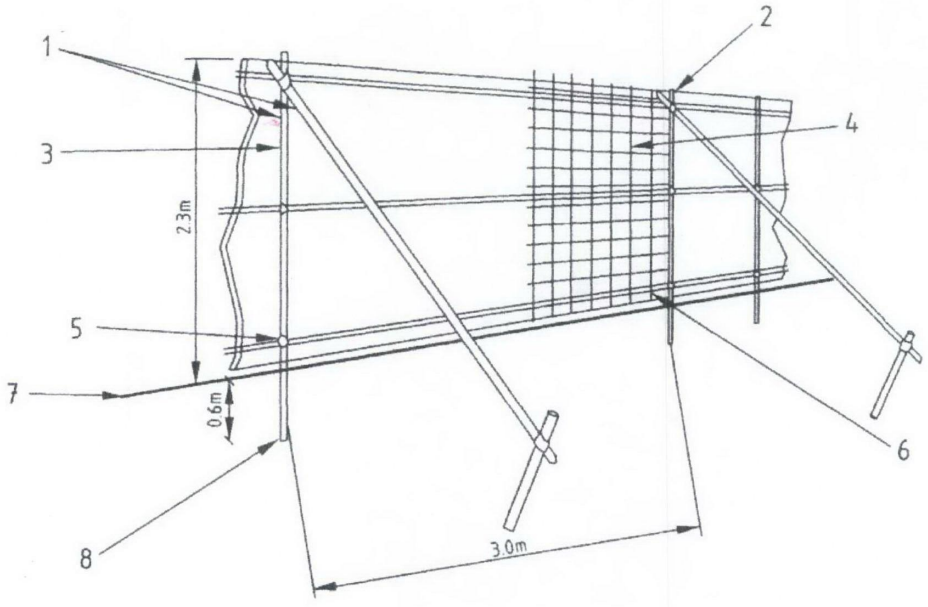
Extent of new terrace area

New Extension Within Existing

Timber or scaffold frame to form tree protection fencing



BS5837 2005 - FIG 2 TREE PROTECTION ZONE BARRIER FENCE



1 Scaffold poles

2 Uprights, to be driven into ground

3 Panels, secured to uprights with wire tires and where necessary scaffold clamps

4 Weldmesh, wired to the uprights and horizontals

5 Clamp

6 Wire, twisted and secured

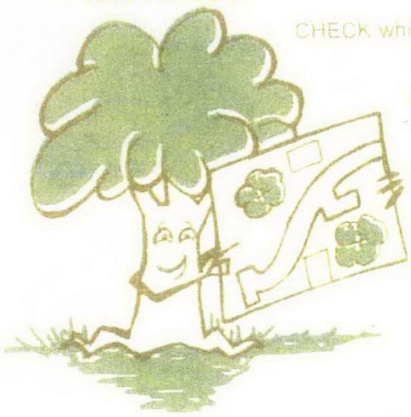
7 Ground level

8 Approx 0.6 m driven into the ground

Construction Sites -

How to work around trees successfully !

Plan Ahead!



CHECK which trees need protecting

PLAN storage areas

Only use the approved plans

Erect protective fencing

PUT THE FENCE UP BEFORE any site works commence

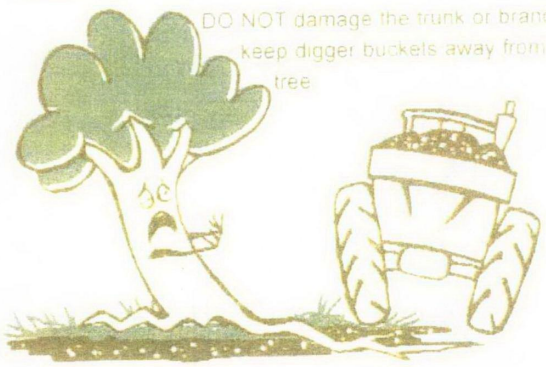
DO NOT remove the fencing without permission

DO NOT raise or lower ground levels within the fenced area

No machinery near trees

BEWARE OF THE ROOTS - these are vulnerable to damage within the canopy spread or half the hight away, whichever is greater

DO NOT damage the trunk or branches - keep digger buckets away from the tree



Don't store materials within the protected area

Heavy materials will damage the roots

Chemical and oil spills will poison the tree

DO NOT mix cement near trees

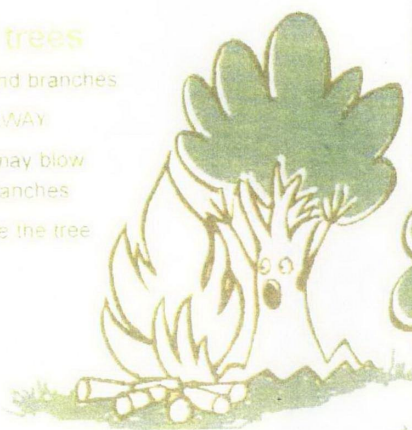
No fires near trees

Beware of the roots and branches

KEEP FIRES WELL AWAY

Remember the wind may blow flames towards the branches

Heat can also damage the tree



Healthy trees sell properties

Trees benefit everyone and help to sell houses

We all want to live in nice surroundings

Appendix 5 – 'Cellular Confinement System'

Appendix 6 – Hand Digging in the Vicinity of Trees

Hand 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.

Appendix 7 – How to Work Around Trees Successfully

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 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.

2.3 The larger the root damaged, the greater the impact on the tree.

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 – this can be calculated by multiplying the distance of the tree trunk's circumference (at 1.5m above ground level) by 4 (NJUG 10) or by referring to Table 1 of BS 5837:2005 'Trees in Relation to Construction. Recommendations'. This area is called the Precautionary Zone or Root Protection Area. **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 precautionary area with ground marker paint, clearly on the ground. This will identify the area within which hand digging must take place. **For safety, ensure there are no underground services 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 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.

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 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 to offer immediate protection. 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.

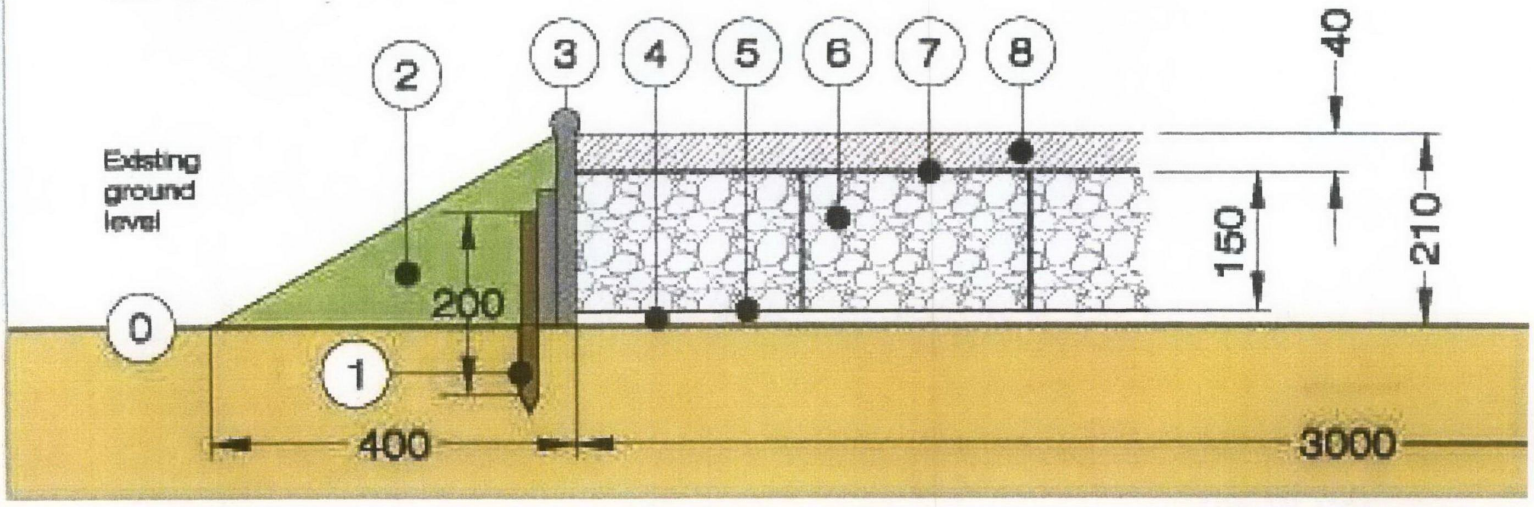
3.8 Where it is impossible to avoid completing the construction in one day for example, any exposed roots or their cut ends are to be covered with sacking material over night to prevent drying out and to add protection. This is particularly important in winter months, where frost can cause further damage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

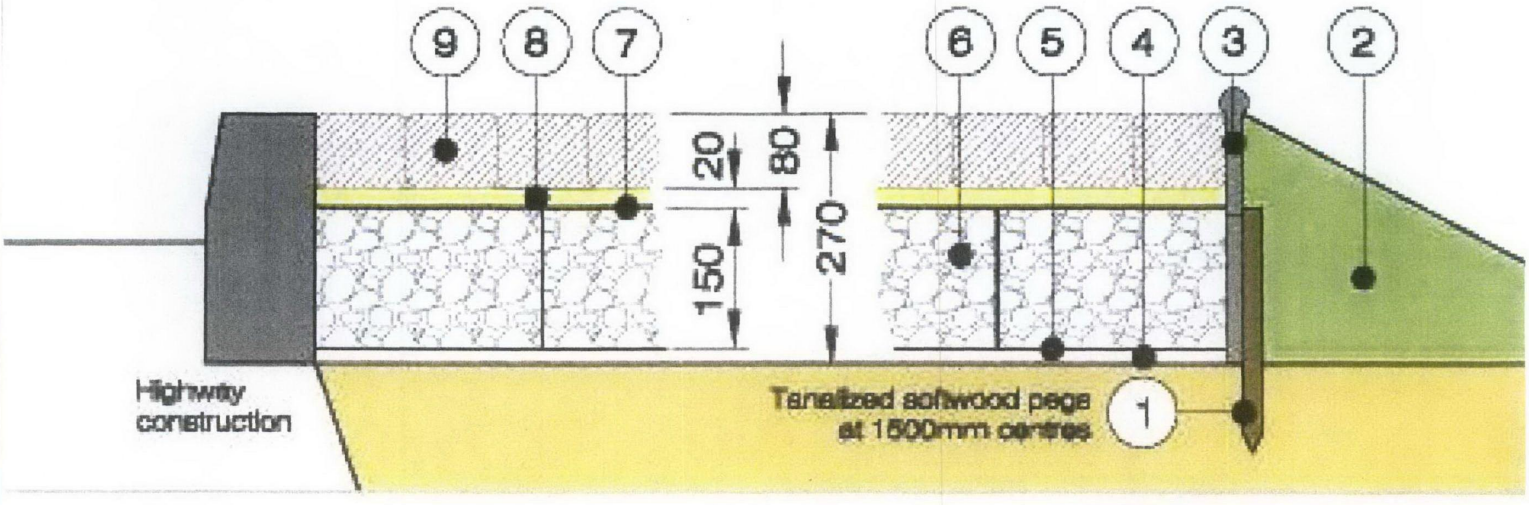
Attached is an extract from the National Joint Utilities Group publication No 10 1995, 'Guidelines for the planning installation and maintenance of utility services in proximity to trees'. In addition Table 2 from BS 5837:2005 'Trees in Relation to Construction. Recommendations' is provided.

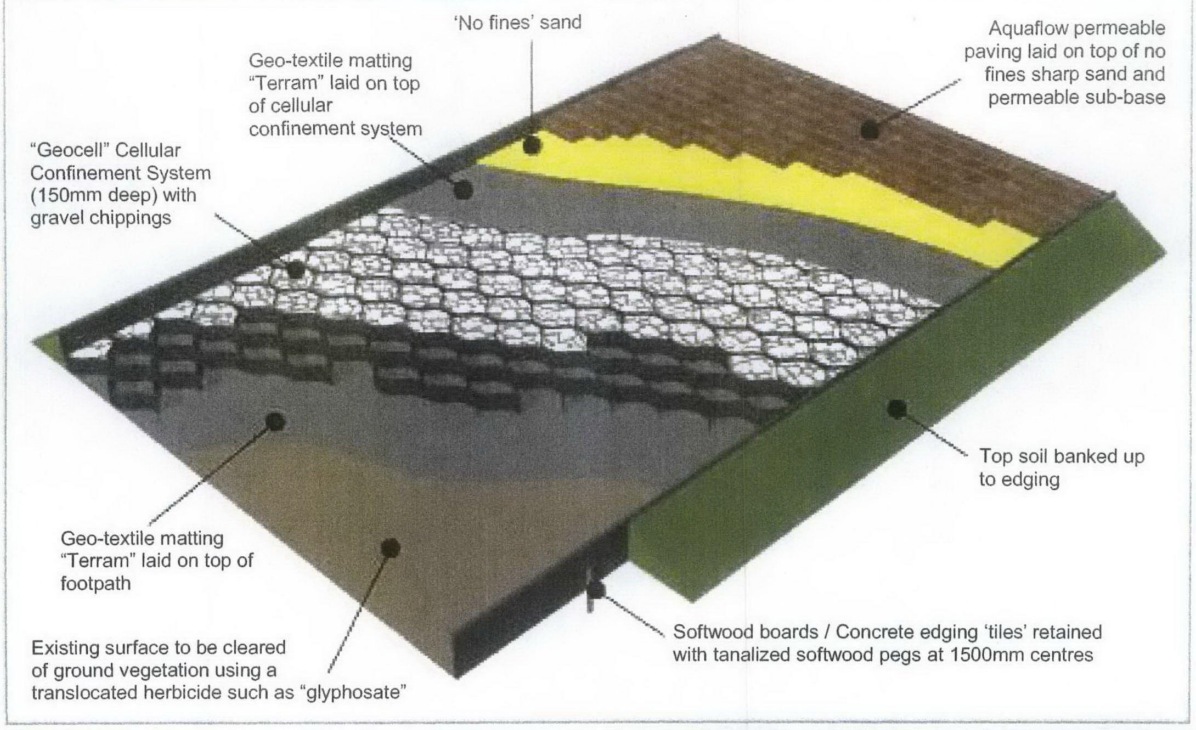
Before considering hand digging and determining precautionary zones or root protection areas, specialist arboricultural advice should be sought.

1) Tanalized softwood pegs at 1500mm centres
2) Top soil banked up to edging
3) Softwood boards / Concrete edging 'tiles'
4) Existing surface to be cleared of ground vegetation using a translocated herbicide such as glyphosate
5) Geo-textile matting "Terram" laid on top of footpath
6) "Geocell" Cellular Confinement System (150mm deep) with gravel chippings
7) Geo-textile matting "Terram" laid on top of cellular confinement system
8) Gravel or paving laid on top of permeable sub-base



2) Top soil banked up to edging
3) Softwood boards / Concrete edging 'tiles'
4) Existing surface to be cleared of ground vegetation using a translocated herbicide such as "glyphosate"
5) Geo-textile matting "Terram" laid on top of footpath
6) "Geocell" Cellular Confinement System (150mm deep) with gravel chippings
7) Geo-textile matting "Terram" laid on top of cellular confinement system
8) 'No fines' sand laid on top of geo-textile matting
9) Aquaflow permeable paving laid on top of no fines sharp sand and permeable sub-base

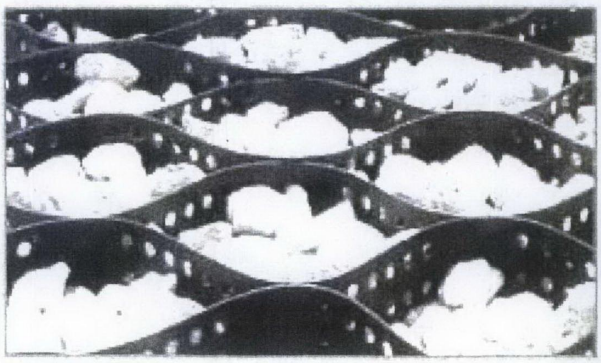


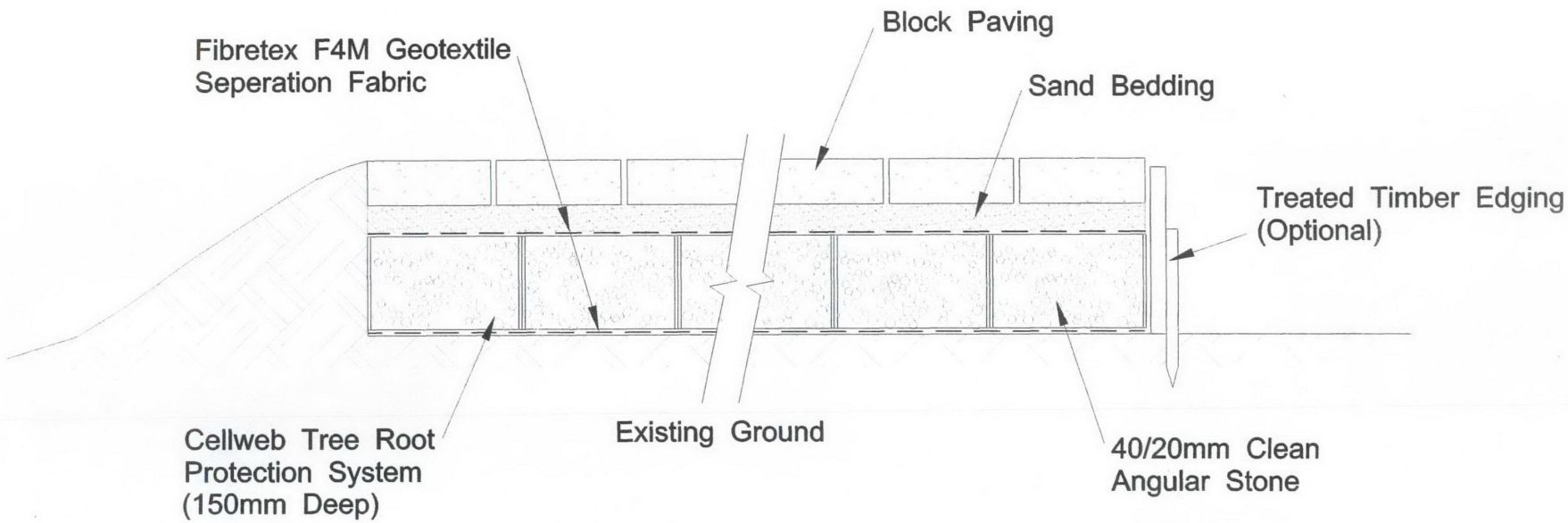


The 3D drawing above may not accurately depict the construction to be carried out and should be taken as indicative only. Use the section drawings on the previous page for full details on the required construction method

'No Dig' system during construction (right)

"Geocell" Cellular Confinement System (100mm deep) with gravel chippings (below)





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TITLE

Cellweb Section - Tree Root Protection
c/w Block Paving Surface

DRAWN BY	SCALE	DATE	CHECKED BY
	1:10	06/05	
DRAWING NO		REVISION	APPROVED
GS-CW-BP-150			