Elmhurst
Venn's Lane, Hereford HR1 1DE

Tree Survey & Arboricultural Assessment
Tree Constraints Report

Prepared for

Lynhales Hall Nursing Home Ltd.
Lynhales Hall Home, Lyonshall, Herefordshire, HR5 3LN.

on the instructions of

JBD Architects, Hereford.

Based on an inspection carried out on
4th November 2010
by

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1 INTRODUCTION:

1.1 The following report was prepared on the instructions of Mr. K Pearce of JBD Architects, acting on behalf of Lynhales Hall Nursing Home Ltd, owners of Elmhurst, Venn's Lane, Hereford. My brief was to visit the site and make an inspection of the major trees in order to assess their form and general condition, specifically in order to consider what degree of constraint they may represent with regard to the possible redevelopment of this property.

1.2 The plan itself is based upon a topographical survey drawing (No.2203 August 2010 provided by Davies's Chartered Land Surveyors, Cardiff). Tree locations are as shown on that plan; however where measurements may prove to be critical (for instance in determining clearances between trees and proposed structures), further on-site measurements should be made.

1.3 The report has been framed as an 'Arboricultural Constraints Report', as defined in BS5837:2005 - *Trees in Relation to construction; recommendations* and the parameters assessed includes those set out in that document. On the basis of the findings, each trees or group is allocated to one of four 'retention categories' (as defined below). This is largely based upon assessments of the trees' overall arboricultural quality, based upon their general health and structural stability and their likely life-expectancy. Other factors that are taken into account include their significance to the local landscape and their general public amenity value, the degree to which they provide wildlife habitat and enhance local biodiversity and any other social or cultural values that they may embody. All of these assessments are based upon the conditions *as they existed at the time of our inspections*.

1.4 Also integral to the methodology of BS5837 is the calculation of Root Protection Areas (RPAs) for each of the trees in question. The RPA is defined as a "*layout design tool indicating the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree.*" In this regard, I must stress that the plan accompanying this report shows the *nominal* RPAs of the trees, indicated as circles centred upon the tree of a radius such that they enclose an area equal to the relevant RPA. In practice the distribution of roots around a tree will frequently prove to be uneven due to the presence of a variety of constraining influences. These may be physical barriers such as existing foundations etc, or the existence of localised soil conditions inhospitable to root growth, such as water-logging or soil compaction. Conversely, soil conditions may be particularly *conducive* to root development in one quarter and this might also lead to an asymmetric distribution of roots around the tree. However in most cases the nominal circular areas as indicated will provide a reasonable guide as to where special measures will be required to protect tree roots and preserve good soil condition.

1.5 The RPAs of the trees will provide the basis for defining Construction Exclusion Zones (CEZs), these being areas around all of those trees intended to be retained where access should be prevented throughout the entire process of site preparation and construction. Protection should be afforded through the erection of fencing, constructed in accordance with BS5837:2005 (see Appendix 1); this should be erected around the CEZs prior to any work proceeding on the site should remain *in situ* until all works have been completed. Some activities within the CEZs may be

acceptable but should not be put in hand until appropriate arboricultural advice has been sought.

1.6 It should be appreciated that this is a *preliminary* report, provided to facilitate the development of a suitable layout that takes full account of the constraints created by trees on and around the site. Details of the protection likely to be required will be dependant upon the details of the final layout. It is similarly premature to put forward recommendations for the treatment of trees, as this too will to a large degree be dependant upon their relationship to any new structures that may be proposed.

1.7 My inspection was carried out on 4th November 2010 and it was made from ground level only. Weather conditions were sunny and clear with adequate visibility throughout for the purposes of this investigation. Only those features apparent at the time of the inspection could be considered and no liability can be accepted regarding trees or their parts that were inaccessible or obscured in part or in whole. It should be stressed that, although the health and safety of the trees is part of the assessment methodology used, this report is intended for planning purposes only; *it should not be construed as an assessment of tree safety*. Faults may be identified and recorded as part of this study but no management recommendations will normally be made and it remains the client's responsibility to take appropriate action. The assessor can accept no liability for damage or injury sustained as a result of the failure of any tree or its parts.

2 The Site: General Observations.

2.1 The site is an unoccupied residential care home located within a residential suburb to the north east of Hereford City centre. The main access is via a private drive leading off Venn's Lane, to the south, which brings you to the main parking area situated to the west of the existing building, which itself occupies a north-eastern position within the site. Surrounding the existing building are a number of footpaths and a generally well maintained private garden that extends out to the property boundary.

2.2 The site is wholly within the designated Conservation Area of Aylestone Hill but information to hand suggests that no Tree Preservation Order applies to it. Elmhusrt itself is a Grade II listed building but once again, information currently to hand does not suggest that gardens are designated.

2.3 The most important trees are all located within the front garden, south of the existing building, with other shrubs and conifer hedging around the periphery of the site. The trees shown on the accompanying plan are those that are considered the most significant specimens that could be affected, directly or indirectly, by any proposed development. Certain trees on the front lawn area are not included in the current assessments as it is understood no alterations are proposed in that part of the site.

2.4 With the exception of tree 7 & G1, the trees to the south and south-west of the existing building are generally in good condition, with very few defects noted. They are relatively prominent in the local landscape and are important in providing a setting for the property and they have therefore been allocated to retention categories 'A' & 'B'. To assure their successful retention, disruptive activities within their respective root protection areas (RPAs) should be avoided or very carefully controlled. These RPAS cover most of the main access into the site: if it is required to improve or upgrade this drive careful consideration will have to be given to the tree roots that will doubtless underlie it. Thus improvements should ensure that the structure (or at least the drive sub-base) remains undisturbed while any new or extended hard surfaces should be designed using minimally invasive, 'no-dig' techniques[1].

2.5 The majority of tree nos.14 to 21 and tree groups G2 & G3, situated to the west of the existing building, are in acceptable physiological condition but are generally of lesser quality and importance than the trees to the south, although some do contribute to the screening of the site. The trees here tend to have developed to be somewhat overcrowded so that the majority are co-dependent to some degree (i.e. each tree is reliant to some degree on the protection afforded by its neighbours). Whilst it might be possible to remove certain individuals to allow greater space for development of other trees , they are largely undistinguished specimens: the best is, perhaps, the sycamore, tree 17, but even this has had its development suppressed by the neighbouring trees in group G3. In view of the poor, or at least compromised condition of trees in this sector, consideration may have to be given to widespread clearance; new planting to mitigate such losses and to re-establish effective buffering may prove to be necessary.

2.6 (It was noted that there was a large amount of garden waste dumped around the bases of these trees: this is not conducive to their continuing good health and should be removed from any tree that is to be retained.)

2.7 The courtyard area to the north of the existing building contains trees 24 & 25, both of which are in satisfactory condition with no significant defects noted although tree 25 (a spruce) has outgrown its current location and while tree 24 (a cherry) is a somewhat undistinguished specimen. Furthermore, their location within the courtyard is such that they have an extremely limited amenity value beyond their immediate surroundings.

2.8 The remaining vegetation in this area is largely small to medium shrubs and other scrubby specimens of varying condition but which were generally considered to be of very minor value, not representing a significant constraint to development in this area.

3 Tree Schedule:

The table overleaf provides details of all the trees surveyed. Notes on the terms and abbreviations *used can be found on the pages following the table.*

[1] See Appendix 2 below

[*See below for explanation of terms & abbreviations used*]

Individual Trees:

ID	*Species*	Height (m.)	Stem No.	Diam (cm)	Crown spread & clearance N		E		S		W		Maturity	Physiological Condition	Structural Condition	Life.Expect	CATEGORY	*Notes*	Protection Radius (m)	RPA (m^2)
					Canopy radius	*Clearance*	*Canopy radius*	*Clearance*	*Canopy radius*	*Clearance*	*Canopy radius*	*Clearance*								
1	Turkey Oak	13	1	44	*0.5*	*11*	*3.5*	*2.5*	*7*	*2.5*	*5*	*3*	M	Good	Good	L	B (i)	Prominent mature tree in good condition. Crown slightly displaced due to suppression from neighbouring trees. Ivy present.	**5.3**	**88**
2	Turkey Oak	9	1	42	*4.5*	*5*	*0*	*-*	*3.5*	*4*	*7*	*5*	YM	Good	Good	L	B (i)	Good condition tree in prominent position. More of a spreading form than is common for this species due to suppression by adjacent trees. Ivy present.	**5**	**79**
3	Tulip Tree	20	1	80.5	*3.5*	*8*	*7*	*6*	*10*	*6*	*4*	*7*	LM	Fair	Poor	M	B (i)	Large, prominent late-mature tree with a number of defects (primarily dead wood) but generally worthy of retention. Substantial dead wood should be removed. A bough to the south is in contact with neighbouring young Horse Chestnut and a suspected abrasion wound is likely to have reduced the structural integrity of this limb; this also needs attention if the tree is to be retained and as such it should be cut back. Ivy present.	**9.7**	**296**
4	Turkey Oak	12	1	51.5	*4*	*6*	*4.5*	*5*	*4*	*2*	*6*	*1*	YM	Good	Good	L	B (i)	Good condition, prominent tree of long lived species. Ivy on lower stem of this tree and tree no1-3 which restricted visibility somewhat.	**6.2**	**121**
5	Giant Redwood (Wellingtonia)	27	1	153.5	*3.5*	*2*	*3.5*	*4*	*3*	*2.5*	*3*	*2*	M	Fair	Good	M	A (i)	Very large prominent tree in good structural condition. Some minor defects such as number of areas of exudation on trunk and a slightly sparse crown.	**15**	**707**

ID	Species	Height (m.)	Stem No.	Diam (cm)	Crown spread & clearance N		E		S		W		Maturity	Physiological Condition	Structural Condition	Life.Expect	CATEGORY	Notes	Protection Radius (m)	RPA (m^2)
					Canopy radius	Clearance	Canopy radius	Clearance	Canopy radius	Clearance	Canopy radius	Clearance								
6	Cedar	16	2	35 & 72.5	5	2.5	7	4	6	2.5	4	2.5	M	Good	Fair	L	B (i)	Large tree in overall good condition but with some noteworthy defects. Split hanging branch precariously suspended from the main trunk needs removing. Smaller second stem has a number of areas of exudation, a potentially weak, tight v-shaped union with the main trunk and evidence of old wounds.	9.7	296
7	Sawara Cypress	7	1	30	2	2	2	2	2.5	2.5	1	3	M	Good	Fair	S	C (ii)	Satisfactory but suppressed by adjacent Cedar.	3.6	41
8	Beech	14	1	31	4	2	3.5	2.5	4.5	3	4.5	4	YM	Good	Good	L	B (i)	Well-established tree in good condition with potential to become significant tree within site and wider landscape.	3.7	43
9	Cedar	14	1	100	5	7	6.5	5	11	3	7.5	3	M	Good	Good	L	A (i)	Prominent tree in excellent condition. One small bough in contact with telegraph post requires cutting back slightly to allow adequate clearance.	12	452
10	Small-leaved Lime	15	1	109	6.5	2.5	8	3	7	3	7.5	3	M	Good	Good	L	A (i)	All three trees are very prominent within the site and the immediate vicinity, and all are in excellent condition with no significant defects noted.	13.1	539
11	Beech	16	1	90.5	4	3	10	3	6	10	7.5	3	M	Good	Good	L	A (i)		10.9	373
12	Cedar	17	1	121.5	12	5	10	2	5	4	8.5	3	M	Good	Good	L	A (i)		14.6	670
13	Holm Oak	6	1	24	2.5	2	2	2	2	0.5	3	1.5	Y	Good	Good	L	B (i)	Small, young tree in good condition. Potential to be substantial size.	2.9	26

ID	Species	Height (m.)	Stem No.	Diam (cm)	Crown spread & clearance N		E		S		W		Maturity	Physiological Condition	Structural Condition	Life.Expect	CATEGORY	Notes	Protection Radius (m)	RPA (m^2)
					Canopy radius	Clearance	Canopy radius	Clearance	Canopy radius	Clearance	Canopy radius	Clearance								
14	Holm Oak	7	1	24*	2	0	3	0	3.5	0	2	0	Y	Good	Good	L	C (ii)	*Base inaccessible; diameter approximated.* Good condition but close to neighbouring property which might result in nuisance issues as tree develops.	2.9	26
15	Irish Yew	10	M	see notes	2	0	2	0	2.5	0	1.5	0	M	Good	Good	M	C (ii)	Base inaccessible and visibility obstructed. Condition appears to be good but re-inspection is suggested if tree is to be retained.	-	-
16	Yew	11	1	45	4.5	2	1.5	3	4.5	2.5	3.5	2	M	Fair	Fair	L	C (i)	Satisfactory condition but significantly one-sided crown.	5.4	92
17	Sycamore	14	1	50	4	3.5	9	3.5	7	2.5	3.5	9	M	Fair	Good	M	B (i)	Acceptable condition with unusual crown form due to suppression and interference by neighbouring trees of group G3.	6	113
18	Sycamore	14	1	34	1	11	1	11	3.5	8	4	3.5	M	Fair	Fair	S	C (i)	Mature tree in fair condition which has outgrown its current location close to the boundary fence.	4.1	53
19	Thuja (W.Red Cedar)	14	1	44	2.5	2.5	2.5	4	2	9	2.5	3	M	Poor	Good	S	C (i)	Good structural condition with displaced crown somewhat sparse of foliage.	5.3	88
20	Thuja (W.Red Cedar)	10	1	28	1	2	2	3.5	2	2.5	2	2.5	M	Fair	Good	S	C (i)	Acceptable but unexceptional.	3.4	36
21	Thuja (W.Red Cedar)	10	1	24	0.5	2	2	1	2	0.5	1	1	M	Good	Good	M	C (ii)	Satisfactory; unexceptional.	2.9	26
22	Pine	15	1	84.5	4	6	2	13	5.5	7	6	2	M	Good	Good	L	A (i)	Very good condition prominent tree with no significant defects. Crown one-sided and tree has slight lean.	10.1	320

ID	Species	Height (m.)	Stem No.	Diam (cm)	Crown spread & clearance N Canopy radius	N Clearance	E Canopy radius	E Clearance	S Canopy radius	S Clearance	W Canopy radius	W Clearance	Maturity	Physiological Condition	Structural Condition	Life.Expect	CATEGORY	Notes	Protection Radius (m)	RPA (m^2)
23	Pine	16	1	67	3.5	9	4	6	4	6	3	8	M	Good	Good	L	A (i)	Good condition mature tree with no significant defects noted.	**8**	**201**
24	Wild Cherry	7.5	1	32.5	3	2	4	2	5	2	2.5	2	M	Good	Fair	M	C (ii)	Acceptable condition but undistinguished.	**3.9**	**48**
25	Spruce	9	1	36	2	1	2	2	2	0	1.5	1	M	Good	Good	L	C (i)	Good condition tree that has outgrown current location.	**4.3**	**58**

Groups:

ID	Species	Height (m.)	Stem No.	Diam (cm)	Crown spread & clearance N Canopy radius	N Clearance	E Canopy radius	E Clearance	S Canopy radius	S Clearance	W Canopy radius	W Clearance	Maturity	Physiological Condition	Structural Condition	Life.Expect	CATEGORY	Notes	Protection Radius (m)	RPA (m^2)
G1	Turkey Oak	16	2	20.5 & 26.5	3	2	1.5	14	5	3	1	8	YM	Good	Good	S	C (i)	Both trees in this group are tall with slender stems and high crowns as a result of close proximity with neighbouring trees. Good condition but minor landscape value.	2.5 & 3.1	20 & 30
G2	Sycamore	11	3	22 24**	3	8	5.5	3	2	10	1	11	Y	Fair	Fair	M	C (i)	***Bases inaccessible, diameters approximated.* Satisfactory; unexceptional.	2.6 & 2.9	21 & 26
G3	Lawson Cypress	12 to	3	20.5 30.5 54*	2.5	2	5	1.5	3	2	2	7	YM	Fair	Good	M	C (ii)	**Several ivy stems at base.* Acceptable but undistinguished. Crowns of western 2 trees significantly one-sided due to suppression by neighbouring Yew (tree no.16).	2.5, 3.7 & 6.5	20, 43 & 133

Notes on the Terms & Abbreviations used in Tree Schedule.

i) The dimensions taken are:

- **HEIGHT**, estimated and expressed in metres.
- **STEM-No.** indicates the number of main stems (i.e. whether the trunk divides at or below 1.5m; "M" = Multi-stemmed)).
- **DIAMETER** (in centimetres), obtained from the girth measured at approx.1.5m. For trees with 2 or 3 sub-stems a notional figure is derived from the sum of their cross-sectional areas. For multi-stemmed trees the diameter is estimated at the base of the tree, just above the region of root-flare.
- The **CROWN SPREAD** is expressed in terms of the crown radii estimated at the four cardinal points and given in metres.
- **CLEARANCE** is an estimate of the average distance between ground level and the lower canopy estimated at the four cardinal points. (Indicative only)

ii) **MATURITY** is defined as follows:

P recently Planted; sapling: A tree that is still establishing and which would be relatively easy to replace or even transplant. Likely to be vulnerable to damage from (e.g.) strimmers, mowing equipment, drought, vandals, etc.

Y Young, establishing trees. Should be growing fast, usually primarily increasing in height more than spread, but as yet making limited impact upon the landscape.

EM Early-mature. Established young trees, normally of good vigour and still increasing in height, but beginning to spread laterally. Beginning to make an impact upon the local landscape & environment.

M Mature: Well-established trees, still growing with some vigour, but tending to fill out and increase spread. Bark may be beginning to crack & fissure. In the middle half of their safe, useful life-expectancies.

LM Late-Mature: In full maturity. Still retaining some vigour but growth slowing.

O Old: Fully mature with vigour declining. Likely to possess features that could be regarded as potential faults, such as large, ponderous branches, old wounds etc. etc., but also likely to be of high amenity value.

A Ancient: "Veteran" trees. Old trees can survive for very many years, with healthy growth continuing although the tree may be of low vigour. Crown size usually becomes reduced, either through natural branch-loss or through management (e.g. pollarding). Decay is usually present. Such trees may represent a significant hazard, but they are also likely to be of considerable conservation value.

iii) **PHYSIOLOGICAL CONDITION:** Essentially a snapshot of the general health of the tree based upon its general appearance, its apparent vigour and the presence or absence of symptoms associated with poor health, physiological stress etc. (Fungal *disease* may be recorded here but *decay giving rise to structural weakness* would be recorded under 'Structural Condition' – see next parameter):

Good	no significant health issues.
Fair	indications of slight stress or minor disease (e.g. the presence of minor dieback/deadwood or of epicormic shoot growth)
Poor	Significant stress or disease noted; larger areas of dieback than above
Bad	Severe decline; widespread dieback and/or severe stress; life-threatening disease.
Dead (or Moribund)	

iv) **STRUCTURAL CONDITION:** Defects affecting the structural stability of the tree, including decay, significant dead wood, root-plate instability or significant damage to structural roots, weak forks (e.g. those where bark is included between the members) etc. etc. Classified as:

Good	No obvious structural defects: basically sound
Fair	Minor, potential or incipient defects
Poor	Significant defect(s) likely to lead to actual failure in the medium to long-term
Bad	Defects liable to cause significant failure in the short term, or to lead to a major or total collapse in the foreseeable future
Severe	Tree that has already suffered or is at imminent risk of a major collapse.

v) **LIFE-EXPECTANCY**: An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued maintenance)

V - less than 10 years S - 10-20 years
M - 20-40 years L - more than 40 years

vi) **RETENTION CATEGORY**: Trees are classed as category **R, A, B** or **C**, based on criteria given in BS5837:2005; summary definitions as follow (see BS5837 for further details). Categories A, B and C are further characterised by the use of sub-categories: (i) refers to qualities of the tree of an arboricultural nature, (ii) indicates qualities concerned primarily with their situation within the landscape and (iii) refers to other values such as those of a cultural, historic or ecological nature. Examples of these qualities for each of the three categories are given below, although these are indicative only.

Note: *This is NOT a health and safety classification; the classification does not take into account any requirement for remedial tree care or ongoing maintenance apart from that which may affect the trees' general suitability for retention.*

R REDUNDANT TREES (★): Defective, poor or negligible specimens, not worthy of retention within a developed site. Trees whose existing value would be lost within *10 years*, or which should be removed on grounds of sound arboricultural management (e.g. trees that will be left unstable by other essential works; poor quality that are trees suppressing better specimens.)

A HIGH RETENTION VALUE (●): Important or valuable trees or groups of trees that are likely to make a substantial contribution to the locality for 40 years or more.

(i) Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g. dominant trees within an avenue etc.)

(ii) Trees, groups or woodlands of particular screening benefit in relation to views into and out of the site; those of notable visual importance (including avenues & other features that may be assessed collectively as groups)

(iii) Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees)

B MODERATE VALUE (■): Trees or groups of some importance and likely to make a significant contribution for in excess of 20 years.

(i) Fair quality but not notably fine; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)

(ii) Numbers of trees, groups or woodlands forming distinct landscape features that are of higher collective value than they would warrant as individuals (e.g. non category A trees within avenues). Also trees internal to the site that are of little visual impact within the wider locality.

(iii) Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.

C MINOR VALUE (▲): Trees or groups of rather low quality, but capable of retention for at least approx. 10 years, e.g. until new planting is established. *Also* small, young trees (below 15cm diam) whose loss would be easily mitigated by new planting, or which would be capable of transplanting.

(i) Retainable (for the present), but not trees that represent a significant constraint

(ii) Secondary specimens within groups or woodlands whose loss would not greatly diminish their landscape value; trees providing only minor or short term screening benefit

(iii) Trees with very limited conservation or other cultural benefit.

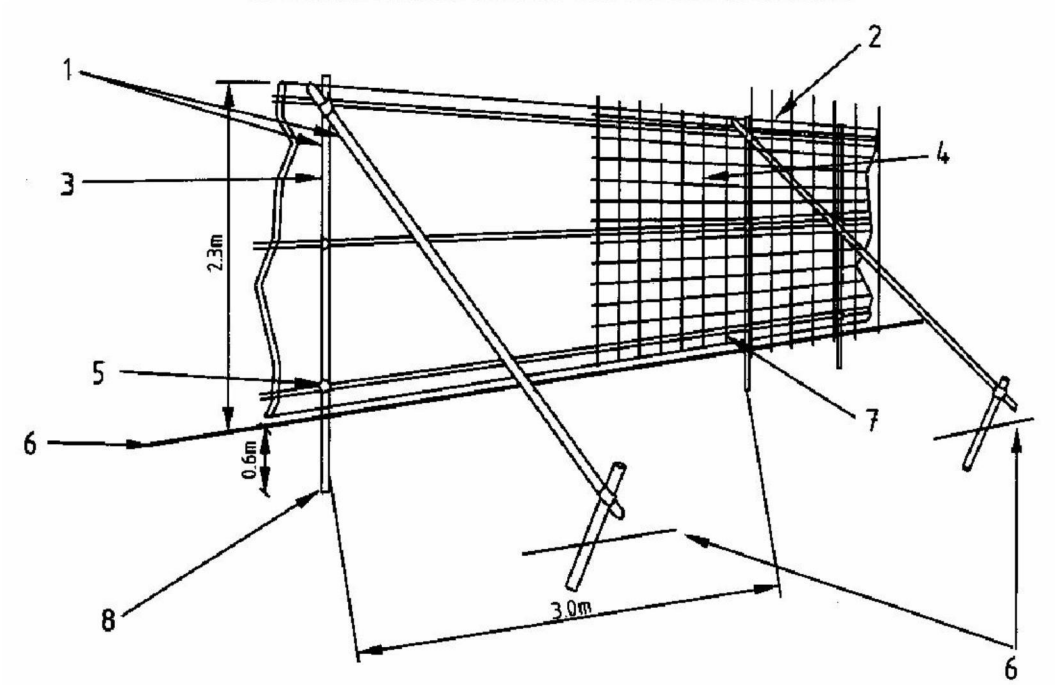
vii) **ROOT PROTECTION AREA (RPA):** This is the area in square metres formed by a circle of radius *(the **Protection Radius**)* twelve times the effective stem diameter of the tree (or, for multi-stemmed trees, 10 times the basal diameter). The RPA represents the minimum area of soil that the tree requires to support a healthy and effective root-system and is the basis whereby the layout of the ***Construction Exclusion Zone (CEZ)*** is determined. This should encompass an area equal to the RPA but its form may be adapted in the light of arboricultural considerations and pre-existing physical constraints. The CEZ should be protected by sturdy temporary fencing (see BS5837:2005) throughout the entire process of construction

*A **CONSTRUCTION EXCLUSION ZONE** should be established around all trees intended for retention, based upon the Root Protection Areas (RPAs) of those trees. These zones should be adequately protected by appropriately designed **protective barriers** & **ground protection** throughout the entire development process.*

1: PROTECTIVE BARRIERS

- Vertical barriers should be erected and ground protection installed **before any materials or machinery are brought onto the site and before any demolition, development or stripping of soil commences**. Areas of new or retained structure planting should be similarly protected, based on the extent of the soft landscaping as shown on the approved drawings.
- **Once erected, barriers and ground protection should be regarded as sacrosanct,** and should not be removed or altered without prior recommendation by an arboriculturist and approval of the local planning authority.
- In the case of particularly vulnerable trees or trees sited close to the construction access, the owner or developer should make arrangements for an arboriculturist to supervise necessary works and the erection of protection before the handover of land to the contractor.
- Pre development tree work may be undertaken before the installation of tree protection, where required, with the agreement of the local planning authority.
- Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.
- In most cases, barriers should consist of a scaffold framework in accordance with the illustration below, comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Onto this, weldmesh panels should be securely fixed with wire or scaffold clamps. Plywood or similar panels may be appropriate in some cases, provided they are adequately secured in a manner similar to that illustrated.
- Note that Weldmesh panels on rubber or concrete feet (as used in 'Heras' fencing') are not resistant to impact and should not be used. Lightweight barriers such as split-chestnut paling and plastic security fencing are also considered unsuitable for this purpose as they are insecure and are too easily moved and damaged.
- It may be appropriate on some sites to use temporary site office buildings as components of the tree protection barriers.

Recommended design of Protective barrier

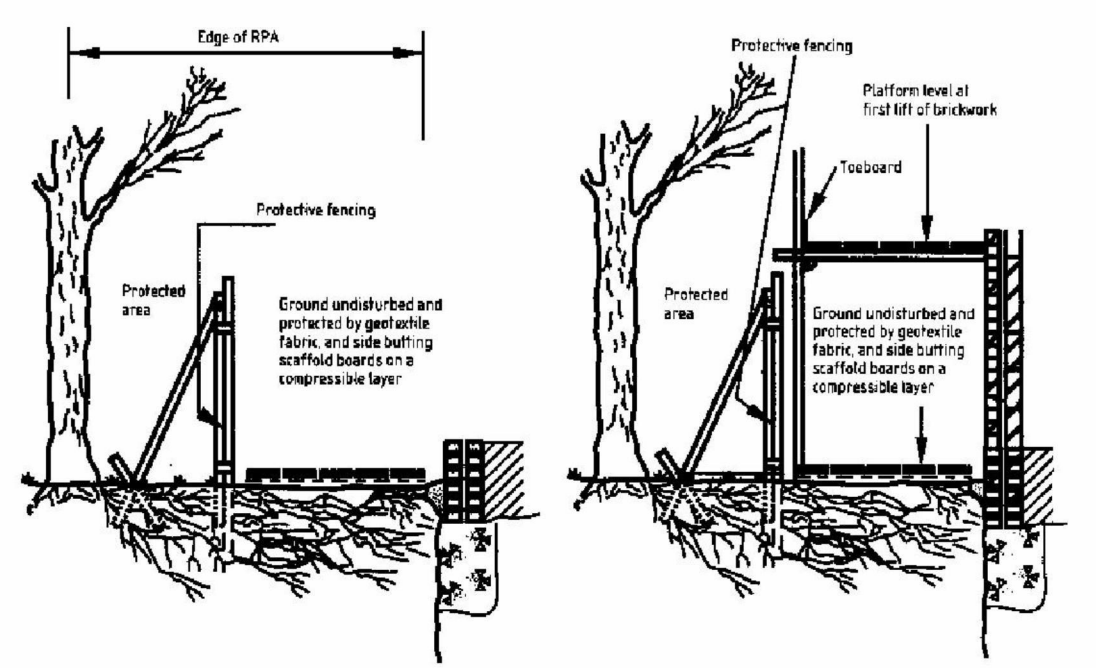


1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and/or standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Ground level
7 Wire twisted and secured on inside face of fencing to avoid easy dismantling
8 Approx. 0.6 m driven into the ground

2: GROUND PROTECTION

- Where it has been agreed during the design stage, and shown on the tree protection plan, that vehicular or pedestrian access for the construction operation may take place within the root protection area (RPA), the possible effects of construction activity should be addressed by a combination of barriers and ground protection. The position of the barrier may be shown within the RPA at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the RPA should be protected with ground protection.
- For pedestrian movements within the RPA the installation of ground protection in the form of a single thickness of scaffold boards on top of a compressible layer laid onto a geotextile, or supported by scaffold, may be acceptable

Scaffolding within the RPA:



- For wheeled or tracked construction traffic movements within the RPA the ground protection should be designed by an engineer to accommodate the likely loading and may involve the use of reinforced concrete slabs or proprietary systems, such as those utilizing cellular confinement 'geogrid' materials *(e.g. "CellWeb" marketed by Geosynthetics Ltd., "Geocell" by Terram Ltd, and "Geoweb" distributed by Buildbase Ltd).*

3 ADDITIONAL PRECAUTIONS OUTSIDE THE EXCLUSION ZONE:

- Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices should be erected on the barrier with words such as:

Construction exclusion zone - Keep out

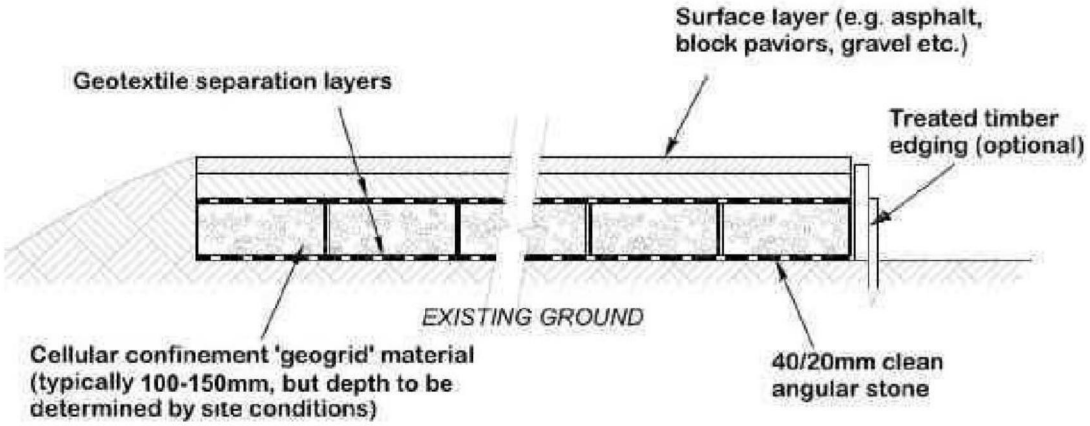
In addition the following should be addressed or avoided.

- Care should be taken when planning site operations to ensure that wide or tall loads, or plant with booms, jibs and counterweights can operate without coming into contact with retained trees. Such contact can result in serious damage to them and might make their safe retention impossible. Consequently, any transit or traverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is maintained at all times. In some circumstances it may be impossible to maintain adequate clearance thus necessitating access facilitation pruning.
- Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged within 10 m of the tree stem.
- Fires should not be lit in a position where their flames can extend to within 5 m of foliage, branches of trunk. This will depend on the size of the fire and the wind direction.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees..

4: DESIGNING ROADS, DRIVEWAYS AND PATHS NEAR TREES.

[See also BS5837:2005 (Trees in Relation to construction – Recommendations) & Arboricultural Practice Note APN12, "Through the Trees to Development", published by the Arboricultural Advisory & Information Service]

- Tree roots are concentrated in the upper metre of the soil, with the great majority 300-600 mm below the soil surface. Beyond 3 or 4 metres from the trunk most of the roots are small in diameter and not readily apparent as originating from trees. They are nevertheless vital to the tree's well-being, as well as being very easily damaged by even rather shallow soil disturbance, such as may be required in establishing a path or driveway.
- Wherever possible paths etc should be routed well outside the Root Protection Area (RPA), when problems should not arise. Note, however, that the position of a path or road on a layout plan may indicate the surface only: *Allowance must be made for any kerbing, and the footing into which kerbs will be set, when considering possible conflicts between trees and nearby paths, roadways etc.*
- Where there is no alternative other than for such a route to impinge upon the RPA of a tree, the possibility of damage can be significantly reduced through the use of No-Dig techniques, where an adequately load-bearing and hard-wearing surface is established over existing roots without them being damaged.
- If necessary, existing surface vegetation should be killed using an *appropriate herbicide* that will not leach into the soil and will not affect tree roots. All herbicides must be applied strictly in accordance with the manufacturer's instructions.
- Loose organic matter and/or turf should be removed carefully, using hand tools. If the surface needs to be levelled this should be achieved using a suitable granular fill material (e.g. no-fines gravel, washed aggregate etc.)
- Roots must not be severed; soil surfaces should not be skimmed and the soil must not be compacted
- Treatments must allow for the free diffusion of gases through the soil. Impermeable surfaces should not be applied to an area greater than 20% of the RPA; they should be restricted to a maximum width of 3m and situated tangentially to one side of the tree only.
- Where load-bearing surfaces are required it is likely that a 'load suspension layer' will need to be installed. Proprietary systems are available that involve the use of a load-bearing, 'cellular confinement' systems, designed to support roads on soft ground. Examples of such products include "CellWeb" marketed by Geosynthetics Ltd.[1], and "Erocell", distributed by Terram Ltd.[2] and "Neoweb" marketed by Civils & Lintels [3] A range of high tensile synthetic 'geogrid' products is also manufactured by Tensar International[4]. Such products, if necessary used in combination with an appropriate aggregate sub-base or fill, can permit a suitable bearing surfaces to be created, lying over undisturbed root-bearing land. A sectional drawing of a typical construction is given below.



The details of design and specification should be set out by an engineer with knowledge of the anticipated loading & bearing capacity of the existing soil strata, working in conjunction with an arboriculturist.

[1] Website:- www.geosyn.co.uk
[2] Website:- www.terram.com
[3] Website:- http://tinyurl.com/34y7ysa
[4] email: customerservice@tensar.co.uk