SE/100399/F

JERRY ROSS arboricultural consultancy

Land at Penrice
Walford Road, Ross-on-Wye HR9 5PQ

Tree Survey & Arboricultural Assessment

(Tree Constraints Report)

SE/100400/C

Prepared by
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On behalf of
MF FREEMAN
Ruardean Works, Varnister Road,
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Based on an inspection carried out on
11th September 2009

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1 INTRODUCTION:

1.1 The following report was prepared on the instructions of Mr L. Freeman of M.F. Freeman Ltd, and concerns land associated with the property known as Penrice, Walford Road, Ross-on-Wye. It is intended to provide information on the major trees growing within and immediately adjacent to the site, which I understand it is hoped might be developed for residential housing. The area in question is shown on the accompanying Tree Location & Constraints Plan; this is based upon a topographical survey prepared by Phil Warren (his drawing no. 09060701/A) onto which I have overlaid data obtained as a result of my inspection.

1.2 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*.

1.3 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 waterlogging 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.

1.4 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.

1.5 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 proposed new structures .

1.6 My inspection was carried out on 11th September 2009 and it was made from ground level only. Weather conditions were bright and visibility was quite adequate 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 Preliminary Observations on Arboricultural Constraints .

2.1 The site falls within the Ross-on-Wye Conservation Area but at the time of writing I am unaware of any tree preservation order that affects it. Indeed, there are in fact only two trees of note actually present within the site, these being the Black Pine (tree 1 in the schedule below) and a Magnolia (tree 3). Elsewhere there are a number of small ornamental conifers and a single flowering cherry (tree 4), none of which have a significant impact upon the wider landscape and whose loss could easily be mitigated through new planting.

2.2 As for the Pine, this *does* have some importance in the landscape, being in a rather prominent position on the Walford Road frontage. However the fork in the main stem at about 2 metres above ground level does appear to represent a potential structural weakness. I do not regard the tree to be significantly unsafe at this time, but the possibility exists for this union to fail at some point in the future, when a major part of the tree could collapse, either into the site or else to the west, across the footpath and into the road. As I say, I do not regard this to be a major or imminent risk, and the chances of it occurring could be lessened by fitting a cable-brace to reinforce the fork. However the recognition that this tree embodies a potentially serious structural weakness does, I suggest, reduce the overall level of constraint that its presence should be regarded as imposing upon any proposed development.

2.3 If the tree is retained, no excavation should be carried out within the area designated as its RPA, which can be seen to extend across the existing driveway. It is to be hoped that, if this access route is to be retained, any improvement or upgrading that may be needed can be confined to resurfacing and/or widening it on its NE side without disturbing soil within the designated RPA. However temporary fencing would be required to protect those parts of the RPA *not* extending into the drive.

2.4 Tree 2, the Magnolia, is a relatively good specimen and is certainly capable of being retained, although problems might be encountered in the coming years as a result of pressure that its growth could impose on the adjacent free-standing stone wall. If it is to be retained, the tree's RPA (and any part of the canopy extending *beyond* the radius of the nominal RPA) would require protective fencing while the site was being developed. (Note that its overall spread could, if required, be reduced slightly through careful pruning.)

2.5 All of the other trees of significance are outside the curtilage of the site. Although some are quite large (notably the Sycamores, 10 & 11) they are to the north and should result in no issues of shading. Their *nominal* RPAs all extend to varying degrees into the site. However the degree to which their roots actually penetrate is likely to have been significantly affected by the presence of the stone boundary wall and the presence of structures within the grounds of Penrice. Assuming that the foundations of the wall are 300-500mm deep, most roots will have been prevented from spreading to the south, while any that did manage to grow under them will have found less than ideal soil conditions. Thus trees 7 to 11 are all close to the block of outbuildings and this will have tended to suppress active root growth here: foundations for the building may well be deeper and provide a more effective barrier than the does the boundary wall, while under the floors of these buildings the soil is likely to be desiccated, compacted and generally of a nature such that root proliferation would be discouraged.

2.6 I would nevertheless suggest that the layout should not include residential buildings close to this boundary, as the presence of large trees within a few metres is likely to prove to be oppressive and to give rise to concern to future occupants.

2.7 Although it is not expected that tree roots will have colonised this area, it may nonetheless be prudent to make use of the existing floor slabs as a working surface during development and, if their eventual removal is required, only to lift them to landscape the area once all construction activity is concluded.
Similar considerations apply to tree 5, where the area to the south is currently paved. (Tree 6 is dead and, as it will begin to break up if left for any length of time, its removal is recommended.)

3 TREE SCHEDULE:

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

Note that trees 5 to 11 inclusive, being outside the curtilage of the site, could not be inspected in detail and neither could direct measurements be made; the findings as presented in the tree schedule are believed to be accurate, but they should be regarded as estimates only..

[See below for explanation of terms & abbreviations used]

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	Black Pine	13.5	1	52	4	2	4	3	4	2	4	3	M	Good	Poor	10-20 yrs	B (ii)	Appearance and health generally good but with a fork at approx. 2m with included bark and although currently sound, *potentially* liable to failure.	6.2	121
2	Lawson Cypress (Yellow)	6.5	M	25	2	0	2	0	2	0	2	0	YM	Good	Good	20-40	C (ii)	An unexceptional ornamental conifer although with no significant defects or problems	2.5	20
3	Magnolia	8	4	19, 17, 13 & 16	3	2	5	2	5	3	4	1.8	M	Good	Fair	10-20 yrs	B (ii)	Mature tree, growing immediately adjacent to the wall; attractive specimen; no significant defects	3.9	48
4	Flowering Cherry	5.5	1	22	2	2	2	2	2	2	2	2	YM	Good	Good	40 yrs+	C (i)	Tree with crown formerly managed by being repeatedly lopped; crown now quite well developed. Fair but unexceptional	2.6	21
	Note: Tree 5 to 11 (in blue) all on adjacent land: dimensions are estimates only.																			
5	Lawson Cypress	13	1	31	2	1	2	1	2	1	2	1	M	Good	Good	40 yrs+	B (ii)	Acceptable specimen	3.7	43
6	Robinia (False Acacia)	13	1	35	4	4	4	4	4	4	4	4	*	Dead	Dead	Dead	R	Dead	4.2	55
7	Purple-leaved Plum	10	1	30	6	2	2.5	3	3	4	4	4	M	Fair	Fair	10-20 yrs	C (ii)	Acceptable	3.6	41
8	Robinia (False Acacia)	11.5	1	18	4	6	3	4	3	4	1	6	YM	Good	Fair	40 yrs+	C (ii)	Immediately behind outbuilding, close to wall ; assessment very limited; no significant problems observed, but tree tall & slender. Canopy extends directly over the outbuilding roof.		15

S/0701/09/TCA

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)
9	Sycamore	9	1	22	3	4	3	4	3	4	3	4	Y	Good	Fair	40 yrs+	C (i)	No significant defects but an entirely undistinguished, self-sown specimen. Could become large in time.	2.6	21
10	Sycamore	20	1	60	6	4	3.5	4	6	3.5	6	4	M	Good	Fair	40 yrs+	B (ii)	Apparently in good condition; acceptable component of woodland group.	7.2	163
11	Sycamore	20	1	60	7	4	7	4	6	3.5	3.5	4	M	Good	Fair	40 yrs+		Apparently in good condition; acceptable component of woodland group. Dense ivy to 14m	7.2	163
12	Monterey Cypress ('Goldcrest')	3.5	M	24	2	0	2	0	2	0	2	0	YM	Good	Good	40 yrs+	C (ii)	Small ornamental conifer. Good but negligible	2.4	18
13	Lawson Cypress (Yellow)	3.5	M	30	1	0	1.5	0	1	0	1.5	0	YM	Good	Good	40 yrs+	C (ii)	Small ornamental conifer. Good but negligible	3	28
14	Monterey Cypress ('Goldcrest')	3.5	M	20	1.25	0	1.75	0	1	0	1.75	0	YM	Good	Good	40 yrs+	C (ii)	Small ornamental conifer. Good but negligible	2	13
15	Sawara Cypress ('Boulevard')	2.5	M	20	1	0	1	0	1	0	1	0	YM	Good	Good	10-20 yrs	C (ii)	Small ornamental conifer. Good but negligible	2	13

Notes on the Terms 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.

YM Young-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):

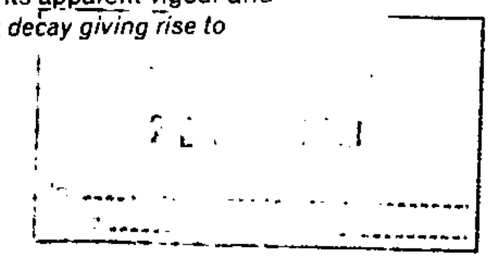
Good no significant health issues.

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 M - 20-40 years S - 10-20 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 assessed on the basis of the area 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 resulting figure (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)*** should be 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 RPAs as indicated on the accompanying tree location plan are represented by circles centred upon the trees in question. While these *nominal* RPAs provide a valuable guide as to where particular care must be exercised if damage to tree roots is to be avoided, they do not necessarily give an accurate representation of root distribution. Thus it may be required that the shapes taken by finalised exclusion zones be adapted to take account of local site and environmental conditions.

ADDENDUM: Notes on the creation of the new access

1. I understand that it is proposed to create a new access into the site to the south of tree1, the Pine. The accompanying extract from the WBA drawing no. 99248.HD100A illustrates the situation.

2. It will be seen that the nominal root protection area of tree 1 extends approximately half way across the entrance road. In order to retain this tree successfully and to construct the road without damaging any underlying roots' it will be necessary to employ 'no-dig' construction techniques, as outlined in Appendix 3 of this report.

3. This will necessitate raising the level of the roadway where it crosses the root protection area above the existing ground level within the site. The details of the design will have to be confirmed by an engineer, but the degree of increase (i.e. the depth of the no-dig section) must be determined according to the anticipated loadings it will have to bear: if construction traffic is intended to gain access here the thickness of the cellular matrix material will have to be significantly greater than if only domestic traffic is anticipated. Furthermore the level of the new surface must link in with that of the existing public highway and footpath.

4. Should the differences in levels prove to be problematic it may be possible to use an alternative 'no-dig' solution, namely to use steel-reinforced concrete to bridge the section over the tree's rooting area. This too would have to be engineer-designed, but it is likely that it will require less depth to achieve an equivalent load-bearing capacity than the cellular support system.

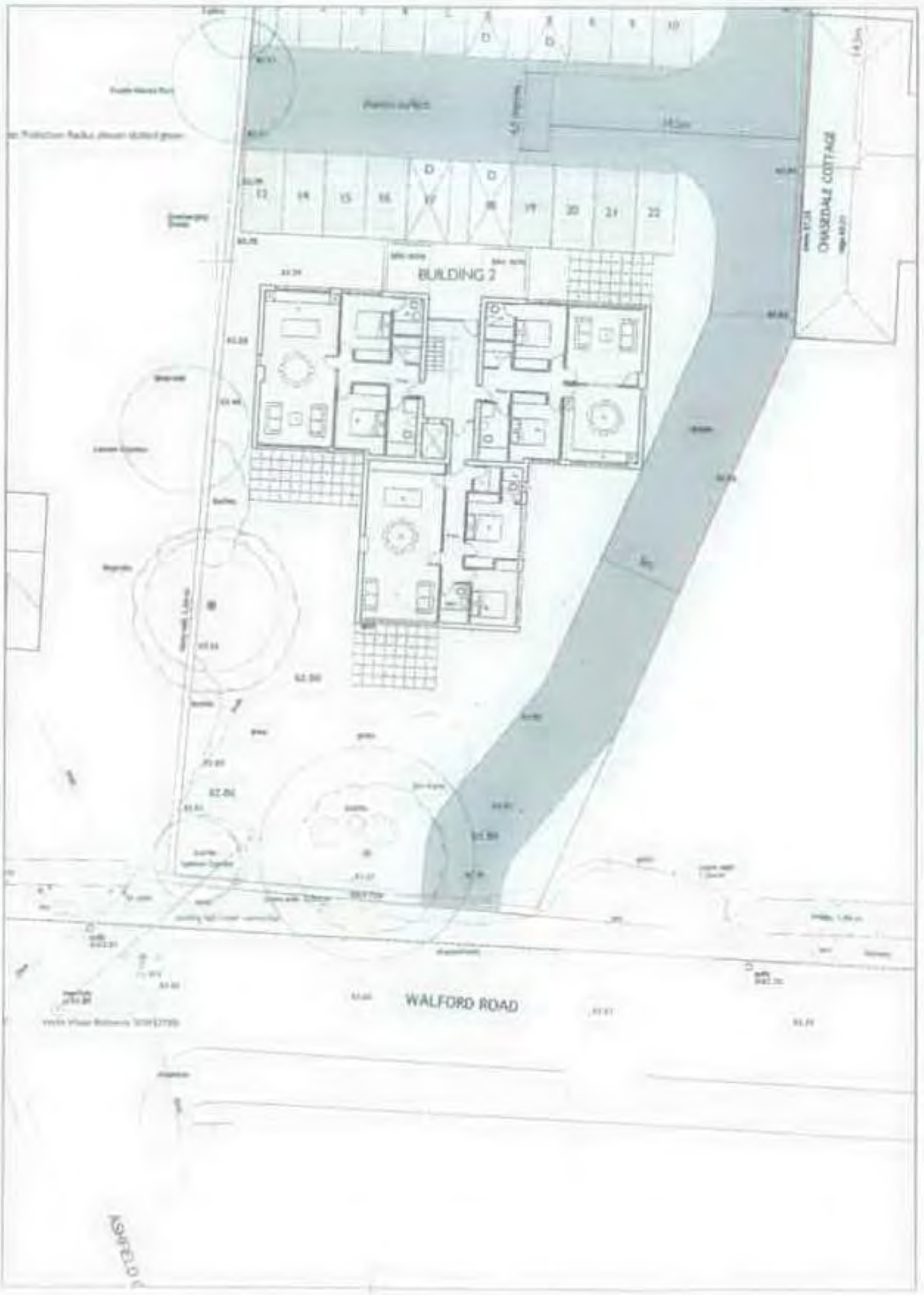
5. In either case it should be noted that the existing driveway will be carefully removed (without disturbance to the underlying soil) and the ground made up with fresh topsoil, thus providing the tree with additional potential rooting volume.

6. The canopy of tree one extends approximately 4 metres to the south with a clearance under of about 2 metres. The near edge of the new road is approximately 3.7 m from the tree, so it will be necessary to carry out some pruning of the pine tree in order to achieve sufficient clearance, both laterally and vertically, for vehicles using the new access. The degree of cut-back is small and it will be possible to achieve without causing the tree any significant harm. The tree will require further work in coming years to maintain adequate clearances and generally to keep it in a safe condition.

7. As a final alternative solution I suggest that it would be worth considering the removal of the pine tree and its replacement by a new tree, to be located slightly further to the north. This will inevitably result in some short-term loss of amenity, but the use of a substantial semi-mature tree would ensure some immediate mitigation of that loss. Furthermore, the existing defect in the fork of the pine tree (as noted in the schedule of this report) means that it will have a reduced safe life expectancy: replacing it would, in effect, assure the presence of a suitable specimen in an appropriate location for a longer period than could be expected from the existing tree.

J.P. Ross B.Sc. F.Arbor.A.
07/11/2009.

Extract from WBA darwing 99248 HD100A showing proposed new access in relation to Tree 1



APPENDIX: The Protection of trees on construction sites:

[Including extracts from BS5837:2005 - Trees in Relation to construction – Recommendations.]

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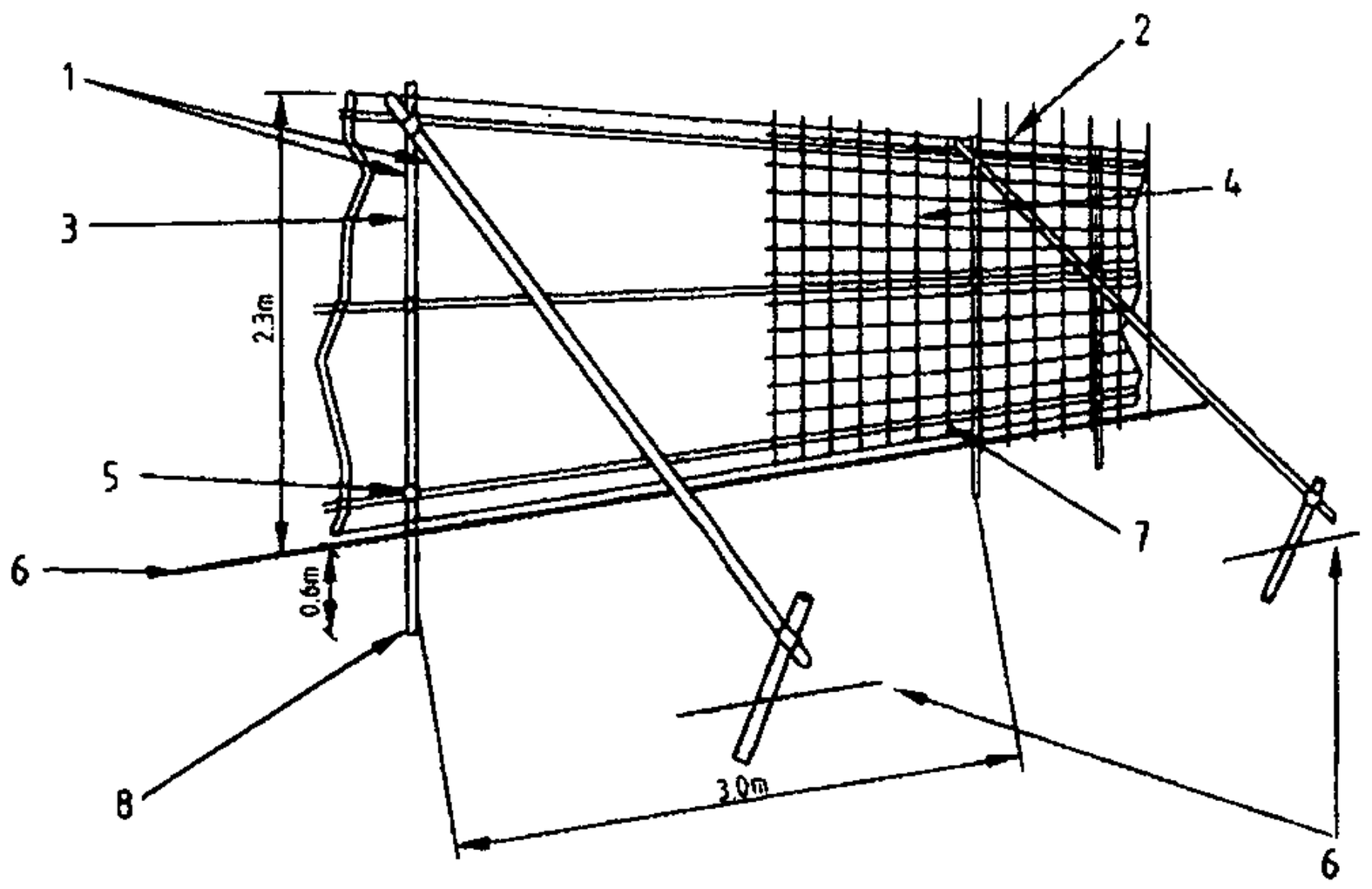
*A **CONSTRUCTION EXCLUSION ZONE** should be established around all trees intended for retention, based upon the Root Protection Areas (RPAs) of those trees. These zones should be adequately protected by appropriately designed **protective barriers & ground protection** throughout the entire development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

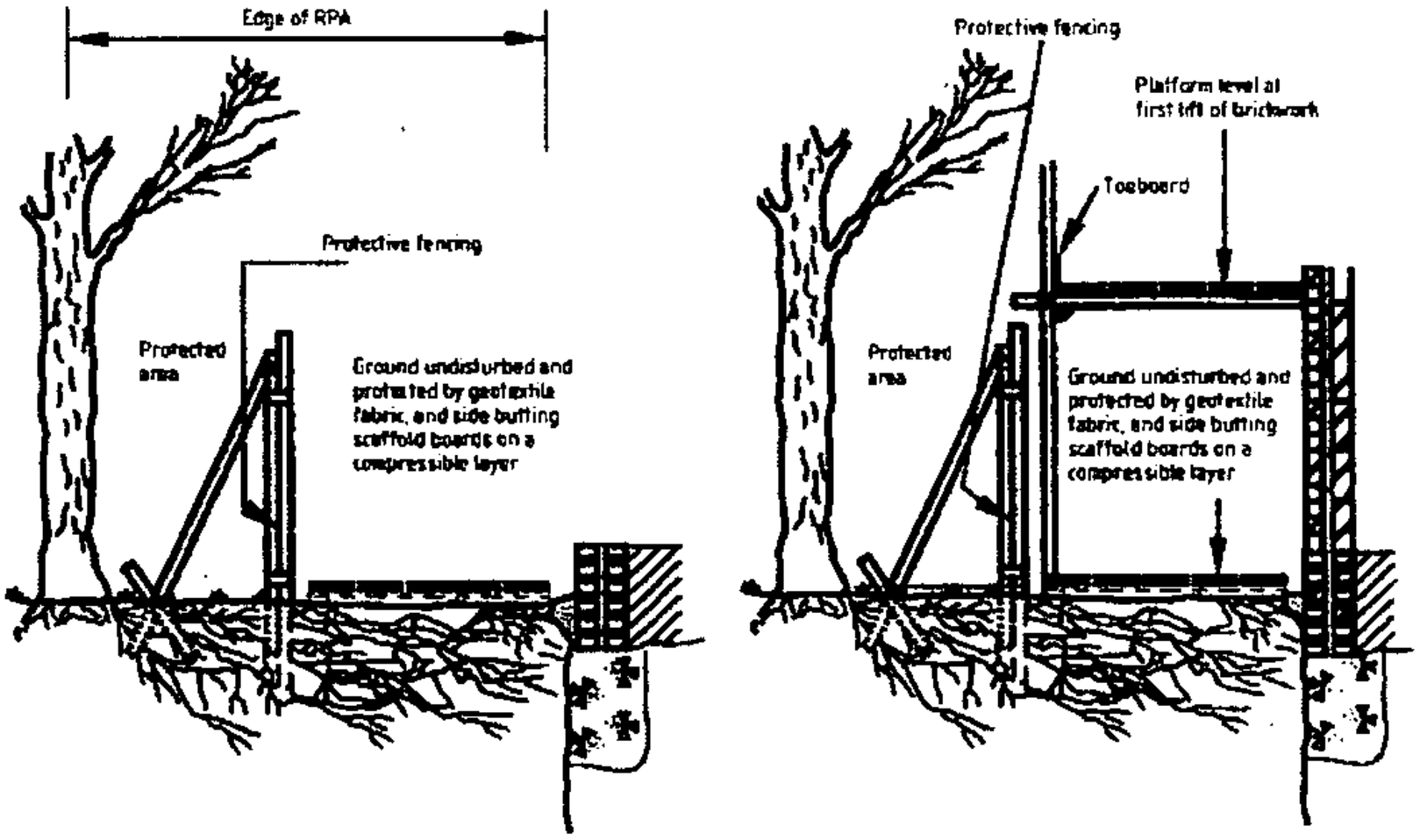


1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and/or standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Ground level
7 Wire twisted and secured on inside face of fencing to avoid easy dismantling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

APPENDIX: Trees on construction sites:

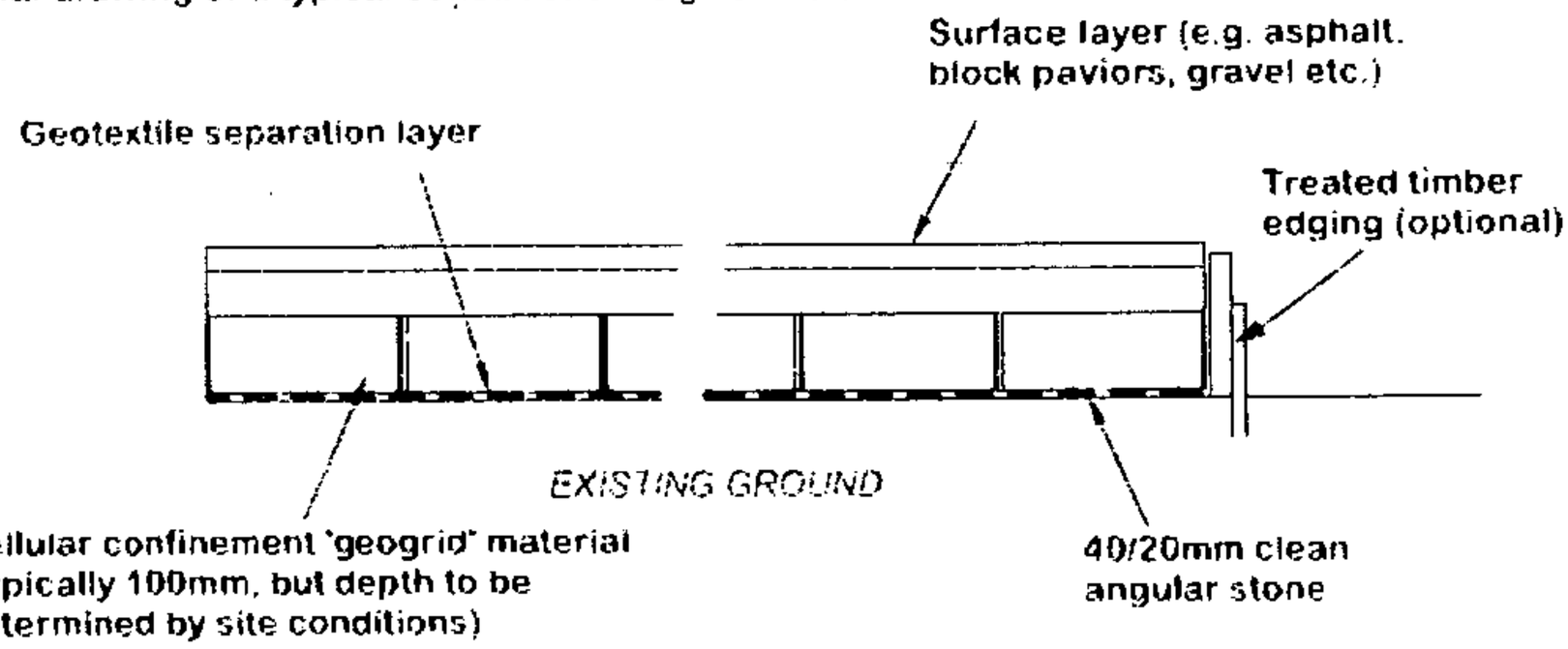
4: Designing Roads, Driveways and Paths near trees

[See also BS5837:2005 (Trees in Relation to construction – Recommendations) *& Arboricultural Practice Note* ***APN12,*** "Through the Trees to Development", *by D. Patch & B. Holding, 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 "Geocell", distributed by Terram Ltd.[2] and "Geoweb" marketed by Buildbase Ltd.[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 bearing capacity of the existing soil strata, working in conjunction with an arboriculturist.

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[1] Website:- www.geosyn.co.uk
[2] Website:- http://tinyurl.com/voyab4
[2] Website:- www.terram.com
[1] email: customerservice@tensar.co.uk

M. F. Freeman. Land at PENRICE, Walford Road, Ross-on-Wye.

Pre-Development Arboricultural Assessment & Constraints Report

ADDENDUM

NOVEMBER 2009

SE/100399/F

Notes on the creation of the new access

1. I understand that it is proposed to create a new access into the site to the south of tree1, the Pine. The accompanying extract from the WBA drawing no. 99248.HD100A illustrates the situation.

2. It will be seen that the nominal root protection area of tree 1 extends approximately half way across the entrance road. In order to retain this tree successfully and to construct the road without damaging any underlying roots' it will be necessary to employ 'no-dig' construction techniques, as outlined in Appendix 3 of the Arboricultural Constraints report of September 2009.

3. This will necessitate raising the level of the roadway where it crosses the root protection area above the existing ground level within the site. The details of the design will have to be confirmed by an engineer, but the degree of increase (i.e. the depth of the no-dig section) must be determined according to the anticipated loadings it will have to bear: if construction traffic is intended to gain access here the thickness of the cellular matrix material will have to be significantly greater than if only domestic traffic is anticipated. Furthermore the level of the new surface must link in with that of the existing public highway and footpath.

4. Should the differences in levels prove to be problematic it may be possible to use an alternative 'no-dig' solution, namely to use steel-reinforced concrete to bridge the section over the tree's rooting area. This too would have to be engineer-designed, but it is likely that it will require less depth to achieve an equivalent load-bearing capacity than the cellular support system.

5. In either case it should be noted that the existing driveway will be carefully removed (without disturbance to the underlying soil) and the ground made up with fresh topsoil, thus providing the tree with additional potential rooting volume.

6. The canopy of tree one extends approximately 4 metres to the south with a clearance under of about 2 metres. The near edge of the new road is approximately 3.7 m from the tree, so it will be necessary to carry out some pruning of the pine tree in order to achieve sufficient clearance, both laterally and vertically, for vehicles using the new access. The degree of cut-back is small and it will be possible to achieve without causing the tree any significant harm. The tree will require further work in coming years to maintain adequate clearances and generally to keep it in a safe condition.

7. As a final alternative solution I suggest that it would be worth considering the removal of the pine tree and its replacement by a new tree, to be located slightly further to the north. This will inevitably result in some short-term loss of amenity, but the use of a substantial semi-mature tree would ensure some immediate mitigation of that loss. Furthermore, the existing defect in the fork of the pine tree (as noted in the schedule in the September report) means that it will have a reduced safe life expectancy: replacing it would, in effect, assure the presence of a suitable specimen in an appropriate location for a longer period than could be expected from the existing tree.

J.P. Ross B.Sc. F.Arbor.A.
07/11/2009

M. F. Freeman.

Land at PENRICE, Walford Road, Ross-on-Wye

ADDENDUM

SE/100399/F

Extract from WBA darwing 9/246 HD108A showing proposed new access in relation to Tree T1

NOVEMBER 1993