Future Arbor

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Arboricultural Assessment

Prepared with reference to:

British Standard 5837:2012
"Trees in relation to design, demolition and construction – Recommendations"

Survey site:

Land at Tremont Park,
Llandrindod Wells,
Powys.
LD1 5AF

(Ordnance Survey Grid Ref: 306462, 261989)

Inspection Commencing on:

27th October, 2023

1.0 Remit and Scope of Report:

1.1 Instructions to carry out an arboricultural assessment in respect of trees located within several acres of open pasture behind Tremont Park, Llandrindod Wells, LD1 5AF, were received from Hughes Architects on behalf of the property owner. We have been requested to review the condition of trees at this site with regard to the requirements of British Standard 5837:2012 and with consideration for the construction of a new residential development.

1.2 This arboricultural assessment has been designed to facilitate the planning process with respect to trees at Tremont Park, Llandrindod Wells that may be affected by proposals being put forward to develop the site. Information has been collected in respect of trees to comply with the requirements of British Standard 5837:2012 – "*Trees in relation to design, demolition and construction - Recommendations.*" In this respect, we aim to provide guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees in respect of development. While the Standard recognises the problems of development close to existing trees which are to be retained, it does not set out to put arguments for or against development, or for the removal or retention of trees. Rather it provides guidance on how to decide which trees are appropriate for retention, on the means for protecting these trees during construction work and also on the means for integrating trees into the landscape upon completion of the development.

1.3 It is appreciated that trees of good quality, well sited and appropriate to their surroundings, will greatly enhance any new development by providing an immediate appearance of maturity. After consideration of the arboricultural, landscape, conservation and cultural values, the British Standard provides a methodology for the determination of "Retention Categories," where Categories "A" and "B" represent trees which must be retained, whilst "C" and "U" identify less valuable trees. Subjectivity in the determination of Retention Categories is minimised within British Standard 5837:2012, which entrusts to those with a specialist and objective understanding of arboriculture. In this regard, this report has been prepared by Brendan Tuer M.Arbor.A, Professional Member of the Arboricultural Association (certificate PR.018).

2.0 Introduction:

2.1 This arboricultural assessment was undertaken on 27th October, 2023. Trees were inspected from ground level, in accordance with our Standard Terms and Conditions for Arboricultural Consultancy Work. The categories for the measurements used to determine the Retention Category for each tree have been taken from British Standard 5837:2012. Additional information has been provided to facilitate a greater understanding of the trees in relation to construction.

2.2 The assessment of trees has been based upon their appearance and condition at the time of inspection and does not take into account any alteration in site conditions that may entail from future site development. Whilst this report is designed to provide the necessary information for planning decisions to be made in relation to trees, this report is not intended for use as an arboricultural health and safety report.

2.3 Whilst every attempt has been made to survey and record all arboricultural information accurately, it may have been necessary to estimate the recording of some information where trees have been either obscured or are not easily accessible. This circumstance may arise with ivy covered trees, on uneven terrain, where trees are in dense groups, access is impaired or trees are located on private property *etc*. In such circumstances responsibility lies with the landowner or client to ensure free access and clear lines of visibility to all trees and tree parts to be included within the survey.

2.4 With regard for proposed future landscaping works, any subsequent landscaping at Tremont Park, Llandrindod Wells should seek to enhance the biodiversity value of the site through planting native trees and shrubs with local provenance. Powys Council's Trees and Planning Policy Notes are publicly available on-line and provide information regarding best practice in landscaping. Alternatively, Future Arbor Ltd offer a well considered and respected landscape design service.

3.0 The Survey:

3.1 This report contains the records for 45 individual trees and tree groups located to the south and north of Tremont Park, Llandrindod wells, Powys, LD1 5AF.

3.2 For the purposes of this development, particular consideration is given to:

(i) The individual species, its age, height and condition. The diameter at breast height (DBH) and the crown spread have also been measured in accordance with BS 5837:2012.

(ii) Identified structural defects have been recorded for trees to facilitate the determination of each tree's Safe Useful Life Expectancy (SULE). Comments and specific notes regarding the condition of each tree are appended to the tables.

(iii) The location of each tree relative to existing site features, *e.g.* its value as a screen or as a skyline feature. The tree's relative suitability, within the context of the proposed site development.

(iv) The suitability of a tree's retention within the context of the proposed development.

3.3 In accordance with the British Standard, we have recorded trees as defined within Table 1: BS 5837:2012. All Retention Categories are colour-coded on the attached plans to ease the identification of those trees, which are most desirable to retain (green and blue).

3.4 Root Protection Areas (RPAs) are clearly shown on the attached Tree Constraints Plan. The RPA is defined as "[a] layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability and where the protection of the roots and soil structure is treated as a priority." This may have been modified to better represent root growth habit in close proximity to the existing buildings or roads. For general purposes, the RPA identified within this report should remain undisturbed, throughout the period of construction, protected as shown within the Appendix of this report.

4.0 Terms used within the Tree Schedule:

4.1 **NUMBERING:** Each tree (or close-growing group) has been given a Tree number, to enable it to be identified through reference to the appended Tree Plans.

4.2 **DIAMETER** at Breast Height ("DBH"), is derived from the circumference measured at approximately 1.5m above ground level and recorded in millimetres. Small diameter, multi-stemmed trees and those in close-growing groups may be given as ranges of DBH.

4.3 **HEIGHT** has been calculated through the use of a clinometer and is recorded in metres. Alternatively, in dense woodlands the following classification may be used: Very small (≤.4m); Small (4-8m.); Medium (8-14m.); Large (14-20m); V. large (≥ 20m).

4.4 **CROWN SPREAD** has been measured in metres at the four cardinal points. **CROWN START** refers to the height at which the crown begins to develop, estimated in metres.

4.5 **AGE** classifications are based on the life *expectancies* of the various species, as follows:

Y	**Young**	Newly planted or self-establishing trees
YM	**Young/ Mature**	Trees of up to one third of their expected lifespans
M	**Mature**	Trees between one and two thirds of their life expectancy
LM	**Late Mature**	Trees in the last third of their expected lives

These classifications are estimated by reference to the appearance and stem-girth of each tree, subjectivity has been reduced through the provision of these age ranges. The life expectancy of the various species has been adapted from Helliwell & Coombes, *Amenity Valuation of Trees & Woodlands*: Arboricultural Association, 1994.

4.6 **CONDITION** provides an overall assessment of the health of the tree and is based, subjectively, on practical experience. BS5837:2012 suggests consideration of both structural and physiological condition and within this report, these have been combined. The condition value may be downgraded where it is recognised that the tree may have a reduced life expectancy due to its location, disposition or where local knowledge may have imparted historical information specific to the condition of a tree. The following descriptions provide some interpretation for each category:

Good: No attention required [special features may be noted.]

Fair: Generally in good health but attention is advised on grounds of health, safety, significant nuisance or problems concerning general amenity.

Moderate: Notable hazards, notable nuisance or low amenity value.

Poor: Trees with faults that represent a significant hazard, or a serious threat to general amenity.

Very Poor: Trees with serious faults where work is essential to remove or ameliorate a hazard.

4.7 **SAFE USEFUL LIFE EXPECTANCY (SULE)** has been determined through reference to "SULE Data Collection," Barrel, J; updated 01/04/2001 and "Tree AZ," Barrel, J; (updated 08/08/2003). These documents allow for the estimation of a tree's life expectancy based upon a consideration, principally, for location and condition, to reflect the number of years remaining that a tree could be perceived to have and therefore to provide guidance as to whether the tree could feasibly be retained through the course of development.

4.8 **RETENTION CATEGORY** ("Category") is allocated as **A, B, C** or **U/R**. These categories are intended to indicate the relative importance given to the retention of each tree and are defined, based upon BS 5837:2012, as provided overleaf.

4.9 **ROOT PROTECTION AREA (RPA)** In order to avoid damage to the roots or rooting area of retained trees, the RPA has been recorded for all Category A & B trees. This is a minimum area in m^2 which should be left undisturbed around each retained tree. For the purposes of the location and survey plans at the end of this document, the approximate extent of the RPA has been sketched as a modified polygon, the area of which is recorded within the Tree Schedule.

4.8: *BS 5837: 2012 RETENTION CATEGORIES, described as follows:*

Trees for removal
Category U: *Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.* 1) Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse 2) Trees that are dead or are showing signs of significant, immediate and irreversible overall decline 3) Trees infected with pathogens of significance to the health and/or safety of other trees nearby (eg. DED) 4) Very low quality trees suppressing adjacent trees of better quality
Trees to be considered for retention
Category A: *Those of high quality and value: in such a condition as to be able to make a substantial contribution (min. 40 yrs)* 1) 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 (eg. The dominant or principal trees within an avenue 2) 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 (eg. Avenues or other arboricultural features assessed as groups) 3) Trees, groups or woodlands of significant conservation, historical, commemorative or other value (eg. Veteran trees or wood-pasture)

Category B: *Those of moderate quality and value: those in such a condition as to make a significant contribution (min. 20 yrs)*

1) Trees that might be included in the high category, but are downgraded because of impaired condition (eg. Presence of remediable defects including unsympathetic past management and minor storm damage)

2) 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 (eg. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to a site, therefore individually having little visual impact on the wider locality.

3) Trees with clearly identifiable conservation or other cultural benefits

Category C: *Trees of low quality with an estimated remaining life expectancy of at least 10 years, or younger trees with a stem diameter of below 150mm. Also, trees which could easily be transplanted or replaced.*

1) Trees not qualifying in higher categories

2) 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

3) Trees with very limited conservation or other cultural benefits

4) Young trees with a stem diameter below 150 mm.

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Tree Schedule

Data collected

in accordance with BS5837:2012

Tree No.	Species	DBH (cm)	Age	Height (m)	Crown Spread (m) N	S	E	W	Crown start (m)	Condition (Physio/ structural)	SULE (years)	Category	RPA (m^2)	Distance to CEZ (m)	Notes, comments and recommendations
1	Sycamore	70.3	M	16.0	7.6	5.2	6.0	6.5	2	Good	40+ yrs	A	223.8	8.4	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space.
2	Pedunculate Oak	133.7	M	18.0	7.2	8.6	7.8	7.4	1	Good	40+ yrs	A	706.5	15.0	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space.
3	Sycamore	79.6	M	16.0	6.0	4.8	4.6	5.8	1	Fair	40+ yrs	A	286.4	9.5	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space. Tree to south has previously collapsed resulting in one-sided canopy.
4	Pedunculate Oak	101.9	M	18.0	7.2	5.5	7.8	6.9	1	Good	40+ yrs	A	469.2	12.2	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space.
5	Pedunculate Oak	95.5	M	20.0	6.7	6.5	8.2	7.5	1	Good	40+ yrs	A	412.3	11.5	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space.

Tree No.	Species	DBH (cm)	Age	Height (m)	Crown Spread (m) N	S	E	W	Crown start (m)	Condition (Physio/ structural)	SULE (years)	Category	RPA (m^2)	Distance to CEZ (m)	Notes, comments and recommendations
6	Pedunculate Oak	124.1	M	20.0	7.4	7.8	9.2	8.5	1	Good	40+ yrs	A	696.9	14.9	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space.
7	Pedunculate Oak	106.3	M	18.0	8.5	7.3	9.6	8.9	1	Good	40+ yrs	A	511.1	12.8	Prominent landscape feature demarking position of old field boundary. Retain this specimen, possibly within newly created Public Open Space.
8	Pedunculate Oak	130.5	M	18.0	8.7	8.2	9.0	9.5	1	Moderate	20<40 yrs	B	706.5	15.0	Large cavity at base and root decay noted to south reducing Safe Useful Life Expectancy. Recommend reducing canopy by 30% and retaining this specimen.
9	Holly	14	M	6.0	3.7	3.0	3.5	3.2	0	Good	40+ yrs	B	8.9	1.7	Contributing to woodland screen between this site and the adjacent school.
10	Sycamore	16	M	10.0	3.6	3.2	3.5	3.6	1	Good	40+ yrs	B	11.6	1.9	Contributing to woodland screen between this site and the adjacent school.
11	Hazel Group	12<14	M	6.0	83.0		9.0		0	Good	40+ yrs	A	8.9	1.7	Contributing to woodland screen between this site and the adjacent school.
12	Wych Elm	4 & 28	M	16.0	7.6	2.0	7.2	5.0	1	Good	20<40 yrs	A	35.4	3.4	Contributing to woodland screen between this site and the adjacent school. A tall and prominent individual

Tree No.	Species	DBH (cm)	Age	Height (m)	Crown Spread (m) N	S	E	W	Crown start (m)	Condition (Physio/ structural)	SULE (years)	Category	RPA (m^2)	Distance to CEZ (m)	Notes, comments and recommendations
13	Wych Elm	32	M	17.0	4.4	2.5	6.8	4.8	1	Good	20<40 yrs	A	46.3	3.8	Contributing to woodland screen between this site and the adjacent school. A tall and prominent individual
14	Wych Elm	48	M	18.0	4.8	4.5	7.0	5.2	1	Good	20<40 yrs	A	104.2	5.8	Contributing to woodland screen between this site and the adjacent school. A tall and prominent individual
15	Field Maple	42	M	16.0	6.2	6.5	6.3	5.0	1	Good	40+ yrs	A	79.8	5.0	Contributing to woodland screen between this site and the adjacent school. A tall and prominent individual
16	Field Maple	46	M	16.0	6.7	6.3	6.6	4.9	1	Good	40+ yrs	A	95.7	5.5	Contributing to woodland screen between this site and the adjacent school. A tall and prominent individual
17	Hazel Group	12<14	M	6.0	14.0		20.0		0	Good	40+ yrs	A	8.9	1.7	Contributing to woodland screen between this site and the adjacent school.
18	Native Group	10<14	M	6.0	28.0		10.0		0	Good	40+ yrs	A	8.9	1.7	Blackthorn and Hawthorn boundary hedge
19	Ash (dead)	12<14	YM	7.0	4.0	4.0	2.0	2.0	2	VP	<10 yrs	U	-	-	Three dead stems within hedgerow. Fell
20	Ash	24	YM	12	4.8	2.1	4.8	4.7	2	Fair	20<40 yrs	B	26.0	2.9	Hedgerow specimen
21	Hazel Group	75cm at 0m	M	5	133		10		0	Good	40+ yrs	A	176.6	7.5	A hazel hedgerow comprised of numerous multi-stemmed specimens and creating a valuable visual screen.
22	Sycamore	18, 19 & 24	YM	12	4.3	4.2	3.5	3.7	2	Good	40+ yrs	A	26.0	2.9	This hedgerow specimen trifurcates at 1m.

Tree No.	Species	DBH (cm)	Age	Height (m)	Crown Spread (m) N	S	E	W	Crown start (m)	Condition (Physio/ structural)	SULE (years)	Category	RPA (m^2)	Distance to CEZ (m)	Notes, comments and recommendations
23	Pedunculate Oak	1.4m at 0m	YM	12	6.2	7	7.6	7.5	1	Good	40+ yrs	A	615.4	14.0	Characterful hedgerow specimen with low, spreading canopy
24	Ash	38	YM	12	6.5	5.8	6.6	6.3	2	Moderate	10<20 yrs	C	-	-	Possible on-set of Ash Dieback identified. Monitor.
25	Pedunculate Oak	14	YM	4	3.5	2	2.7	2.5	1	Good	40+ yrs	C	-	-	A healthy but isolated specimen. Seek to retain within development or transplant.
26	Hawthorn	45cm at 0m	M	6	3.7	3.5	3.4	3.6	1	Fair	20<40 yrs	C	-	-	This specimen is located next to a depression which results in naturally forming pond. Consider retaining tree and pond as a landscape feature.
27	Pedunculate Oak	52	YM	16	8	6.6	6.2	7.1	3	Good	40+ yrs	B	122.3	6.2	Attractive and healthy specimen with long Safe useful Life Expectancy
28	Ash	48	M	18	3	6.5	5.2	3.1	8	Fair	20<40 yrs	C	-	-	Potential on-set of Ash Dieback. Monitor. If removed, seek to retain hazel under-storey
29	Ash	66	M	18	5	6.8	4.2	3.6	8	Very Poor	<10 yrs	U	-	-	Dead specimen. Fell
30	Ash	42 & 44	M	17	6.8	5.3	6.1	2.3	8	Very Poor	<10 yrs	U	-	-	Dead specimen. Fell
31	Goat Willow	27 & 32	M	7	5.7	5.1	4.9	5.3	1	Fair	20<40 yrs	C	-	-	Two stems next to stream.
32	Goat Willow	25cm at 0m	YM	5	3.2	2.8	3	3	1	Fair	20<40 yrs	C	-	-	Isolated specimen next to stream.
33	Goat Willow	21cm at 0m	YM	5	3.6	4.2	3.3	3.1	1	Fair	20<40 yrs	C	-	-	Isolated specimen next to stream.

Tree No.	Species	DBH (cm)	Age	Height (m)	Crown Spread (m) N	S	E	W	Crown start (m)	Condition (Physio/ structural)	SULE (years)	Category	RPA (m^2)	Distance to CEZ (m)	Notes, comments and recommendations
34	Goat Willow	26	YM	5	3.5	3.5	3	3	1	Fair	20<40 yrs	C	-	-	Isolated specimen next to stream.
35	Goat Willow	22	YM	5	2.8	3.8	3	2.8	1	Fair	20<40 yrs	C	-	-	Isolated specimen next to stream.
36	Goat Willow	18	YM	5	2.9	2.6	3.3	3	1	Fair	20<40 yrs	C	-	-	Isolated specimen next to stream.
37	Goat Willow	18<24	YM	7	35.0		30.0		1	Good	40+ yrs	B	26.0	2.9	Very wet area. Retain and plant to enhance biodiversity.
38	Ash (dead)	58	M	20	7.5	5.2	6.0	6.4	5	Very Poor	<10 yrs	U	-	-	Dead specimen. Fell
39	Ash (dead)	63	M	20	0.0	7.2	6.3	6.6	5	Very Poor	<10 yrs	U	-	-	Dead specimen. Fell
40	Ash	37	M	18	5.6	5.3	2.1	6.9	8	Very Poor	<10 yrs	U	-	-	Dead specimen. Fell
41	Pedunculate Oak	56	M	18	5.3	7.2	8.1	5.6	1	Good	40+ yrs	A	141.8	6.7	Prominent hedgerow specimen. Retain.
42	Pedunculate Oak	65	M	17	6.0	7.3	6.1	6.8	1	Good	40+ yrs	A	191.0	7.8	Prominent hedgerow specimen. Retain.
43	Alder	120cm at 0m	M	12	6.5	8.0	8.7	6.3	1	Good	40+ yrs	B	452.2	12.0	Multi-stemmed specimen with a spreading canopy. Retain.
44	Alder	38	LM	8	5.2	6.1	5.8	4.3	2	Good	40+ yrs	B	65.3	4.6	This specimen and the adjacent hazel are located at the intersection of hedgerows.
45	Group	25<40	M	12	12.0		174.0		0	Good	40+ yrs	A	152.1	7.0	A native, established hedgerow with high biodiversity value and high landscape screening value.

5.0 Discussion

5.1 The parcel of land adjacent to Tremont Park, Llandrindod Wells comprises a number of open fields for grazing livestock bound by native hedgerows. To the south of the site, the land is bound by Trefonen Lane and Ysgol Treffonen, a primary school for 4-11 year olds. To the north is located the new Police, Fire Station and Court complex, completed in 2017. To the west, the site borders the Tremont Housing Estate with its most recent southern extension, Dulas Bank. In terms of arboriculture, most trees are located along the site boundary demarked by field boundary hedgerows, however a crescent of mature oaks extend into the site from the north-east corner of Ysgol Treffonen.

5.2 The attached site plans clearly show the locations of surveyed trees along with the constraints that they pose to development. Trees identified for retention fall into three main areas and these should be retained throughout the development process and guide site layout proposals.

1. The first area of tree retention can be described as a belt of trees and continuous hedgerow which borders Ysgol Treffonen and continues north to the south-west corner of Dulas Bank (Tno's 9-24). The Tree Constraints Plans show the locations for the erection of Tree Protective Fencing however a wider buffer zone should be created along this wooded fringe, particularly next to the school, to afford a greater buffer for the school and in consideration of potential property shading in the afternoons. Plan 4 shows how tree shadows will move into residential gardens immediately adjacent, as the sun passes its zenith, resulting in a lack of sunlight in these rear gardens in the late afternoons and early evenings. This may result in calls to fell those trees bordering the school once properties are occupied, however these trees provide a valuable buffer between the school and any future development. Consideration for this should be included within the final layout design.

2. The second most significant group of trees (Tno's 1-8) are located within a crescent of land between Dulas Bank and Trefonen Lane. Tnos 1-8 are a row of late mature Pedunculate Oak and Sycamore with exceptional landscape and biodiversity value. Out recommendation is that these trees are retained within generous Public Open Space. All services should be routed around this retained area and no construction machinery should be allowed to traverse this area, to avoid unnecessary damage to tree roots. The location of the Tree Protective Fence creates a "Construction Exclusion Zone" in this area and the construction methodology for this site must ensure that these trees are adequately protected at the earliest stages of development, before any construction activity whatsoever, including delivery of heavy plant to site, soil stripping, installation of drainage or any other construction activity. Once again, the shadows cast by trees in this

location (Plan 4) could compromise the amenity of residential gardens and a generous buffer around these trees will reduce the likelihood of future conflict upon the completion of development.

3. The final area for retention includes those trees which screen the new Police, Fire and Court facility to the north of the site (Tno's 41-45). Whilst Tno's 38, 39 & 40 can be removed, the wider group (Tno.45) should be protected. This band of trees are located along the northern perimeter of the site and their associated shadows will not out-shade the new development.

5.3 Whilst Tno.27 could be retained, we suggest that this tree along with the remainder of the group of trees in this location, are removed. With the exception of Tno.27, these trees are in poor health and the removal of Tno's 27-31 will not adversely affect landscape character. It will, however, allow for better layout design. The site plans currently show a Construction Exclusion Zone for Tno.27, if this should be required.

5.4 From an arboricultural perspective, we believe that there is no significant constraint to the principal of development within the parcel of land surveyed and simply ask that the final layout respects retained trees as shown on the site plan, particularly those providing a buffer next to the school and the central oaks and sycamore in group 2..

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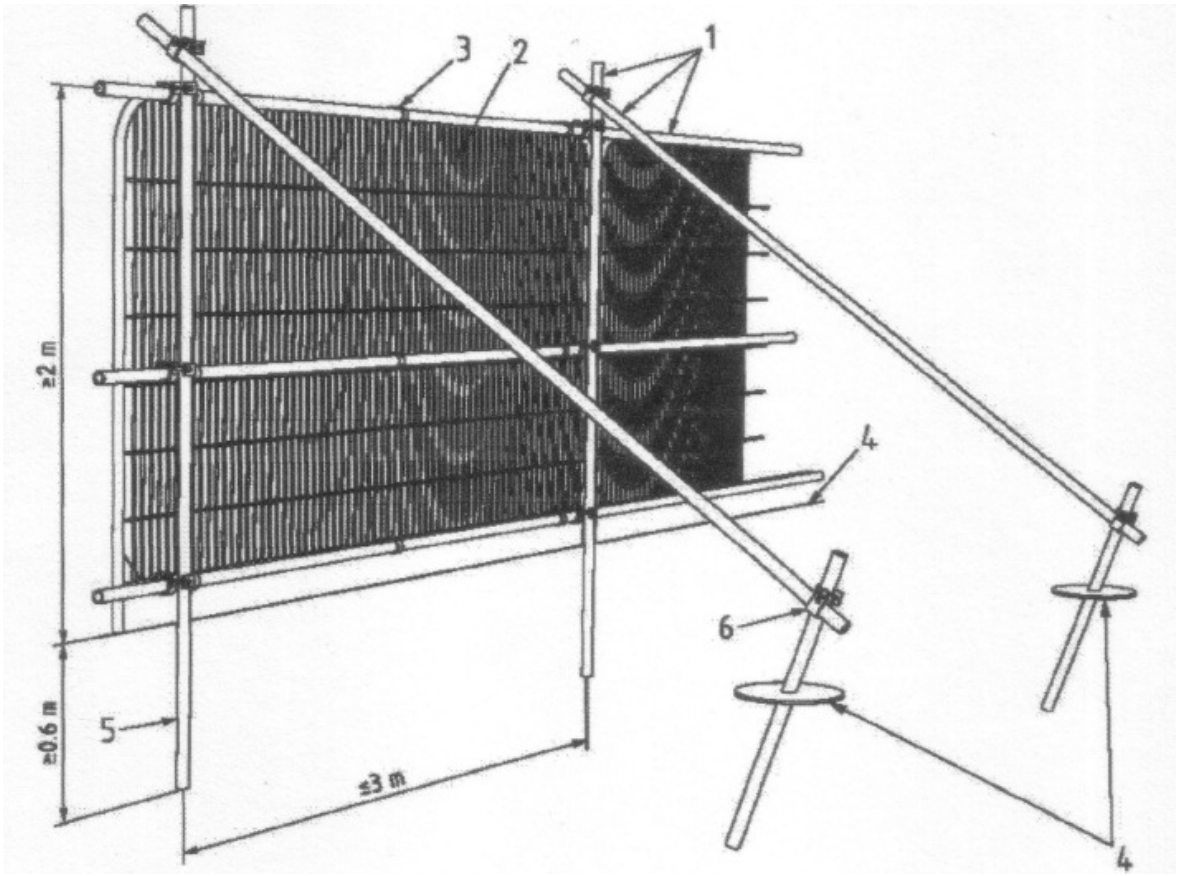
Site Plans

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.

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.
- The default specification 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 wore 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.

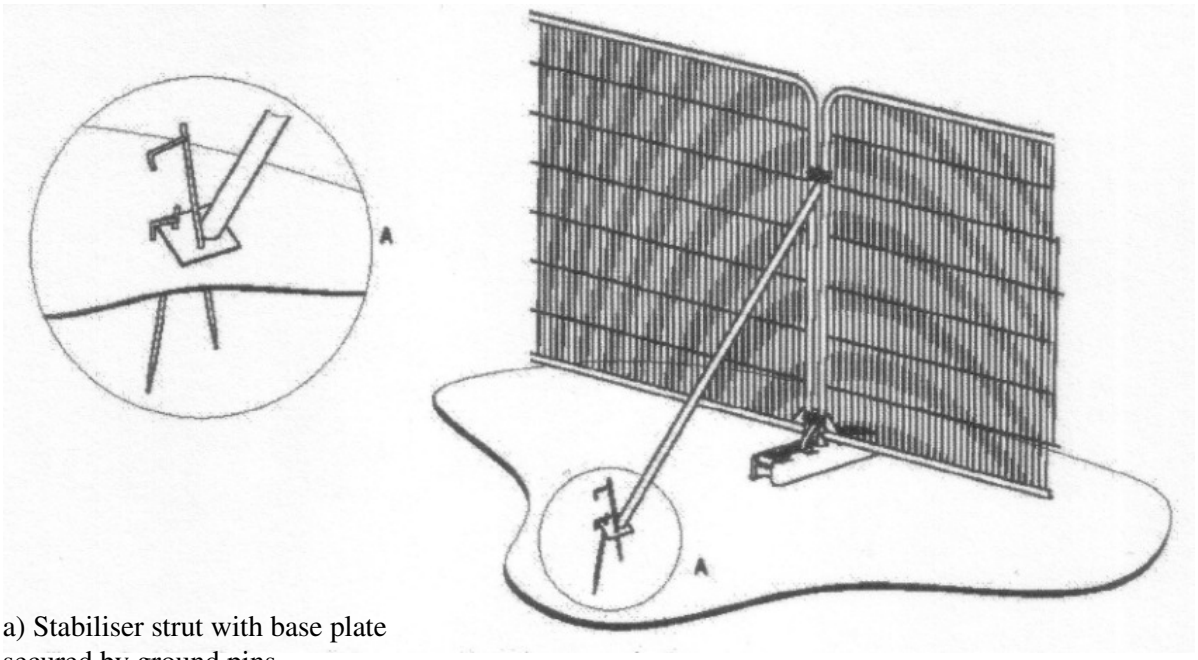
Default design of Protective barrier



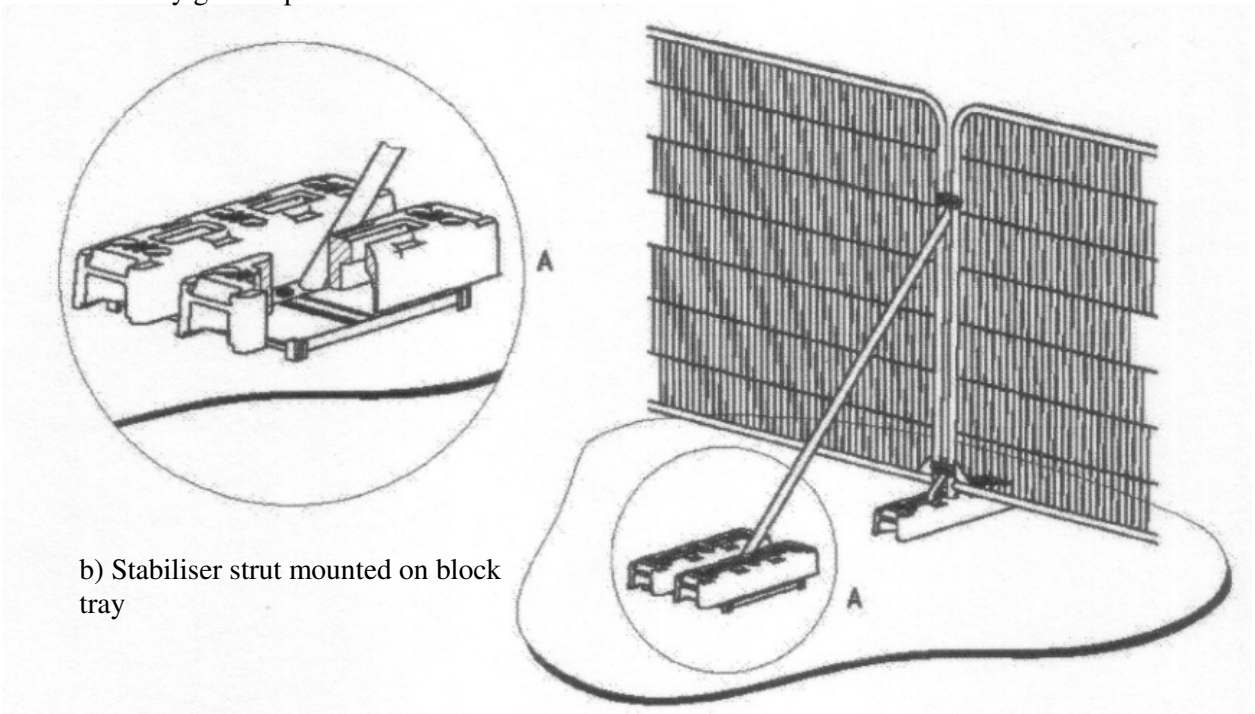
1 Standard scaffold poles
2 Heavy gauge 2m galvanised tube and welded mesh infill panels
3 Panels secured to uprights and cross members with wire ties
4 Ground level
5 Uprights driven into the ground until secure
6 Standard scaffold clamps

- Note that weldmesh panels on rubber or concrete feet might provide an adequate level of protection depending on agreement with project arboriculturist and, where relevant, agreed with the LPA. In such cases the fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside of the fence. The panels should be supported on the inner side by stabiliser struts which should normally be attached to a base plate secured with ground pins, see Fig 3a. Where the fencing is to be erected on retained hard surfacing or it is otherwise unfeasible to use ground pins e.g. due to the presence of underground services, the stabiliser struts should be mounted on a block tray, see Fig 3b

Example of an above-ground stabilising system (BS5837;2012, Fig 3)



a) Stabiliser strut with base plate secured by ground pins



b) Stabiliser strut mounted on block tray

- It may be appropriate on some sites to use temporary site office buildings as components of the tree protection barriers.
- All-weather notices should be attached to the barrier with words such as:
  "CONSTRUCTION ZONE – NO ACCESS"

Notes on the Construction of Roads, Paths, Driveways etc. near Trees.

[See also BS5837:2012 (*Trees in Relation to construction – Recommendations*) & the 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.

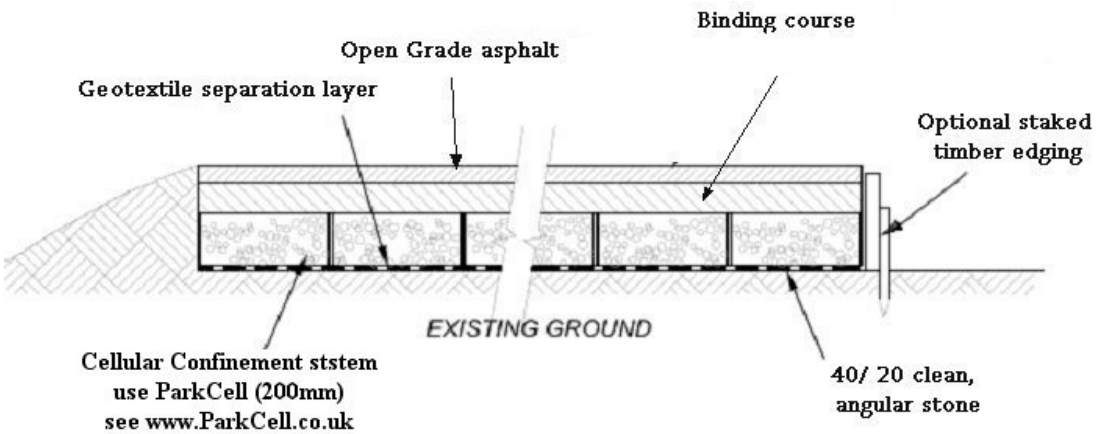
If necessary, existing surface vegetation should be killed using an *appropriate herbicide* that will not leach into the soil and will not affect tree roots. All herbicides must be applied strictly in accordance with the manufacturer's instructions.

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 "ParkCell" marketed by Parkcell 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.



[1] Website:- www.parkcell.co.uk

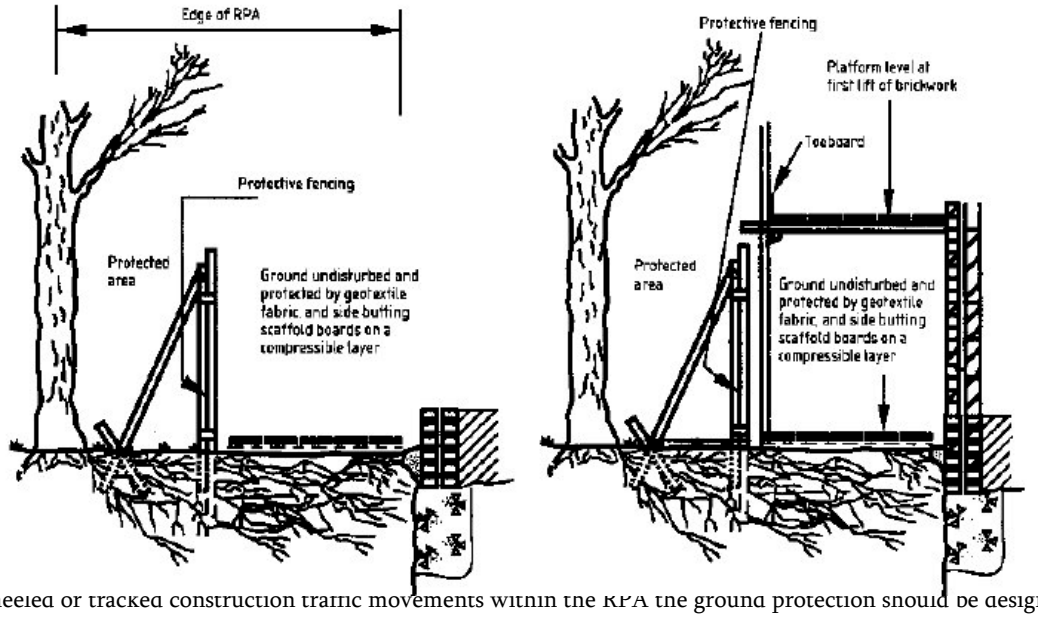
[2] Website:- www.terram.com

[3] Website:- http://tinyurl.com/yoyab4

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" distributed by Terram Ltd. and "Geoweb" marketed by Buildbase Ltd.

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..