

Arboricultural Implications Assessment and Method Statement for Cockpit Farm, Knowle Lane, Fair Oak

eco **urban**
ARBORICULTURAL

Ash Fraxinus excelsior Aspen Populus tremula Beech Fagus sylvatica Blackthorn Prunus spinosa Black poplar Populus nigra Box elder Acer negundo Catalpa Catalpa bignonioides Coast redwood Sequoia sempervirens Dawn redwood Metasequoia glyptostroboides Deodar cedar Cedrus deodara Douglas fir Pseudotsuga menziesii Elder Sambucus nigra False acacia Robinia pseudoacacia Field maple Acer campestre Goat willow Salix caprea Hawthorn Crataegus monogyna Hazel Corylus avellana Holm oak Quercus ilex Holly Ilex aquifolium Hornbeam Carpinus betulus Horse chestnut Aesculus hippocastanum Indian bean tree Catalpa bignonioides Japanese cedar Cryptomeria japonica Judas tree Cercis siliquastrum Lawson cypress Chamaecyparis lawsoniana Leyland cypress x Cupressocyparis leylandii Liquidambar Liquidambar styraciflua Lombardy poplar Populus nigra 'Italica' London plane Platanus x hispanica Maidenhair Ginkgo biloba Mimosa Acacia dealbata Monkey puzzle Araucaria araucana Monterey cypress Cupressus macrocarpa Monterey pine Pinus radiata Norway maple Acer platanoides Norway spruce Picea abies Oak Quercus robur Persian ironwood Parrotia persica Red horse chestnut Aesculus carnea Red oak Quercus rubra Rowan Sorbus aucuparia Scots pine Pinus sylvestris Sitka spruce Picea sitchensis Swedish whitebeam Sorbus intermedia Sweet chestnut Castanea sativa Sycamore Acer pseudoplatanus Tulip tree Liriodendron tulipifera Turkey oak Quercus cerris Walnut Juglans regia Western Hemlock Tsuga heterophylla Western red cedar Thuja plicata Whitebeam Sorbus aria Wild cherry Prunus avium Wellingtonia Sequoiadendron giganteum White poplar Populus alba White willow Salix alba Wild Cherry Prunus avium Yew Taxus baccata Ash Fraxinus excelsior Aspen Populus tremula Beech Fagus sylvatica Blackthorn Prunus spinosa Black poplar Populus nigra Box elder Acer negundo Catalpa Catalpa bignonioides Coast redwood Sequoia sempervirens Dawn redwood Metasequoia glyptostroboides Deodar cedar Cedrus deodara Douglas fir Pseudotsuga menziesii Elder Sambucus nigra False acacia Robinia pseudoacacia Field maple Acer campestre Goat willow Salix caprea Hawthorn Crataegus monogyna Hazel Corylus avellana Holm oak Quercus ilex Holly Ilex aquifolium Hornbeam Carpinus betulus Horse chestnut Aesculus hippocastanum Indian bean tree Catalpa bignonioides Japanese cedar Cryptomeria japonica Judas tree Cercis siliquastrum Lawson cypress Chamaecyparis lawsoniana Leyland cypress x Cupressocyparis leylandii Liquidambar Liquidambar styraciflua Lombardy poplar Populus nigra 'Italica' London plane Platanus x hispanica Maidenhair Ginkgo biloba Mimosa Acacia dealbata Monkey puzzle Araucaria araucana Monterey cypress Cupressus macrocarpa Monterey pine Pinus radiata Norway maple Acer platanoides Norway spruce Picea abies Oak Quercus robur Persian ironwood Parrotia persica Red horse chestnut Aesculus carnea Red oak Quercus rubra Rowan Sorbus aucuparia Scots pine Pinus sylvestris Sitka spruce Picea sitchensis Swedish whitebeam Sorbus intermedia Sweet chestnut Castanea sativa Sycamore Acer pseudoplatanus Tulip tree Liriodendron tulipifera Turkey oak Quercus cerris Walnut Juglans regia Western Hemlock Tsuga heterophylla Western red cedar Thuja plicata Whitebeam Sorbus aria Wild cherry Prunus avium Wellingtonia Sequoiadendron giganteum White poplar Populus alba White willow Salix alba Wild Cherry Prunus avium Yew Taxus baccata Ash Fraxinus excelsior Aspen Populus tremula Beech Fagus sylvatica Blackthorn Prunus spinosa Black poplar Populus nigra Box elder Acer negundo Catalpa Catalpa bignonioides Coast redwood Sequoia sempervirens Dawn redwood Metasequoia glyptostroboides Deodar cedar Cedrus

Arboricultural Implications Assessment and Method Statement

Cockpit Farm, Knowle Lane, Fair Oak

Produced by:

Barrie Draper BSc (Hons) Arb TechCert(ArborA) CertArb(RFS)

Arboricultural Consultant

Report Ref: **221462 - AIA**

Report Date: **30 June 2022**

No.	Title	Page
1	Introduction	3
2	Site Visit, Description and Work Methodology	5
3	Arboricultural Implications Assessment	7
4	Summary	11
5	Preliminary Arboricultural Method Statement	12
Appendix 1	Tree Protection Plan	18
Appendix 2	Tree schedule and inventory	19
Appendix 3	Illustrative specification for tree protection barriers	25
Appendix 4	Illustrative specification for ground protection measures within Root Protection Areas	26
Appendix 5	Illustrative specifications for 'low invasive' surfacing within Root Protection Areas	27
Appendix 6	BS 5837:2012 – Assessment categories	29
Appendix 7	Qualifications and experience of Barrie Draper	30

1 INTRODUCTION

- 1.1 **Instruction:** I am instructed by PC Group Ltd to report on trees which could be affected by a development proposal at Cockpit Farm, Knowle Lane, Fair Oak and prepare an Arboricultural Implications Assessment (AIA) and preliminary Arboricultural Method Statement (AMS) to support a planning application on the site.
- 1.2 **Document disclosure:** Initially, I was provided with a topographical survey (drawing reference '1164HH01 Site Survey'). This showed the positions of the significant trees on or near the site, together with the existing buildings and other important features. Subsequently, I was supplied with a copy of the proposed layout, (drawing reference 'JD_104_SLO1_coloured') showing a new site configuration.
- 1.3 **Scope of report:** All my tree observations are of a preliminary nature, with the tree survey carried out from ground level without any investigations using invasive or diagnostic equipment. I was not able to fully view all the trees detailed in this report from all directions, as some were located on adjacent private property. I have therefore confined observations of them to what was visible from within the site. I have not checked the accuracy of the positions of the trees shown on the provided plans and I have estimated all dimensions unless otherwise indicated.
- 1.4 **The Tree Protection Plan:** This is included in Appendix 1 and is a composite drawing derived from the information provided. It shows the existing landscape features (from the land survey) in grey superimposed over the proposed site plan shown in colour. This allows the relationship between the two to be clearly seen and an appropriate analysis of the implications of the proposed site changes to be undertaken. The Tree Protection Plan has also been annotated to show protection measures for the trees which could realistically be affected by the proposed development. It shows any activities in Root Protection Areas (RPAs) and if trees are to be removed, they are shown with a red dashed outline.
- 1.5 **Qualifications and experience:** This report is based on my site observations and I have come to my conclusions in the context of my experience as a former local government tree officer and a private practice arboricultural consultant. I have qualifications in both arboriculture and forestry and details of these, together with a career summary are provided in Appendix 7.

-
- 1.6 **Ecological issues and statutory tree protection:** Providing guidance on ecological issues is not within my sphere of expertise. However, trees and other vegetation can often provide nesting, roosting and feeding opportunities for protected species. Therefore, before any tree work proceeds on site, I advise that appropriate advice is sought to see whether the trees to be removed are being utilised by any protected species. At the time of writing, I have made no checks to ascertain whether any of the trees discussed are covered by tree preservation orders, or if the site is located within a conservation area. Therefore, any person intending to carry out any operations involving trees (before a formal planning consent is issued) should consult the council before any such works are undertaken.

2 SITE VISIT, DESCRIPTIONS, OBSERVATIONS AND SURVEY METHODOLOGY

- 2.1 **Site visit and description:** I visited the site on 5 April 2022 to gather my tree data. Cockpit Farm is located in Knowle Lane, which is situated toward the outskirts of the village of Fair Oak. It is positioned on the western side of the road and consists of a disused poultry unit. The only building on site runs in a rough north/south orientation and there are areas of hardstanding and access points located to the east and south of the building. Individual and groups of trees are located to the north, east, south and west of the building and these are positioned on or close to the site boundaries.
- 2.2 **Description of proposed development:** This development proposal is to demolish the existing poultry unit building and replace it with nine new dwellings.
- 2.3 **Soil assessment:** British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction – Recommendations advocates that a soil assessment should be carried out to inform decisions relating to Root Protection Areas (RPAs), tree protection, new planting and foundation design. I have consulted the British Geological Survey (BGS) website and their Geology of Britain viewer and this advises that the bedrock geology for the site is Wittering Formation - Sand, Silt and Clay. I did not undertake any excavations on site to confirm this and a full geotechnical site investigation may need to be undertaken to provide a more in-depth level of information regarding soil type for the site.
- 2.4 **Tree survey methodology:** My inspection of the trees was visual and did not involve any climbing or exploratory investigations. During my visit, I identified obvious groups where appropriate and I assigned an identification number to each tree and group, as shown on the plan in Appendix 1. Tree stem diameters are also indicated on the Tree Protection Plan and in some instances for trees assessed as group features, I have also assigned an additional number to the main group figure (e.g., G1-1) to aid identification. I then collected the tree data included in Appendix 2 and placed the vegetation in one of four categories (U, A, B or C), as set out in British Standard (BS) 5837:2012. I have included the BS categorisations in Appendix 6 for easy reference. Where of relevance, I also estimated the crown spreads for each tree/group at the appropriate cardinal compass points and this information is also shown in the tree schedule in Appendix 2. Although this document is not a full and detailed report on tree health and safety, any significant visible structural defects or physiological conditions identified, together with preliminary tree works, are also noted in the appropriate columns in the tree schedule. However, this report is not a tree condition survey and a full post development tree inspection

is recommended to establish that the trees retained pose acceptable levels of risk once the development has been completed.

- 2.5 **Data interpretation:** The Root Protection Area (RPA) figures are included in Appendix 2. As set out in paragraphs 4.6.2 and 4.6.3 of the BS, the RPAs may have been adjusted as a matter of arboricultural judgement to indicate the estimated likely position of important tree roots. These modified (or unmodified) RPAs dictate the location of the tree protection barriers and also determine the position of any ground protection measures. Tree protection details are shown on the plan included in Appendix 1. Where there is a need for incursions into RPAs, an assessment of the implications of these activities is set out in Section 3 (Arboricultural Implications Assessment) of this report. Where appropriate, details of suitable work methodologies to protect trees and also mitigate any impact are set out in Section 5 (Arboricultural Method Statement).
- 2.6 **Revisions to the provided land survey:** During my site visit, I noted that some trees were not shown on the provided topographical survey. For completeness, I have therefore illustrated their approximate positions on the plan in Appendix 1.

3 ARBORICULTURAL IMPLICATIONS ASSESSMENT

3.1 **Introduction to the implications of the development proposal on trees:** BS 5837:2012 sets out in some detail how trees on development sites should be managed. It is usually accepted amongst arboriculturists that Category A (high quality) and Category B (moderate quality) trees are potential constraints on any development proposal, whereas vegetation belonging to Category C (low quality) is considered to be generally less important. Category U trees/hedges are in such poor condition that they are considered unsuitable for retention. This is because they cannot realistically be retained as living entities in respect of the current land use for longer than 10 years. Therefore, these can be effectively discounted in the context of a planning application. On this site a total of sixteen individual trees and groups were recorded during the tree survey and were assigned to the BS 5837:2012 categories, as set out in Table 1 below:

Category A and B trees	Category C trees	Category U trees
A total of eight trees/groups (T2, T8, T11, G12, T13, G14, T15 and T16) were rated Category B	A total of four trees/groups (G1, G3, G4 and T10) were rated Category C	A total of four trees/groups (T5, T6, T7 and G9) were rated Category U

Table 1: Tree numbers and BS categories

No Category A trees were recorded during my survey and I have therefore focussed on the implications of the development proposal on the Category B and C trees on or near the site. Of the total of sixteen trees/groups surveyed, parts of two groups are scheduled to be removed to facilitate this development proposal. Additionally, seven trees will have activities arising from the development occurring within their RPAs. I have summarised the development related implications on trees in Table 2 below and set out the site tree issues in more detail in the following paragraphs.

Trees to be removed for development		Activities in RPAs arising from the development proposal	
Category A and B	Category C	Category A and B	Category C
None	Parts of G1 and G4	T2 (ground protection issues) T8 and T13 (removal of existing hardstanding and new surfacing), T11, G14 and T16 (new surfacing)	G1-11 (ground protection issues)

Table 2: Trees lost and activities in RPAs arising from the development proposal

3.2 Direct implications of the development proposal - Tree retention and tree loss

3.2.1 **BS Category B trees to be retained (trees of high and moderate quality):** All the Category B trees surveyed will be retained and protected in accordance with the guidance set out in BS 5837:2012. Consequently, no high or moderate category trees will need to be removed to facilitate this development proposal.

3.2.2 **BS Category C trees to be removed (trees of low quality):** As discussed, trees belonging to Category C are not normally retained where they would impose a significant constraint on the development or redevelopment of a site. In this instance, parts of two Category C groups (see Table 2) are scheduled to be removed to facilitate the development proposal. I set out my view on the implications of the loss of these trees, as follows:

- **Group G1:** Eight trees (G1-1, G1-2, G1-3, G1-4, G1-7, G1-8, G1-9 and G1-13) within the group are indicated to be removed to allow the closest new dwelling (and its garage) to be positioned and a new footpath to be formed. A number of trees within the group and close to the southern site boundary are indicated for retention. I feel that these retained trees will buffer the loss of those indicated for removal; to the extent that any implications arising from their loss are likely to be somewhat limited.

-
- **Group G4:** Nine trees (G4-1, G4-2, G4-3, G4-4, G4-5, G4-6, G4-7, G4-8 and G4-9) within this group are indicated to be removed because they are either under the footprint of new structures or are positioned so that their loss is likely to be needed to allow construction access during the build phase. The trees to be removed are not particularly large in size and I think it relevant that the bulk of group G4 further to the west will be retained. Although individual stem positions for the bulk of the trees were not shown on the provided land survey, these trees would nonetheless provide a significant backdrop to the development and this could be enhanced with new planting. Consequently, I feel that the loss of the trees indicated is acceptable and their removal is unlikely to have significant impact in the locality.

3.3 **Additional implications arising from the development proposal**

3.3.1 **Trees and activities within RPAs:** Seven trees/groups will have activities arising from the development occurring within their RPAs. My comments on these issues are as follows:

- **Trees T2 and G1-11:** The protective barriers around these trees will need to be set back to allow sufficient room for the positioning of scaffolding and to provide suitable space for the movement of materials and personnel around the new building during its construction. The protective barrier positions around the trees are shown on the plan in Appendix 1. The area of the RPAs that is outside of the barriers will be covered in ground protection and this will be installed after the erection of the barriers, but before any clearance or construction work starts on site. The provision of ground protection to allow access in RPAs is supported in paragraph 6.2.3 of BS 5837:2012 and I do not perceive this to be a particular problem provided it is implemented correctly and remains in situ during the construction phase of the project.
- **Trees T8 and T13:** The existing hard surfacing within parts of the RPAs of these trees is indicated for removal, with areas returned to soft landscaping. Provided it is taken up with care, the removal of the existing surfacing has the potential of being of some benefit for the tree. I have indicated some guidance in section 5.2.2 of this report on how this work should proceed in order to safeguard the health and wellbeing of the nearby trees. Provided the work is carried out with care, then I would not envisage any particular tree implications arising from this activity.

-
- **Trees/groups T8, T11, T13, G14 and T16:** A new footpath and part of a vehicular turning area are indicated within the RPAs of these trees. In principle, the sub base for the footpath could be a cellular confinement system. This would negate the need for significant excavation and excessive disturbance to the RPAs of nearby trees. The use of cellular confinement systems is supported in BS 5837:2012, together with bespoke suspended engineered solutions (paragraph 7.4.2.7). I have set out some guidance in section 5.2.3 of this report detailing how this work should proceed in order to reduce the risk of implications for these trees. Provided the work proceeds in accordance with this methodology, then I feel that the risk of implications for these trees is likely to be relatively low.

3.4 **Additional site tree issues**

- 3.4.1 **BS Category U trees normally removed for management reasons:** Category U trees are in such poor condition that they are considered unsuitable for retention. This is because they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. Therefore, these trees can be effectively discounted in the context of the planning process. On this site, I have assessed trees/groups T5, T6, T7 and G9 as falling into Category U. Consequently, these trees are scheduled for removal for management reasons. As they are unsuitable for retention in the context of the current site use, I do not believe that their loss should be a consideration in respect of the current planning application.
- 3.4.2 **New tree planting:** As discussed, some trees will be lost from the site to facilitate the development proposal. However, these are category C trees and given their low quality I believe that their loss could be mitigated by the provision of new tree planting elsewhere on the site. Preliminary tree planting proposals are set out on the landscape strategy plan prepared by Deacon Design and submitted to the council under a separate cover. In my view, carefully selected new trees would be an enhancement, adding some needed resilience to the existing tree cover on the site through both species and age class diversification.
- 3.4.3 **Tree protection during development:** A preliminary Arboricultural Method Statement is included in Section 5 and it details the various issues associated with successful tree protection in a development context on this site. If deemed appropriate by the council, this can be specifically referred to in a suitably worded planning condition attached to any subsequently issued planning consent.

4 SUMMARY OF THE IMPLICATIONS OF THE DEVELOPMENT ON TREES

- 4.1 **Summary:** Of the total of sixteen trees/groups surveyed, parts of two groups are scheduled to be removed to facilitate this development proposal. Additionally, seven trees will have activities arising from the development occurring within their RPAs. The trees to be removed are low quality and their loss will be buffered by the retention of existing tree planting nearby and the provision of new trees elsewhere on the site. Provided the tree protection measures set out in this report are realised and care is taken during the sensitive works within tree RPAs, then the proposal is acceptable from an arboricultural perspective and the risk of implications for retained trees is likely to be low.

5 PRELIMINARY ARBORICULTURAL METHOD STATEMENT

5.1 Tree protection issues

5.1.1 **Tree Protection Plan (TPP):** The plan in Appendix 1 is illustrative, but is based on the layout drawings and topographical survey provided. Therefore, all scaled measurements should be checked against the original design documents. The attached plan and all other information in this report should only be used for dealing with the tree protection issues and all other uses are prohibited, unless authorised by ecourban Ltd. All the existing trees will have been numbered, with any higher categories (A and B) highlighted in green and blue rectangles and any low categories (C and U) highlighted in grey and red respectively. The plan also shows the locations of the proposed protective measures, including areas where special care may be required. Additionally, any trees to be removed are indicated with a red dashed crown outline. The TPP is an important document and a copy of it should be kept on site for reference whilst the development is under construction.

5.1.2 **Protective barriers:** The approximate location of the barriers is illustrated on the plan in Appendix 1 and information on barrier design based on BS 5837:2012 guidance is included in Appendix 3. The protective barriers will be erected before any materials or machinery are brought onto the site and before any clearance or construction activities occur. With the exception of the barrier positions around trees/groups T8, T11, G12, T13, G14, T15 and T16 (see below), once the protective barriers have been positioned, these will stay in situ for the duration of the construction, unless previously agreed with the arboricultural consultant or council's tree officer. There will be no access into the protected areas and the storage of excavated debris and building materials will be prohibited, unless authorised by the arboricultural consultant, after discussion with the council's tree officer. No fires or fuel storage will be allowed within (or near to) protected areas under any circumstances.

5.1.3 **Temporary repositioning of barriers:** With regard to trees/groups T8, T11, G12, T13, G14, T15 and T16, the barriers around these trees encompass areas where existing surfacing is indicated for removal (and return to soft landscaping) or where new footpaths/hard surfacing is indicated. The barriers in these locations will therefore need to be redeployed to the edge of the construction zone to allow this activity to commence and then returned to the positions indicated on the TPP once the work has been completed. However, the movement of the barriers will only occur immediately prior to the commencement of these tree sensitive works, so as to reduce the risk of any incidental construction related damage occurring to these trees.

5.1.4 **Ground protection measures:** Where the positioning of tree protection barriers is not feasible due to the need for construction access, then ground protection measures will be required to help safeguard RPAs. The position of ground protection is shown on the plan included in Appendix 1, with guidance for ground protection design included in Appendix 4. The ground protection will also be installed before any materials or machinery are brought onto the site and prior to any clearance or construction activities occurring. Again, once the ground protection has been positioned, it will stay in situ for the duration of the construction phase, unless previously agreed with the project arboricultural consultant or council's tree officer.

5.2 **Arboriculturally sensitive operations**

5.2.1 **Activities within Root Protection Areas (RPAs):** Work within RPAs must be undertaken with care, as set out in the following text. Site personnel will be properly briefed before any activities start and all sensitive work will be inspected regularly during the course of operations.

5.2.2 **Removal of existing surfacing:** Trees T8 and T13 could be potentially affected by this activity and great care must be taken to avoid damage, particularly to tree roots. With this in mind, I set out the following guidance to help minimise the risk of significant impact occurring:

- **Working in RPAs:** All works will generally be undertaken using appropriate hand operated tools. A small machine on rubber tracks and with a suitable reach may be used (under supervision) if it can work from outside the RPAs indicated on the plan in Appendix 1, or from an element of the existing temporarily retained surfacing. If a machine is being used, the bucket of the excavator should only be used in a careful scraping or lifting motion to minimise any disturbance to the underlying soil where tree roots are likely to be found.
- **Tree roots:** During digging, care will be taken to locate any substantial tree roots. Any roots temporarily exposed will be protected from direct sunlight, drying out and extremes of temperature by appropriate covering. Where roots may need to be cut, those smaller than 25mm diameter may be pruned back, preferably to a side junction, using a cutting tool such as bypass secateurs or handsaws. Roots larger than 25mm should only be severed following consultation with an arboriculturist, as they may be essential to the tree's health and stability.

- **Surfacing debris removal:** Work to remove the surfacing will start at a point closest to the trees and then work backward away from them. In this way, there should be no need to repeatedly traverse the areas where the surfacing has been removed. Debris and other material will be moved manually across the existing surfacing in a way that prevents any soil compaction. Alternatively, debris or spoil can be lifted out by machines working from outside the RPAs. Once the surfacing has been removed, the newly exposed soil and any roots beneath are vulnerable to compaction damage. Therefore, vehicular or repeated pedestrian access across the RPAs will be restricted during this activity.
- **Installation of new soft landscaping:** Soft landscaping activity after construction can also be damaging to tree roots. Therefore, no significant level changes, deep excavation or cultivation shall occur within RPAs. Where necessary, good quality top soil can be used around trees and this should be firmed into place, but not over compacted in preparation for turfing or grass seeding. As discussed, exposed soil and tree roots are vulnerable to damage by compaction. Therefore, vehicular access will not be permitted in RPAs during the soft landscape installation phase and pedestrian movements required to carry out the necessary work will be kept to a minimum. In order to protect the recently exposed soil, new soft landscaping and tree root activity beneath, the tree protection barriers will need to be redeployed to their original positions until such times as all construction related activities are complete.

5.2.3 **Installation of new surfacing:** Trees/groups T8, T11, T13, G14 and T16 may be affected by the installation of a new pedestrian footpath and vehicular turning area. As discussed, it has been proposed that the sub base of the new footpath within RPAs could be a cellular construction. The use of a cellular confinement system is suggested in BS 5837:2012 as one appropriate way to achieve hard surfacing over tree roots and the following guidance is based on this principle. However, before implementation the following specifications and guidance will need to be reviewed by an engineering specialist, to ensure that the final construction is appropriate from an engineering viewpoint and suitable for the purpose intended.

- **Installation:** An installation video for a proprietary cellular confinement system is available to view at <https://www.youtube.com/watch?v=OuyM1guylBM>. Generally, any required changes in topography will be accomplished by the use of fill materials rather than cutting into the existing site levels, which could have a significant impact on tree health. Suitable fill materials include uncompacted crushed stone or sharp sand. In this instance, the removal of the top layer of vegetation to a depth of 50mm (to provide a flat

surface for the installation of the cellular sub base) is unlikely to encounter or damage any tree roots. Any additional excavation will need to be assessed by the arboriculturist, in consultation with the council's tree officer. However, in the event that roots may need to be cut, those smaller than 25mm diameter may be pruned back, preferably to a side junction, using a cutting tool such as bypass secateurs or handsaws. Roots larger than 25mm should only be severed following consultation with an arboriculturist, as they may be essential to the tree's health and stability.

- **Sub base and final wearing courses:** Once a level surface has been formed, the cellular system will be installed on top of the existing soil, with no compaction of its structure. The cell infill material will be crushed aggregate (typically 20-40mm, clean angular stone), with no fines, as per the manufacturer's specification. Suitable final wearing courses include resin bound gravel, paving slabs, washed gravel or block pavements set on a sand base, although other surfacing may be appropriate after consultation with the project arboriculturist.
- **Edge retention:** The use of non-invasive ground contact structures (including proprietary edging products, gabions, wooden boards or railway sleepers) is suggested in BS 5837:2012 as effective edge supports in RPAs, to be secured by metal rods, track or road pins or wooden pegs. This, or a similar approach (negating the need for excessive ground disturbance within RPAs) will be used to help minimise the risk of impact on trees.
- **Illustrative specifications:** Final drawings will be prepared by the project engineer. These will be based on the illustrative manufacturers specifications for special surfacing included in Appendix 5, or an alternative 'low invasive' construction technique. These definitive plans can be secured by way of a suitably worded planning condition and approved by the council before any construction activity occurs on site.

5.3 Additional tree-related issues

- 5.3.1 **Site supervision:** Site personnel will be properly briefed regarding the tree protection issues before any work starts and the tree protection will be inspected periodically to ensure the retained trees are protected in accordance with this document and any conditions imposed by the council.

-
- 5.3.2 **Installation of new services or upgrading of existing provision:** Where practicable, all new services will be outside the protected areas indicated on the plan in Appendix 1, but where existing services within RPAs require upgrading or new provision is needed, great care will be taken to minimise any disturbance. Trenchless installation will be the preferred option, but if this is not feasible, any excavation will be carried out by hand in accordance with the guidelines set out in NJUG Volume 4 - Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.
- 5.3.3 **Material storage areas and site compounds:** All construction material storage areas, cement silos or cement mixing areas, fuel storage points and compounds for machinery etc. will be outside protected areas, unless otherwise agreed with the council.
- 5.3.4 **Contractors car parking, site offices and welfare facilities:** Whilst it is possible to have site offices and welfare facilities within RPAs, care is needed in their positioning and also in the connection of water, electricity and drainage to service them. Therefore, these will generally be sited outside the tree RPAs, unless agreed previously with the council. Contractor's car parking facilities will also be located away from retained trees.
- 5.3.5 **Tree works:** Any tree pruning or tree removal operations are set out in the tree schedule included in Appendix 2. Additionally, those trees scheduled for removal are also shown on the Tree Protection Plan included in Appendix 1.
- 5.3.6 **Planning, communication and preliminary timing of events:** It is not unusual for the details of timing of operations that could impact on important trees to only be finalised once planning consent has been given. Site managers, clearance and construction teams and other important personnel are normally only appointed at this stage and it is these people who will be crucial in delivering the tree protection detailed in this report. My experience is that the pre commencement site meeting is critical in terms of avoiding damage to trees and this particular aspect, along with tree protection issues can be specifically referenced in a suitably worded planning condition imposed by the council. In the intervening time, I propose the following preliminary cascading timetable of events to help minimise the risk of impact on important trees. However, the following schedule may be modified at the pre-commencement meeting, subject to discussion with all parties and agreement with the council:
1. Pre-commencement site meeting
 2. Extent of any arboricultural supervision agreed

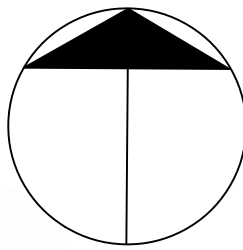
-
3. Tree works undertaken
 4. Protective barriers erected before any clearance or construction activities occur on site and notification to the council that this is in place
 5. Ground protection installed before any clearance or construction activities occur on site and notification to the council that this is in place
 6. Redeployment of barriers to allow surfacing removal and installation of new footpaths/surfacing
 7. Removal of surfacing undertaken and return of areas to soft landscaping
 8. Installation of new footpath within tree RPAs and then return of barriers to original positioning
 9. Tree protection only removed at the end of the construction phase when there is no longer any risk to trees

Barrie Draper BSc (Hons) Arb TechCert(ArborA) CertArb(RFS)
Arboricultural Consultant

Date: **30 June 2022**

Appendix 1: Tree Protection Plan

1 A1 plan



Indicative
North



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
SCALE BAR 1/250

eco urban
ARBORICULTURAL

ECO 2 - TREE PROTECTION AT COCKPIT FARM, KNOWLE LANE, FAIR OAK

SCALE: 1:250 @ A1

COMPOSITE PLAN:
LAND SURVEY OUTLINED IN GREY,
PROPOSED DEVELOPMENT SHOWN IN COLOUR

T1
xxx
BS Category B: Trees
of moderate quality
T1
xxx
BS Category C: Trees
of low quality

T1
xxx
BS Category U: Trees
unsuitable for retention

Tree protection barriers

RPA outside barriers requiring
ground protection

Trees to be removed

Root Protection Areas (RPAs): Below
ground tree constraints for retained trees
based on BS 5837 guidance

Approximate positions of trees
not shown on land survey

This drawing was originally produced in colour,
therefore any subsequent monochrome photocopies
may not show appropriate levels of detail and should
not be relied upon for the purposes of dealing
with site tree issues

Appendix 2: Tree Schedule and Inventory

Background fill colour represents BS 5837:2012 categories: A Category trees have green backgrounds, B Category trees have light blue backgrounds, C Category trees have grey backgrounds and U Category trees have red backgrounds.

Tree No.	Species	Ht (m)	Single stem dia. at 1.5m (cm)	Est. Dia. *	STEM DIAMETERS (MULTIPLE)								Branch spread (m)				Ht above ground (m)	Age class	Notes	Management proposals	BS cat	RPA area (m²)	RPA radius (m)
					Multi stemmed trees with 1 - 5 stems (cm)					Multi stemmed trees with 1 - 5 stems combined (cm)	Multi stemmed trees >5 stems												
					1	2	3	4	5		Mean stem dia. (cm)	No. of stems	N	E	S	W							
All trees																		Crown clean all trees. Where appropriate, crown lift trees by up to 4m over site and 5m over public carriageway.					
G1	Ash, hornbeam, sycamore and oak	19 Avg, group ht.	58	* Lgst	-	-	-	-	-	-	-	-	6	4	-	7	4	MA	Mixed species and closely spaced trees. Ash component of group with canopy symptom indicating declining vitality, extensive deadwood on ground.	Remove part of group (see plan)	C1	152	7.0
T2	Oak	11	63	-	-	-	-	-	-	-	-	-	5	6	6	7	3	MA	Conjoined stems with some deadwood in canopy. Marginal Cat B tree.		B1	180	7.6

Appendix 2: Tree Schedule and Inventory

Tree No.	Species	Ht (m)	Single stem dia. at 1.5m (cm)	Est. Dia. *	STEM DIAMETERS (MULTIPLE)								Branch spread (m)				Ht above ground (m)	Age class	Notes	Management proposals	BS cat	RPA area (m²)	RPA radius (m)
					Multi stemmed trees with 1 - 5 stems (cm)					Multi stemmed trees with 1 - 5 stems combined (cm)	Multi stemmed trees >5 stems												
					1	2	3	4	5		Mean stem dia. (cm)	No. of stems	N	E	S	W							
G3	Lombardy poplar and Lawson cypress	27	101	* Lgst	-	-	-	-	-	-	-	-	2	2	2	2	5	M	Typical multi stemmed Lombardy poplar (LP), with unremarkable Lawson cypress. Some tight forks amongst the LP.		C1	461	12.1
G4	Mainly grey poplar with birch, hawthorn, field maple and hazel	19	25	* Avg	-	-	-	-	-	-	-	-	3	3	3	3	4	Y	Stand of closely spaced mainly grey poplar trees, with additional small trees on periphery of main group. Bulk of individual grey poplar stems not shown or survey.	Remove part of group (see plan)	C1	28	3.0
T5	Goat willow	11	-	*	-	-	-	-	-	-	20	6	-	-	-	-	3	M	Multi stemmed, partially collapsed and leaning. Decayed at base.	Fell.	U	0	0.0
T6	Goat willow	10	22	* Avg	-	-	-	-	-	-	-	-	-	-	-	-	n/a	MA/ M	Closely spaced trees, one tree collapsed, remaining unbalanced and declining.	Fell.	U	22	2.6
T7	Ash	4	22	*	-	-	-	-	-	-	-	-	-	-	-	-	n/a	Y/ MA	Trunk covered in ivy. Stem failure/collapse at 4m.	Fell.	U	22	2.6

Appendix 2: Tree Schedule and Inventory

Tree No.	Species	Ht (m)	Single stem dia. at 1.5m (cm)	Est. Dia. *	STEM DIAMETERS (MULTIPLE)								Branch spread (m)				Ht above ground (m)	Age class	Notes	Management proposals	BS cat	RPA area (m²)	RPA radius (m)
					Multi stemmed trees with 1 - 5 stems (cm)					Multi stemmed trees with 1 - 5 stems combined (cm)	Multi stemmed trees >5 stems												
					1	2	3	4	5		Mean stem dia. (cm)	No. of stems	N	E	S	W							
T8	Yew	10	105	*	-	-	-	-	-	-	-	-	-	5	3	4	3	M	Offsite tree, no direct access to survey and restricted clear line of sight. Some crown asymmetry.		B1	499	12.6
G9	Elm and elder	7	10	*	-	-	-	-	-	-	-	-	-	-	-	-	n/a	Y	Small dead and moribund trees/shrubs.	Fell dead stems and cut remainder to ground level and allow to regenerate.	U	5	1.2
T10	Sycamore	15	25	-	-	-	-	-	-	-	-	-	5	0	0	5	4	Y	Severely unbalanced canopy due to proximity to adjacent tree.		C1	28	3.0
T11	Oak	16	58	-	-	-	-	-	-	-	-	-	8	6	4	6	4	MA	Influenced by proximity to adjacent tree. Some decay in vicinity of secondary stem near base.		B1	152	7.0
G12	Mainly hawthorn and holly	9	20	* Avg	-	-	-	-	-	-	-	-	3	3	1	4	n/a	MA	Linear grouping of roadside trees/undermanaged hedgerow. Some with structural deficiencies.		B2	18	2.4
T13	Oak	12	53	-	-	-	-	-	-	-	-	-	7	6	6	2	4	MA	Unbalanced canopy. Marginal Category B tree.		B2	127	6.4

Appendix 2: Tree Schedule and Inventory

Tree No.	Species	Ht (m)	Single stem dia. at 1.5m (cm)	Est. Dia. *	STEM DIAMETERS (MULTIPLE)								Branch spread (m)				Ht above ground (m)	Age class	Notes	Management proposals	BS cat	RPA area (m²)	RPA radius (m)
					Multi stemmed trees with 1 - 5 stems (cm)					Multi stemmed trees with 1 - 5 stems combined (cm)	Multi stemmed trees >5 stems												
					1	2	3	4	5		Mean stem dia. (cm)	No. of stems	N	E	S	W							
G14	Mainly hawthorn	7	15	* Avg	-	-	-	-	-	-	-	-	1	3	2	3	n/a	MA	Linear grouping of roadside trees/undermanaged hedgerow. Some with structural deficiencies.		B2	10	1.8
T15	Oak	10	42	-	-	-	-	-	-	-	-	-	5	5	5	3	4	MA	Some crown asymmetry.		B1	80	5.0
T16	Oak	10	31	-	-	-	-	-	-	-	-	-	5	4	3	3	4	Y/ MA	Some crown asymmetry.		B1	43	3.7

Abbreviations:

Abbreviations	Meaning	Abbreviations	Meaning	Abbreviations	Meaning
T	Individual tree	M	Mature	>	More than
G	Groups of trees	MA	Maturing	<	Less than
H	Hedge	Y	Young	Lgst	Largest tree diameter within group
W	Woodland	RPA	Root Protection Area	Avg	Average tree diameter within group

Appendix 2: Tree Schedule and Inventory

Tree Schedule Notes:

Tree number	Assigned during the site visit and also referenced on the plan in Appendix 1.
Species	Common name and referenced to scientific name in the above list. Where I have some doubt over the actual tree species, the genus will have been noted followed by sp. Where trees are numerous and present in groups, not every individual species may have been noted.
Height	Measurement of total tree height using a laser hypsometer to nearest metre or where clear line of site is not possible then an estimate based on interpolation of heights of nearby measured trees.
Stem diameters	Measurement of stem diameter either at 1.5m above ground (or in accordance with BS guidance where trees have multiple stems) with a forester's girth measuring tape. Diameters followed by asterisk symbol indicate estimated diameters because of access difficulties, presence of ivy or other obstructions. Where trees are present in a group, the tree with the largest stem diameter within the group will have been measured/estimated.
Est. Dia.	Estimated diameters due to access restrictions are indicated with an asterisk
Branch spread	Where appropriate and where ground conditions allow, an estimate of the crown spread at each of the cardinal compass points. Where only part of the site is affected by trees, measurement may be in one or two directions only
Existing height above ground level	Distance in metres to first significant branch or canopy or a height above which crown lifting operations would not be appropriate
Age class	Simplistic estimate of tree age in one of FOUR categories (young, maturing, mature or over mature).
Notes	Although this document is not intended to be a full and detailed report on tree health and safety, any significant structural defects or physiological conditions have been identified where these were visible. Where no entries are recorded, this indicates no observable issues were identified. Where there is restricted access to the base of a tree, its attributes are assessed from the nearest point of access. Climbing inspections are not carried out during a walkover tree survey and, if heavy ivy is present, tree condition is assessed from what can be seen from the ground.

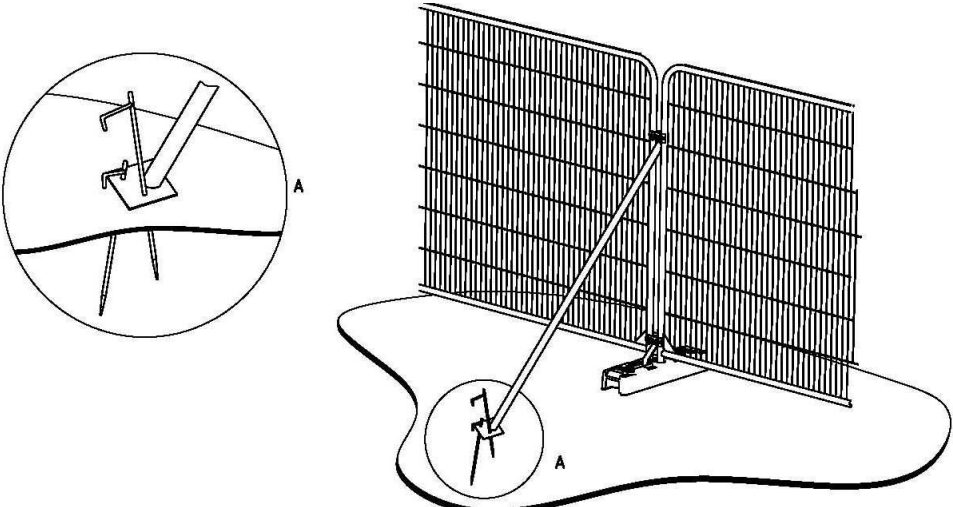
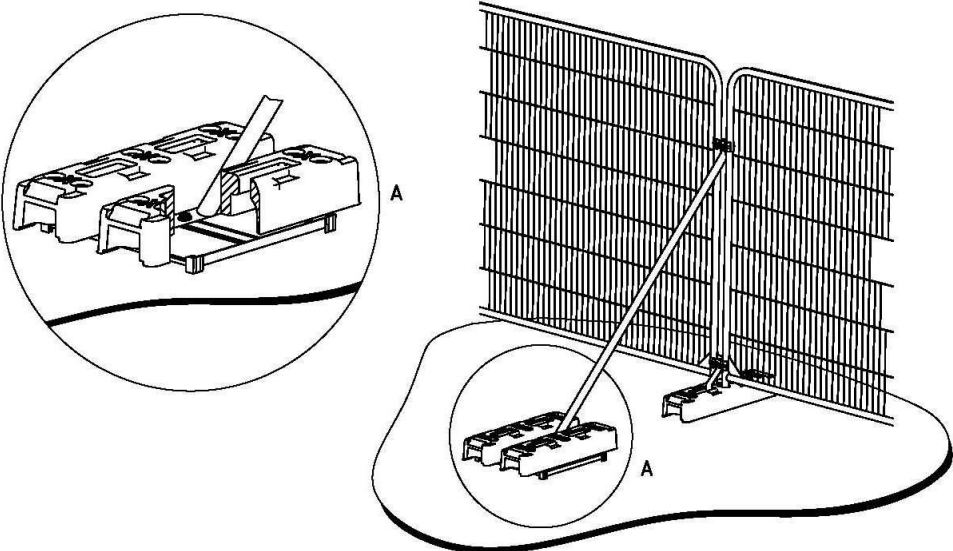
Appendix 2: Tree Schedule and Inventory

Management proposals	The inspection of all trees was of a preliminary nature and only defects visible from the ground have been identified. Each individual tree may not have been inspected closely because of access difficulties and only defects visible from the inspection point have been identified. Monitoring may be indicated where tree risk can be adequately managed by increased frequency of site inspections. Further investigation may be indicated where additional data may be required beyond a purely visual assessment. However, a full post development tree inspection is recommended to establish that the trees retained during construction pose acceptable levels of risk once the development has been completed.
BS 5837 :2012 Category	Either U, A, B or C based on the BS 5837:2012 guidance.
RPA and RPA radius	RPA and RPA radius calculations have been undertaken in accordance with the guidance set out in BS 5837:2012.

Tree Inventory:

Common Tree Names	Scientific Tree Names		Common Tree Names	Scientific Tree Names
Ash	<i>Fraxinus excelsior</i>		Hazel	<i>Corylus avellana</i>
Birch	<i>Betula pendula / pubescens</i>		Holly	<i>Ilex aquifolium</i>
Elder	<i>Sambucus nigra</i>		Hornbeam	<i>Carpinus betulus</i>
Elm	<i>Ulmus</i> sp		Lawson cypress	<i>Chamaecyparis lawsoniana</i>
Field maple	<i>Acer campestre</i>		Lombardy poplar	<i>Populus nigra 'Italica'</i>
Goat willow	<i>Salix caprea</i>		Oak	<i>Quercus robur</i>
Grey poplar	<i>Populus x canescens</i>		Sycamore	<i>Acer pseudoplatanus</i>
Hawthorn	<i>Crataegus monogyna</i>		Yew	<i>Taxus baccata</i>

Appendix 3: Illustrative Specification for Tree Protection Barriers

 a) Stabilizer strut with base plate secured with ground pins	
 b) Stabilizer strut mounted on block tray	
Illustration taken from British Standard 5837:2012 - Trees in relation to design, demolition and construction – Recommendations.	
2m tall welded mesh panels on rubber or concrete feet might provide an adequate level of protection from cars, vans, pedestrians and manually operated plant. 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 the fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence. The panels should be supported on the inner side by stabilizer struts, which should normally be attached to a base plate secured with ground pins – BS 5837:2012	
Ref: Tree Protection Barriers (Type 2)	Drawing No. TPB2
Scale: N/A	

Appendix 4: Illustrative Specification for Ground Protection within RPAs



New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

NOTE The ground protection might comprise one of the following:

- a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;
- b) for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards, placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;
- c) for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

– BS 5837:2012

Ref: Ground Protection	Drawing No. GP1
Scale: N/A	

Appendix 5: Illustrative Specification for ‘Low Invasive’ Surfacing within RPAs

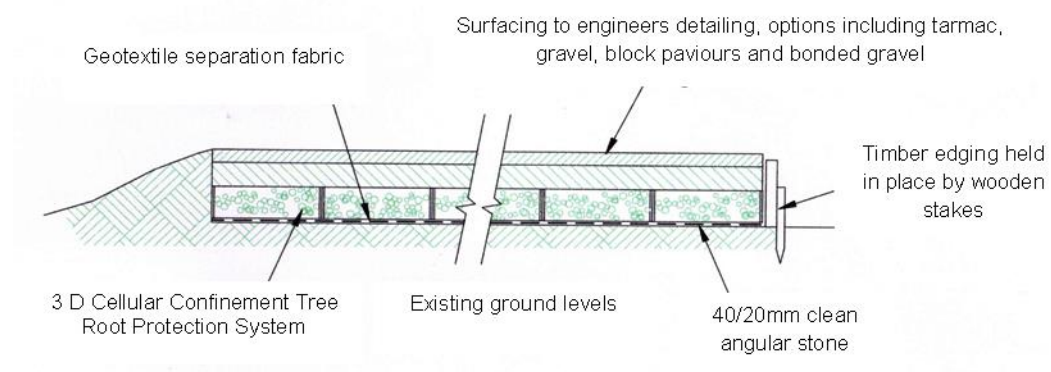


Illustration adapted from original drawings provided by Geosynthetics Ltd.

Appropriate sub-base options for new hard surfacing include three-dimensional cellular confinement systems. Alternatively, piles, pads or elevated beams can be used to support surfaces to bridge over the RPA or, following exploratory investigations to determine location, to provide support within the RPA while allowing the retention of roots greater than 25 mm in diameter.

– BS 5837:2012

Ref: No dig surfacing	Drawing No. NDS 1
Scale: N/A	



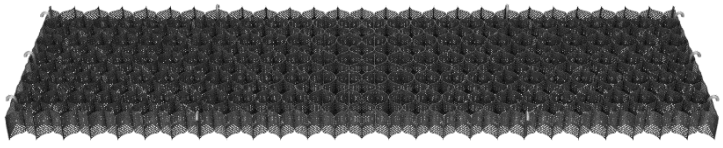
Cellweb®TRP

Why protect trees?

Trees provide a wealth of benefits within the urban environment including cleaning the air, prevention of flooding and moderation of the climate.

As a result, within the UK it is an offence to cut down, lop, uproot, top, wilfully damage or destroy a protected tree without authorisation. Fines, if the defendant is found guilty in a Crown Court, are unlimited.

To minimise the environmental impact and avoid legal proceedings, we offer the independently tested Cellweb®TRP system.



What is Cellweb®TRP?

Cellweb®TRP is a cellular confinement system specifically designed for tree root protection. The system creates a stable, load-bearing surface for traffic or footfall whilst eliminating damage to roots through compaction and desiccation.

The Cellweb®TRP system comprises of three specific elements, Cellweb®TRP, Treetex™ pollution control geotextile and an infill of clean angular stone. The system has been designed to create an unparalleled solution to tree root protection applications.

Cellweb®TRP is a no-dig solution that ensures that the load placed upon it is laterally dissipated rather than transferred to the soil and roots below. The use of Treetex™ pollution control geotextile allows for drainage and separation whilst preventing contaminants from reaching the roots.

The walls of the cells are perforated and when combined with the infill of clean angular stone, enables free movement of water and oxygen, ensuring that supplies to the tree roots are maintained.



Geosynthetics
Engineered Solutions

“Creating Innovative Solutions with Outstanding Products”



What makes Cellweb®TRP different?

With over 15 years of captured data and thousands of installations, the Cellweb®TRP system has developed a reputation for excellence.

We are so confident in our system, we offer a guarantee that covers the replacement of the trees and of the system itself. With Cellweb®TRP being quick to install and having a 100% success rate it is clear to see why the Cellweb®TRP is regularly specified by tree officers and arboriculturalists across the country.

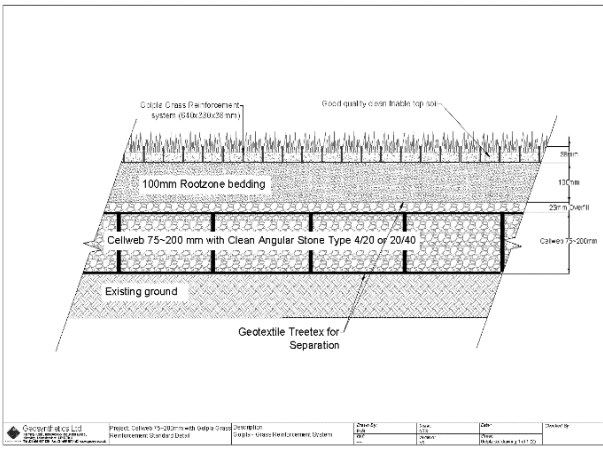
From the drawing board to installation, we are here to help.

We have been supplying the Cellweb®TRP system since 1998 and our technical team have vast experience with tree root protection and the associated legislation.

Delivering complete peace of mind to customers is our number one priority. As part of this customer care package we offer free on site consultations, technical recommendations and on site installation guidance on all projects.

Our in-house engineering team provide site specific recommendations to ensure the solution used is cost effective and environmentally sound.

For more information on Cellweb®TRP or Geosynthetics Limited please contact our sales office on 01455 617139 or visit www.geosyn.co.uk.



Geosynthetics Ltd	Project: Cellweb TRP - 200mm with Gravel Grass	Client: [Redacted]	Drawn By: [Redacted]	Check: [Redacted]	Date: [Redacted]	Drawn By: [Redacted]
Geosynthetics Ltd	Product: Cellweb TRP - 200mm with Gravel Grass	Client: [Redacted]	Drawn By: [Redacted]	Check: [Redacted]	Date: [Redacted]	Drawn By: [Redacted]



CERTIFICATE NO. 11161
ISO 14001:2004

CERTIFICATE NO. 11161
ISO 9001:2008



INVESTORS
IN PEOPLE | Bronze

Geosynthetics Limited | Fleming Road | Harrowbrook Ind Est | Hinckley | Leicestershire | LE10 3DU
sales@geosyn.co.uk | Tel: 01455 617 139 | Fax: 01455 617 140 | www.geosyn.co.uk

Appendix 6: BS 5837:2012 – Assessment Categories

TREES FOR REMOVAL				
Category and definition	Criteria			Identification on plan
<u>Category U</u> Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve.</i>			RED
TREES TO BE CONSIDERED FOR RETENTION				
Category and definition	Criteria — Subcategories			Identification on plan
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
<u>Category A</u> Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	GREEN
<u>Category B</u> Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation)	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	BLUE
<u>Category C</u> Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	GREY

Appendix 7: Qualifications and Experience of Barrie Draper

- 1 Qualifications:** I have a BSc degree (with Honours) in Arboriculture from the University of Central Lancashire. I also hold a BTEC Higher National Diploma (HND) in Forestry (Lowland Management), the Arboricultural Association's Technician's Certificate in Arboriculture (Tech Cert), the Royal Forestry Society's Certificate in Arboriculture (Cert Arb) and the National Examinations Board Certificate in Forestry.

- 2 Career experience:** I began my arboricultural career in 1993 as an arborist with Portsmouth City Council. During my time with the council I worked for both the direct labour organisation and for a private contractor where I obtained valuable hands on experience in all aspects of arboriculture. From 1999 to 2002 I was employed as Senior Arborist by Parchment Housing Group, a housing association based near Portsmouth. I managed the Groups' tree stock on their behalf, carrying out tree inspections and practical management operations. I have also worked in local government, spending time with Thurrock Borough Council in Essex where I was the Tree and Landscape Officer, and with Winchester City Council, where I was Arboricultural Officer for a period of 2 years. During my time working in local government, I was responsible for making Tree Preservation Orders, administering applications to work on protected trees and advising on planning applications when trees were considered material constraints on development. Working within a planning environment allowed me to gain valuable experience in the management of trees in development situations and an understanding of the planning process and how it relates to trees. From January 2005 I worked for Barrell Tree Consultancy Ltd advising clients on a wide range of tree related issues. I left the company in September 2008 and set up **ecourban** ltd.



ecourban ltd, 13 The Greencroft, Salisbury SP1 1JD

T: 01962 877 397 M: 07532 373 563 E: barrie@eco-urban.co.uk

W: www.eco-urban.co.uk