



**Land at rear of Bairds Farm Shop, Climping
Littlehampton**

**BS 5837 (2012) Tree Survey, Arboricultural Impact
Assessment and Arboricultural Method Statement
Brackley Investments Ltd**

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August 2020

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Report Title: **Land at rear of Bairds Farm Shop, Crookthorn Lane, Climping
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and Arboricultural Method Statement**

Revision: **V03**
Issue Date: **May 2018**
Report Ref: **9328**

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Executive Summary

On behalf of Brackley Investments Limited, Ecus Ltd. have carried out a tree survey to BS 5837 (2012) "*Trees in relation to design, demolition and construction- Recommendations*" in March 2018 at Crookthorn Lane, Climping, Littlehampton, BN17 5SN. The survey has formed the basis of an assessment of the impact development proposals may have on existing trees and any methodologies to be adopted to protect any retained trees.

The survey records all trees within the site and all those which may be affected by any development proposals within the site boundary, recording a number of parameters including species, crown spread and Root Protection Area (RPA).

Throughout this report 'RPA' is used to refer to 'Root Protection Area'. The RPA of any given tree is the area of ground around that tree which should not be disturbed by excavation, compaction, changes in level or other construction/demolition operations. The extent of the RPA is calculated in accordance with BS5837 (2012), and is an important part of the methodologies described in this report.

The survey recorded 16 individual trees.

None of the trees are protected by Council Tree Preservation Orders. The site is not located within a Conservation Area.

The Client proposes construction of a specialist dementia residential care unit with associated hard and soft landscaping. This will require the removal of two trees, and the pollarding of four white willows for safety reasons, but may also have an impact on above and below ground parts of retained trees unless adequate protection of these trees is provided.

This report details the arboricultural impact and offers a range of protection measures that should be put in place prior to works starting on site as well as construction methodologies which should be adopted. These measures as described in detail in Chapter 5 will prevent accidental damage and other adverse affects on the health of retained trees and cover:

- Access facilitation pruning.
- Protective fencing.
- Installation of utilities and services within RPA.
- Construction within RPA
Fencing, surfacing.
- Level changes within RPA.
- Soft landscaping and planting within RPA.

This report also makes further recommendations for any measures to mitigate or compensate the loss of trees within the site and the likely impact on the site and the local landscape. These include: *(delete as appropriate)*

- Replacement tree planting to compensate the loss of trees.

For ready reference, Figure 1 (Chapter 1) is a simplified version of the 'Design and Construction Process and Tree Care' table outlined in BS5837:2012. The table clearly identifies processes and obligations expected at the various stages of the construction project. BS:5837 is considered an iterative process, and as such the project arboriculturist's advice should be ongoing.

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1. Introduction

1.1 Context of this document in the Planning System

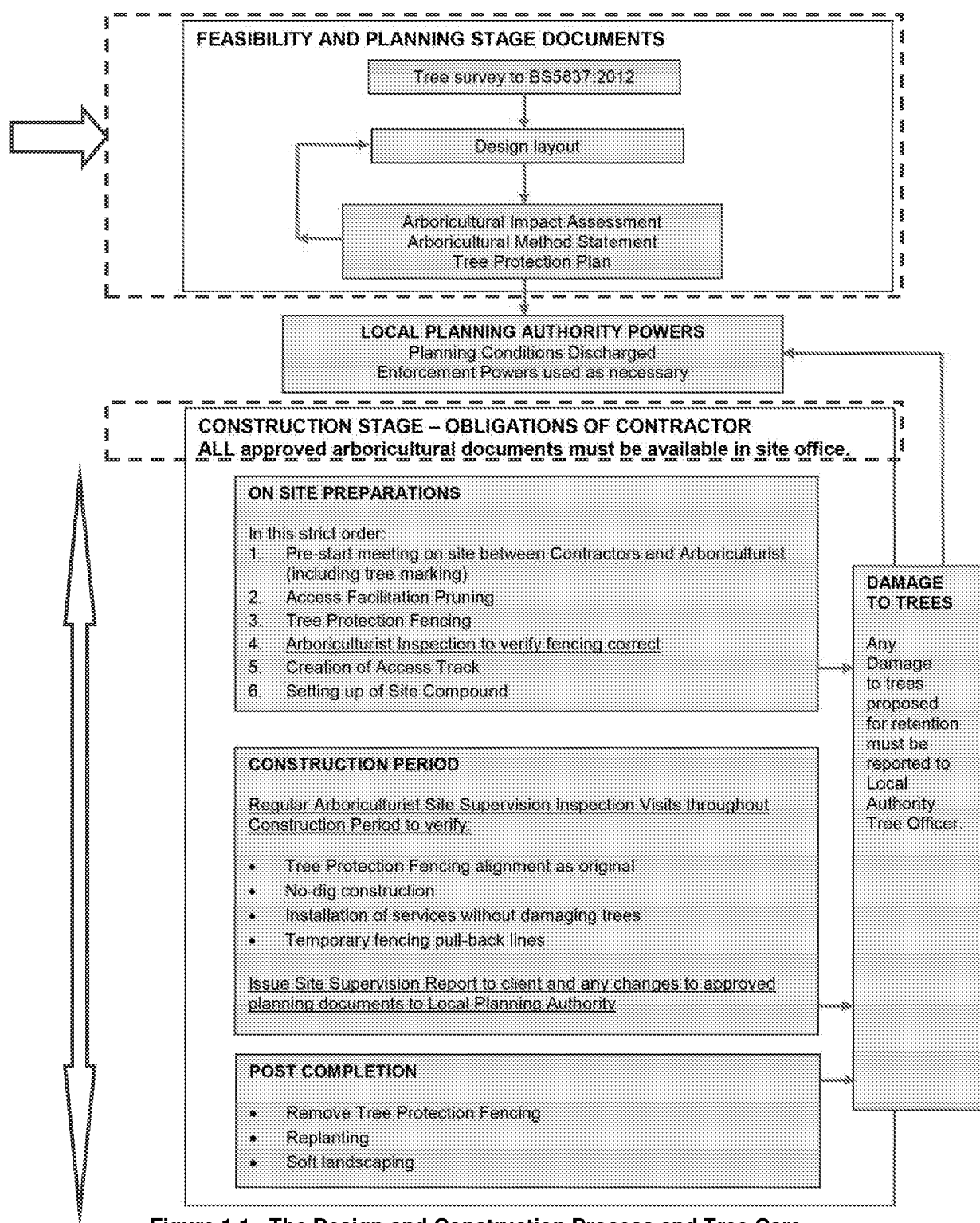


Figure 1.1 - The Design and Construction Process and Tree Care

1.1.1 This document has been prepared at the feasibility and planning stage of a project.

1.1.2 If it becomes an approved Planning Arboricultural Method Statement of tree protection

measures and/or Tree Protection Plan, a copy should be to hand in the Site Office at all times during the Construction Stage.

1.2 Location

- 1.2.1 Ecus Limited were commissioned by Brackley Investments Limited to undertake a tree survey of the site of land to the rear of Bairds Farm shop at Crookthorn Lane, Climping, Littlehampton, BN17 5SN. The site location is shown on Figure 2 below.



Figure 2 – Location Plan
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- 1.2.2 The survey was carried out in accordance with BS 5837 (2012) “*Trees In Relation To Design, Demolition And Construction- Recommendations*”. This report sets out the findings of the survey and recommendations have been made for preliminary tree work that may be required.

1.3 Tree Designations

- 1.3.1 The survey included identification of any existing designations affecting trees on site such as Tree Preservation Orders and Conservation Area status by consulting with the Local Planning Authority (LPA); Arun District Council, Maltravers Road, Littlehampton, West Sussex. BN17 5LF.
- 1.3.1 The Arboricultural/Tree Officer at Arun District Council confirmed that there are no Tree Preservation Orders (TPO) on any of the trees surveyed.

2. Tree Survey Methodology

2.1 Site survey

- 2.1.1 Ecus carried out the tree survey in March 2018 when the trees were not in leaf. The tree survey was a ground based visual inspection carried out by a suitably qualified arboriculturalist. The trees were not tagged as part of the survey.
- 2.1.2 The inspection of the trees, the site and the immediate surrounding area was carried out by Ben McWalter MRICS, MArborA.
- 2.1.2 The following characteristics were recorded:
- Species
 - Stem diameter at 1.5 m above ground level (mm).
 - Estimated height (m)
 - Approximate crown spread (m) as North, South, East and West measurements.
 - An estimate of the number of years that the tree is likely to remain suitable for retention.
 - <10 = less than 10 years
 - 10+ = 10-20 years
 - 20+ = 20-40 years
 - 40+ = more than 40 years
 - Age class
 - YNG = Young and recently established trees
 - SM = Semi-mature trees age less than 1/3 life expectancy
 - EM = Middle age trees 1/3 – 2/3 life expectancy
 - M = Mature trees over 2/3 life expectancy
 - OM = Over mature – declining or moribund trees of low vigour
 - Condition category in accordance with BS5837: *Trees In Relation To The Design, Demolition And Construction Recommendations (2012)*. The categories listed are defined as per BS5837:2012 and briefly are:
 - 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
 - A = Those of high quality and value- best trees with a long expected safe life
 - B = Those of moderate quality and value
 - C = Those of low quality and value and trees less than 15cm diameter
 - Value subcategories in accordance with *BS 5837:2012*. The subcategories listed are defined as per BS5837:2012 and briefly are:
 - 1 = Mainly arboricultural values
 - 2 = Mainly landscape values
 - 3 = Mainly cultural values, including conservation
 - General notes about physiological and structural condition and any management recommendations.

- 2.1.3 The survey recorded all trees on site with a stem diameter of 75 mm or more at 1.5 m height and includes all trees outside the site boundary which may be affected by any future development of the site, either by their crown overhanging the site or their Root Protection Area potentially extending into the site.
- 2.1.4 A full topographic survey of the site was provided; this was used as the basis for producing the tree survey plan.
- 2.1.5 Where densely wooded areas are not expected to be affected by any development proposals (e.g. woods located outside the site boundary) the mapping of trees was limited to significant trees located along the woodland perimeter.
- 2.1.6 At the time of carrying out a site survey it is not always possible to know which trees will be in conflict with development proposals. Therefore, when proposals are confirmed, it may be that arrangements are made to check measurements on site, especially where development is proposed very close to existing trees.
- 2.1.7 Trees are living organisms that change over time. The condition of all trees described by this survey must be checked by a qualified arboriculturalist or tree surgeon before works commence, especially if there have been any storm events or 12 months or more have passed since the survey was carried out.

2.2 Calculation of Root Protection Area (RPA)

- 2.2.1 Below ground constraints to development are represented by the root plate around a tree which needs protecting in order for the tree to be incorporated into a proposed scheme, without adverse harm to the tree or structural integrity of any proposed foundation structures. This area is illustrated by the Root Protection Area (RPA) and is calculated according to the formulae set out in BS5837:2012 clause 4.6.1.
- 2.2.2 Any deviation in the RPA from the original circular plot should take account of physical site conditions that influence the disposition of tree roots, e.g. streams, building foundations and retaining walls.

3. Tree Survey Results

3.1 General Site Description

- 3.1.1 The property currently comprises an area of pasture located to the south of a Farm Shop. The site is current used as a Dog Training & Off Lead Facility approved under CM/1/16/PL.
- 3.1.2 The existing grounds comprise of an area of open pasture located to the south of a Farm Shop business with an access strip from the existing tarmacadam car park.
- 3.1.3 The site is bordered to the SW boundary by some significant trees together with a mix of native and non-native trees of various ages, located off-site. The height of these trees varies between approximately 8 to 10 metres. The eastern boundary is formed by a hedge approximately 8 years old, which is comprised of a mix of native species, This hedge is currently 4 – 5 metres in height and if left will continue to grow to a likely height of circa 15 – 18 metres

3.2 Results of Tree Survey

- 3.2.1 The Tree Survey Schedule in Table 3.1 (Appendix 1) describes the results of the tree survey and includes preliminary management recommendations. The table should be read in conjunction with Figure 4 Tree Survey and Tree Constraints Plan (Appendix 3). This drawing illustrates the location of the trees surveyed, the extent of their canopies as well as the Root Protection Areas (RPA) of each tree and tree group.
- 3.2.2 16 individual trees have been recorded during the survey. A full survey to BS 5837 (2012) was carried out for those trees, including the recording of the stem diameter to determine the Root Protection Area (RPA) of the trees.
- 3.2.3 Of these 16 trees there was 1 Cherry (*Prunus spp*), 2 Hawthorn (*Crataegus monogyna*), 4 Ash (*Fraxinus excelsior*), 1 Beech (*Fagus sylvatica*), 2 Goat Willow (*Salix caprea*), 2 Sycamore (*Acer pseudoplatanus*) and 4 White Willow (*Salix alba*).
- 3.2.4 The quality of trees on site is summarised in Table 3.2 below

Table 3.2: Summary of tree survey findings.

Category B	Category C	Category U
T7 – Hawthorn (<i>Crataegus monogyna</i>)	T1 – Cherry (<i>Prunus spp.</i>)	T4 – Beech (<i>Fagus sylvatica</i>)
T9 – Sycamore (<i>Acer pseudoplatanus</i>)	T2 – Hawthorn (<i>Crataegus monogyna</i>)	T16 - Goat willow (<i>Salix caprea</i>)
T10 – Sycamore (<i>Acer pseudoplatanus</i>)	T2, T5, T6 – Ash (<i>Fraxinus excelsior</i>)	
T12 – Ash (<i>Fraxinus excelsior</i>)	T8 – Goat willow (<i>Salix caprea</i>)	
	T11 – White willow (<i>Salix alba</i>)	
	T13, T14, T15 – White willow (<i>Salix alba</i>)	
Total 4 trees	Total 10 trees	Total 2 trees

4. Arboricultural Impact Assessment (AIA)

4.1 Development Proposals

- 4.1.1 An Arboricultural Impact Assessment of the proposed site plan has been undertaken to assess the likely impact of the development on existing trees and tree groups. This assessment is based on the development plan provided by Brackley Investments Limited (ref: Hunters M9316-HUN-ZZ-SL-DR-A-03-0020-B).
- 4.1.2 The client proposes construction of a Specialist Dementia Care Centre with associated hard and soft landscaping.
- 4.1.3 Construction will be of a single phase using standard materials and methods.

4.2 Arboricultural Impact Assessment

Direct Impact from Development (T1 and T2)

- 4.2.1 The development plan indicates that two trees within the red line site boundary will need to be removed to accommodate the new development, including new buildings, new roads and drives as well as new hard landscape.
- 4.2.2 T1 and T2 are both poor quality trees of limited life expectancy. Their removal can easily be compensated for by the planting of some good quality replacements in a location along the road frontage.

Tree Works for Amenity and Safety Reasons (T11, T13, T14, T15)

- 4.2.3 Willows T11, T13, T14 and T15 were identified as shedding limbs and being in a poor condition during the Ecus tree survey. To maintain the safe use of the outdoor space of the new development, these trees shall be pollarded. A suitable pollard height shall be selected by a competent arboricultural contractor on site. The current ivy growth on the stem shall also be severed to allow a healthy regrowth of the pollards crown and allow thorough inspection of the trunk.
- 4.2.4 Pollarding of the willows will also reduce the demand on the root stock of the trees and reduce the area which will be required to be protected by protective fencing.

Summary

- 4.2.5 A total of two category C trees (T1 and T2) will have to be removed to facilitate the development, in addition to pollarding of 4 category C trees (T11, T13, T14, T15) recommended for substantial works due to their poor quality.

4.3 Recommendations

- 4.3.1 As the development proposals assume the removal of two trees growing within the site, no protection measures will be required for those trees.
- 4.3.2 Chapter 5 Arboricultural Method Statement describes measures to protect the retained trees during the development, and operations within the RPA of retained trees including:
 - Access Facilitation Pruning Works.
 - Protective fencing.

-
- Installation of power supply services.
 - Permanent surfacing in the RPA
 - Excavation for soft landscaping.
- 4.3.3 It is recommended that replacement tree planting is carried out close to the locations of T1 and T2. The trees should be planted at minimum 12-14 cm standard size. Proposed tree species should be suitable for spatial constraints imposed by their surroundings. Recommended tree species include large grown native species such as lime (*Tilia sp.*), oaks (*Quercus sp.*) and beech (*Fagus sylvatica*).
- 4.3.4 Tree planting and establishment should be carried out in accordance with BS 8545:2014 *Trees: From Nursery to Independence in the Landscape – Recommendations*.
- 4.3.5 It is recommended that tree planting follows 5-10-20-30 formula (i.e. No more than 5% of any one cultivar, no more than 10% of any one species, no more than 20% of any one genus, and no more than 30% of any one family.) This gives any new tree population maximum resilience against pests and diseases.

5. Arboricultural Method Statement (AMS)

5.1 Important Founding Principle of BS5837:2012

- 5.1.1 The most important and effective process, in terms of preventing damage to trees on a construction site, is the timely erection of tree protection fencing. **This must be erected as the first operation on site**, for example, before access track construction, before Contractors site cabins, and before trenching for service runs.
- 5.1.2 The founding principle of BS5837:2012 Trees In Relation To Construction is that the protective fencing is erected before any other operation. However, it is noted that the fencing provides a unnecessary and potentially dangerous restriction to essential tree works and therefore tree works can be carried out before fencing is erected.
- 5.1.3 The following paragraphs are laid out in sequence of chronological order of operations on site.

5.2 General

- 5.2.1 The Arboricultural Method Statement should be read in conjunction with Figure 5 Tree Protection Plan in Appendix 3. The Arboricultural Method Statement paragraphs below are written in the chronological sequence they are to be carried out:

5.3 Pre-Commencement

- 5.3.1 It is advised that a Pre-Commencement Site Meeting is held with contractors who are responsible for operating machinery on site. The meeting will firstly highlight the potential for damage occurring to tree crowns, but thereafter ensure that extra care is applied when manoeuvring any machinery within close proximity of retained trees to prevent any contact with the tree and consequent damage to crown, stem or roots.
- 5.3.2 For clarity, prior to any construction or development work proceeding, the alignment of the protective fencing (Section 6.4) and the RPA's of any individual trees to be retained which are not able to be protected by fencing should be marked out using the distances provided in the table within the tree survey report. Marking out should be completed or approved by a person with arboricultural expertise as individual trees will have root zones that may be affected by local conditions and allowances will need to be made to accommodate this. This may be done prior to, or during, the Pre-Commencement Site Meeting.

5.4 Access facilitation pruning

- 5.4.1 As it is expected necessary to operate a wide or tall load, plant bearing booms, jibs and counterweights or other such equipment, and such equipment would have potential to cause injurious contact with crown material i.e. low branches and limbs, of retained trees within, or without, the RPA fencing, it is best advised that appropriate, but limited tree surgery, be carried out beforehand to remove any obvious problem branches. This is classed as 'Facilitation Pruning' within BS 5837 (2012).
- 5.4.2 Willows T11, T13, T14 and T15 have all been identified as being in poor condition and shedding limbs. All four trees should be pollarded at a suitable height decided on site by a qualified arboricultural contractor. The existing ivy should be severed as close to ground level as possible to allow for thorough inspection of the trunk and successful re-growth of from the pollard cut.
- 5.4.3 The following trees require pruning to facilitate the development, including the use of

outdoor spaces:

Table 5.1: Access facilitation pruning

Tree number	Tree work required	Reason
T11	Pollard tree to suitable point decided onsite by a qualified arborist, monolith if appropriate	Tree beginning to collapse, make safe, instigate regular pollard cycle and reduce demand on RPA
T13	Pollard tree to suitable point decided onsite by a qualified arborist, monolith if appropriate	Tree beginning to collapse, make safe, instigate regular pollard cycle and reduce demand on RPA
T14	Pollard tree to suitable point decided onsite by a qualified arborist, monolith if appropriate	Tree beginning to collapse, make safe, instigate regular pollard cycle and reduce demand on RPA
T15	Pollard tree to suitable point decided onsite by a qualified arborist, monolith if appropriate	Tree beginning to collapse, make safe, instigate regular pollard cycle and reduce demand on RPA

- 5.4.4 All tree works should be carried out in accordance with BS 3998 (2010) “*Tree Works-Recommendations*”.
- 5.4.5 The Facilitation Pruning should be carried out on site by a suitably qualified and experienced tree surgeon before construction or demolition operations commence on site. The Facilitation Pruning can run concurrent with operations to erect tree protection fencing as long as this can be co-ordinated such that neither presents a hazard to the other.
- 5.4.6 Trees on site which are not to be retained can be removed as part of the Facilitation Pruning (or earlier if the appropriate planning consent is confirmed). To avoid mistakes, the individual trees to be removed should be identified and marked by a person with arboricultural expertise.
- 5.4.7 It is recommended that any trees that require removal or significant canopy works, should be checked in advance of works by an ecologist to ensure there is no possibility of any disturbance to nesting birds or roosting bats.

5.5 Protective Barrier/Tree Protection Fencing

- 5.5.1 The development design prepared for the site indicates that a number of trees within the site are being retained. In addition there are several trees off site but within 12m of the site boundary. All these trees need to be protected from all construction operations by a protective barrier (fencing to BS5837 (2012) which creates a sacrosanct Construction Exclusion Zone (CEZ).
- 5.5.2 The alignment of the protective barrier is based on the calculated extent of the RPA in accordance with BS5837 (2012). The detailed alignment is shown in Figure 5 Tree Protection Plan in Appendix 3.
- 5.5.3 In principle, protective fencing should be erected before any construction operations start on site and should be removed only on completion of all construction works on site.

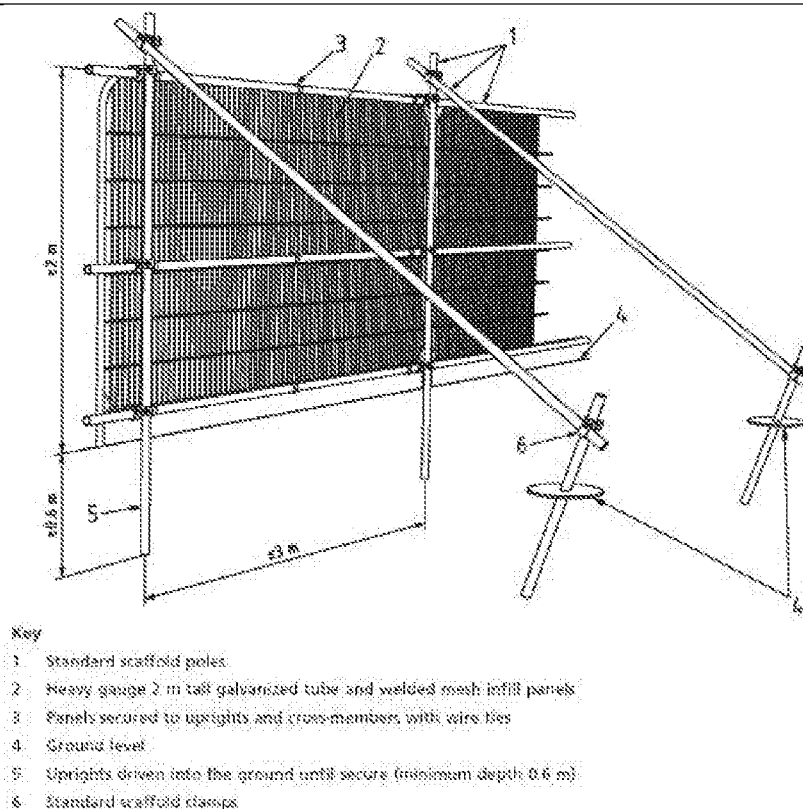


Figure 5.1: Default Specification for Protective Barrier to BS 5837 (2012)

- 5.5.4 The default specification for protective barrier is shown in Figure 5.1 above. Site hoarding is an acceptable alternative. It may be appropriate on some sites to use temporary site offices as components of the protection barriers, on the understanding that they will remain *in situ* for the duration of the construction works and their removal will be planned to ensure the Contractor's co-ordinated withdrawal from site away from the trees rather than towards them.
- 5.5.5 BS 5837 (2012) clause 6.2.2.3 specifies an alternative protective barrier where site circumstances and associated risk of damage incursion into the RPA do not necessitate the default level of protection. This can include 2m tall welded mesh panels (e.g. Heras fencing) on rubber or concrete feet to protect from cars, vans, pedestrians and manually operated plant. The alternative specification for the protective barrier should only be used if and where agreed with the Local Planning Authority.
- 5.5.6 All weather notices should be placed on fencing to indicate that operations are not permitted within the fenced area, for example "CONSTRUCTION EXCLUSION ZONE – NO ACCESS" or similar.
- 5.5.7 Once set up fences should not be removed or altered without prior consultation with the arboricultural advisor.
- 5.5.8 The presence of long grass and other vegetation in the 'Construction Exclusion Zone' is a welcome indicator that the protected area has been left undisturbed. However, on occasion, and certainly towards the end of the project, it is acceptable to cut the vegetation by hand held strimmer or scythe taking care not to work within 300mm of the tree trunk (to avoid damaging the bark). Vegetation within 300mm of the trunk can be cut with non-mechanised shears.

5.6 Installation of power supply and services

- 5.6.1 There are currently no proposals to route services or utilities through the RPA of any retained trees. If this changes at a later stage of the project, proposals should be submitted to the local planning authority Tree Officer for approval.
- 5.6.2 As guidance only, it is noted here that any underground power supply and services routed through the RPA should be installed in accordance with BS 5837:2012 clause 7.7.2 and NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

5.7 Construction within RPA

- 5.7.1 For no-dig permanent surfacing, see Section 5.9

Fence construction within RPAs

- 5.7.2 Where fence posts need to be installed within RPAs, excavations should be minimal and carried out using hand held tools. Fence posts should be erected at least 1 m from trees, using metal post support spikes or semi-dry postcrete mixes if installed within the RPA.
- 5.7.3 The proposed fence alignment should allow for a minimum distance of 500 mm between the tree stems and the fence, providing sufficient room for the future increase of the stem diameter and minimising the risk of potential conflicts between the fence structure and the tree stem.

Changes of level within RPAs

- 5.7.4 Generally, the levels within the RPA or protected area should not be changed. Tree roots are considered to be, in the main, within the top 600 mm of the soil. Obviously, any excavation into this will remove part of the root system and potentially affect the vigour or stability of the tree. Conversely, any additional material built up above ground level will compact the soil beneath it, potentially compacting all the air pores in the 600 mm depth of soil that most roots are in, effectively suffocating the roots and thus affecting the vigour or stability of the tree.
- 5.7.5 On occasion, additional soil may be gently spread by hand within the RPA/protected area, for example, to marry levels in small areas between raised levels of no-dig construction and the existing levels. The maximum depth of this would be to 150 mm, reducing to nil. However, it is not generally acceptable, in large areas of the RPA/protected area to raise the level as a blanket. Any areas which will need to be raised are to be agreed Local Planning Authority prior to construction. Specifically there will be no mechanical equipment within the RPA/protected area to spread, compact, or level out soil levels as this would compact the soil.

5.8 Excavations for soft landscaping

- 5.8.1 Where soft landscaping is proposed within the RPA of retained trees, excavations should be kept to the minimum required to provide adequate conditions for the establishment of new shrubs and trees. Excavations should be carried out carefully and by hand, avoiding the severance of any roots larger than 25mm diameter.

Soil Improvements and Mulching

- 5.8.2 To compensate for root damage and stress caused by construction activities, retained trees onsite should be mulched. The materials that may be used for mulching include

coarsely divided plant matter, such as wood chip, pulverized bark, or leaf mould, any of which may be combined with well-rotted animal manure. The mulched area should extend over as much of the root system as can be allowed by other site-usage requirements. The depth of an organic mulch should not be so much as to inhibit aeration of the root system or to cause overheating of uncomposted material (normally no more than 80 mm to 100 mm). The mulch should be periodically replenished as it decomposes, so that it does not become depleted.

5.9 Permanent Surfacing (No-dig construction) in RPA (T9 and T10)

- 5.9.1 The protective fencing will remain on its indicated alignment until the construction of the footpath is to begin. The construction of the footpath will be carried out by hand, or by machinery operating outside of the indicated RPA of the trees. Until complete to a load bearing standard, the protective fencing shall remain in position.
- 5.9.2 After scraping off the above soil vegetation layer, a geotextile will be laid out on top of the existing ground, and subsequently a three-dimensional Cellular Confinement System (CCS) (for example Presto Geoweb as supplied by Greenfix.co.uk) will be pegged out, and infilled as manufacturer's recommendations. Infill materials should be no-fines aggregate (granular) which will interlock and be free draining and allow gaseous exchange. When infilled, this structure will act as the sub-base. Over fill (for example by 25 mm) in accordance with manufacturer's recommendations and proposed use. A separation geotextile should be laid on top of this construction before any final wearing course is installed (unless machine laid bounded surface), or overfill by 40-60mm to provide the wearing course.
- 5.9.3 The wearing course should be a permeable surface allowing gaseous exchange and the infiltration of water into the root zone.
- 5.9.4 New hard surfacing should only be installed on completion of surrounding construction work.
- 5.9.5 Where existing hard surfaces were retained as temporary ground protection, new permanent hard surfacing should be built using the existing sub base and therefore avoiding any excavations and changes in level. This is to be carried out only on completion of surrounding construction work.
- 5.9.6 Roots smaller than 25mm diameter may be pruned back, making a clean cut with a suitable sharp tool except where they occur in clumps. Roots occurring in clumps or of 25mm diameter and over should be severed only following consultation with an arboriculturalist, as such roots might be essential to the tree's health and stability.
- 5.9.7 Kerbs and edgings that require excavations should not be used. Where kerbing is required for light structures, above-ground peg and board edging might be acceptable. Where the use of standard kerbs is unavoidable in areas used by vehicular traffic, foundations should not be continuous where this would require cutting or severing of roots larger than 25mm diameter. Instead, the kerbs should be "bridged" over the roots, leaving space that allows for future increase of the root diameter.

6. Tree Management

- 6.1.1 The following section provides guidance as to how retained trees will best be protected during construction. More detailed guidelines for tree protection during construction are given in BS5837: Trees in relation to the design, demolition and construction recommendations (2012).
- 6.1.2 Any tree roots severed during site clearance works will be wrapped or covered with hessian sheets (wet in summer, dry in winter) as an immediate protection measure against desiccation and rapid temperature changes. This will be removed prior to backfilling which should be carried out as soon as possible. In addition the advice of an arboriculturalist, or the Tree Officer of the local planning authority, will be sought as soon as possible on the potential effect of the root damage on the tree's stability, vitality and legal implications.
- 6.1.3 All tree works will follow best practice procedures as set out in BS 3998 (2010). All trees should be maintained in good condition on site and be inspected annually (where overall condition requires) or every 2 years and after any major storm events, with safety a priority.
- 6.1.4 The best practice principles have been broadly summarised below:
- Once areas around trees have been protected by fencing, any works on the remaining site area may be commenced providing activities do not impinge on protected areas.
 - Wide or tall loads etc. will not come into contact with retained trees. Banksman will supervise transit of vehicles, jibs, booms etc. where this is in close proximity to retained trees.
 - Oil, bitumen, cement or other material that is potentially injurious to trees will not be stacked or discharged within 10 m of a tree bole. No concrete mixing will be done within 10 m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree.
 - No fires will be lit where flames are anticipated to extend to within 5 m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire.
 - Notice boards, telephone cables or other services should not be attached to any part of a retained tree.
 - In the event of having caused any branch or limb damage to retained trees, the advice of an arboriculturalist will be sought on what tree surgery can be carried out, in accordance with BS 3998 (2010) Recommendations for Tree Work, to correct the damage, and the best timescale for that tree surgery which will be determined by season, species, gravity of damage and legal status of the tree (Tree Preservation Order/ Conservation Area/nesting birds/roosting bats).
- 6.1.5 All of the above precautionary measures will be applied to minimise the effect of any damage to long-term tree health and safety.
- 6.1.6 It is recommended that any trees that require removal or significant canopy works

should be checked in advance of works by an ecologist to ensure there is no possibility of any disturbance to nesting birds or roosting bats.

7. References

Books and Papers

BS 3998:2010 *Tree Work – Recommendations*. ISBN 978 0 580 53777 6

BS 5837:2012 *Trees In Relation To Design, Demolition And Construction – Recommendations*.
ISBN 978 0 580 69917 7

BS 8545:2014 *Trees: From Nursery to Independence in the Landscape – Recommendations*.

Volume 4 NJUG *Guidelines For The Planning, Installation and Maintenance of Utility
Apparatus in Proximity To Trees*, Volume 4: Issue 2: 16/11/2007, www.njug.org.uk

Appendix 1 – Tables

Table 3.1 – BS5837 Tree Survey Schedule

Key:	Measurements	Age – Class	Overall Condition	BS 5837 2005 : Cascade Chart for Quality Assessment/Retention Category	Symbols:
	MS – Multi-stemmed	YNG – Young Mature	G – Good	A – High	< = less than
	Ht - Height in metres	SM – Semi-mature	F – Fair	B – Moderate	~ = approximately
	Stem – Stem Diameter at 1.5m in mm	EM – Early mature	P – Poor	C – Low	> = greater than
	Crown – Crown spread in metres	M – Mature	D - Dead	U – Unsuitable for retention	
	TD - Trunk division (height in metres)	OM – Over mature		Sub-categories: 1 = mainly arboricultural values 2 = mainly landscape values 3 = mainly cultural values.	
		Est Yrs – estimate of years remaining (40+ years; 20+ years; 10+ years, <10 years)			

RPA = Root protection area (equivalent to a circle with a radius 12 x the stem diameter of single stem trees or 12 x the notional stem diameter of multi stemmed trees as per BS 5837:2012 clause 4.6). This will be capped to 707m² for trees with a stem diameter larger than 1.25m.

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations incl. Arboricultural Method Statement	BS 5837 Category	RPA Radius (m)	RPA (m ²)
T1	Cherry (<i>Prunus spp.</i>)	4.5	285	1	1	1	1	1	EM	10+	Fair	Multi-stemmed. Weak union at crown break.	Remove to create site access	C2	3.42	36.75
T2	Hawthorn (<i>Crataegus monogyna</i>)	2.5	250	1	1	1	1	0.25	YNG	10+	Poor	Young tree which has grown through fence - has been cut down several times.	Remove to create site access	C2	3.00	28.27
T3	Ash (<i>Fraxinus excelsior</i>)	8	320, 105, 154	3	3	3	0	4	YNG	10+	Fair	Included bark and crown break. Re-growth from old stump.		C2	4.44	61.93
T4	Beech (<i>Fagus sylvatica</i>)	6	154, 113, 108	1	1	1	1	4	YNG	10+	Poor	Remove		U	2.63	21.70

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations <i>incl. Arboricultural Method Statement</i>	BS 5837 Category	RPA Radius (m)	RPA (m²)
T5	Ash (<i>Fraxinus excelsior</i>)	8	234	2	0	1	3	5	YNG	10+	Fair	Included bark and crown break. Re-growth from old stump.		C2	2.81	24.77
T6	Ash (<i>Fraxinus excelsior</i>)	10	635	5	5	5	5	5	EM	20+	Fair	Triple stemmed at crown break with included bark. Has lost limbs. Risk of further significant limb loss if allowed to grow large		C2	7.62	182.41
T7	Hawthorn (<i>Crataegus monogyna</i>)	8	115, 350, 160	3	4	3	2	2	EM	20+	Good	Ivy clad		B2	4.82	73.11
T8	Goat willow (<i>Salix caprea</i>)	6	203,210	3	3	3	3	1	EM	10+	Fair	Previously cut as hedge		C2	3.48	38.05
T9	Sycamore (<i>Acer pseudoplatanus</i>)	13	650	4	4	4	4	3	M	20+	Good	Provides screen		B2	7.80	191.13
T10	Sycamore (<i>Acer pseudoplatanus</i>)	15	620	5	5	5	5	4	M	20+	Fair	Provides screen		C2	7.44	173.90
T11	White willow (<i>Salix alba</i>)	16	600	8	10	4	8	3	OM	<10	Poor	Ivy clad. Shedding limbs.	Reduce heavily or pollard prior to construction	B2	7.20	162.86
T12	Ash (<i>Fraxinus excelsior</i>)	14	350	3	3	3	3	3	EM	20+	Fair	Provides screen.		B2	4.20	55.42
T13	White willow (<i>Salix alba</i>)	16	635	5	10	5	8	3	OM	<10	Poor	Ivy clad. Shedding limbs.	Reduce heavily or pollard prior to construction	C2	7.62	182.41

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations <i>incl. Arboricultural Method Statement</i>	BS 5837 Category	RPA Radius (m)	RPA (m²)
T14	White willow (<i>Salix alba</i>)	17	743	3	10	5	10	2	OM	<10	Poor	Ivy clad. Shedding limbs.	Reduce heavily or pollard prior to construction	C2	8.92	249.74
T15	White willow (<i>Salix alba</i>)	15	1,250	5	10	8	8	2	OM	<10	Poor	Ivy clad. Shedding limbs.	Reduce heavily or pollard prior to construction	C2	15.00	706.86
T16	Goat willow (<i>Salix caprea</i>)	6	340	3	5	3	4	-	M	<10	Poor	Grown tight against flint wall. Likely to damage wall	Remove	U	4.08	52.30

Appendix 2 – Site Photographs



Plate 1: Cherry (Weak Union)



Plate 2: Hawthorn

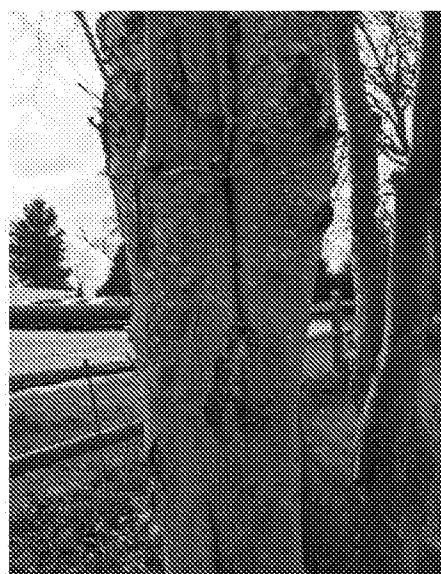


Plate 3: Ash (Crowded union)

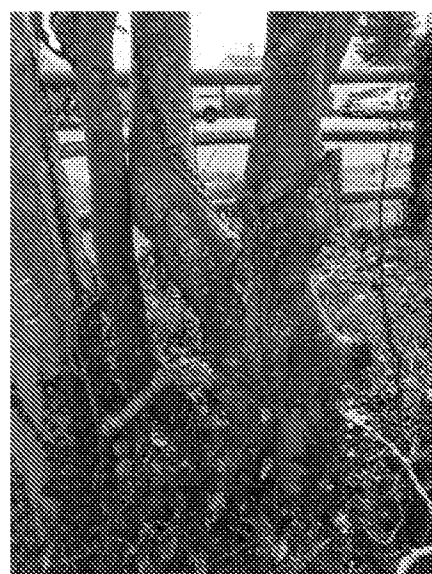


Plate 4: Beech (poor form)



Plate 5: Ash (weak union)



Plate 6: Ash (possible decay)



Plate 7: Goat Willow

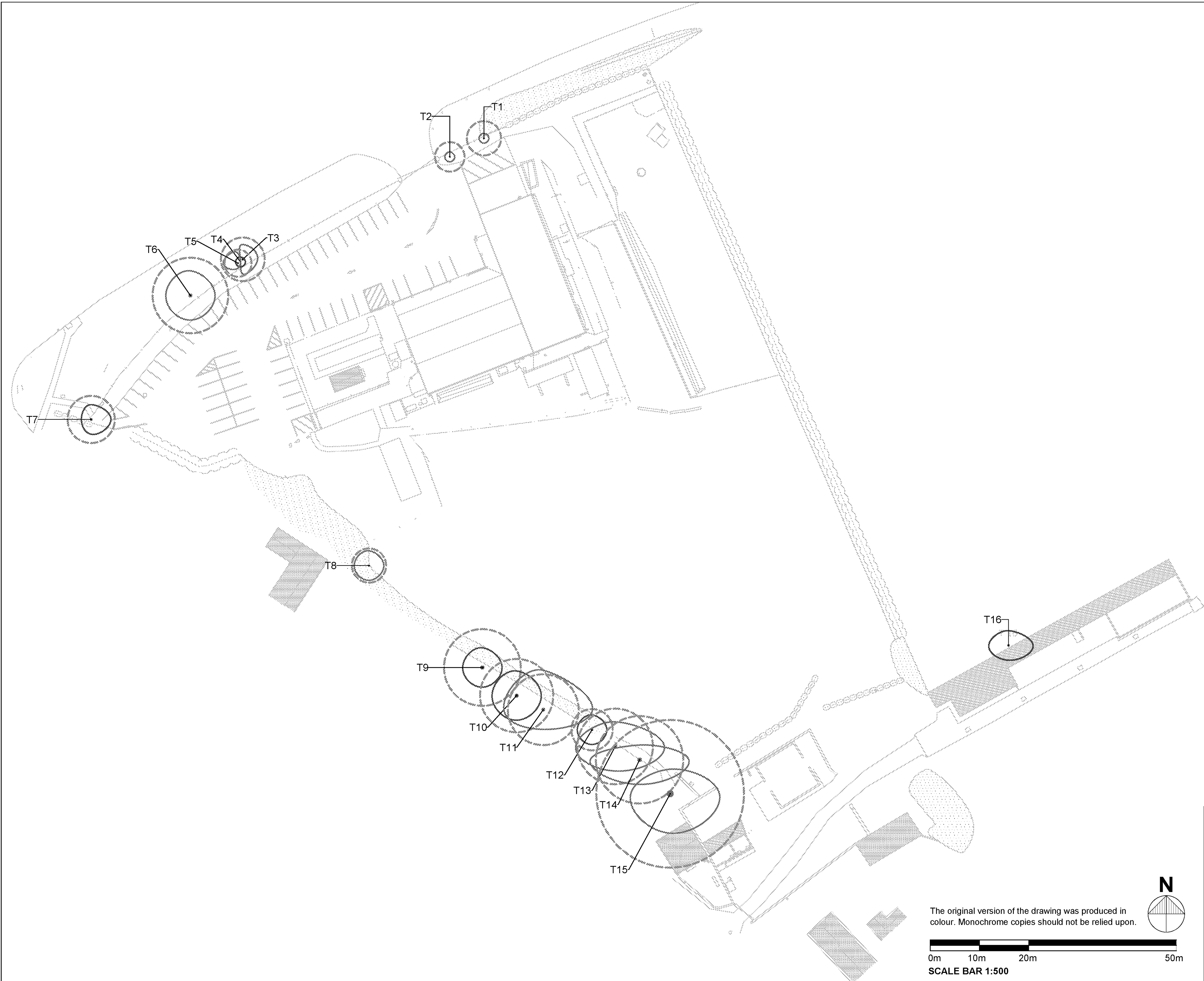


Plate 8: West boundary – mixed species



Plate 9: Group of willows – fallen limbs and wounds in the tree

Appendix 3 – Figures



GENERAL NOTES - TREE SURVEY

- Drawing for Planning purposes only.
- Based on Hurst's tree survey data in Arboricultural Site Development Report dated 17 March 2018.
- Check all dimensions on site.
- Do not scale from this drawing.
- Report any discrepancies and omissions to Ecus Ltd.
- This drawing is Copyright.

3RD-PARTY INFORMATION
NB This drawing includes information provided by independent surveyors and / or consultants, to whom all queries shall be made. Ecus Ltd can accept no liability for its context or accuracy.

KEY


Trunk location from topographic survey


Trunk location approximated by ECUS

 Shrubs and hedges

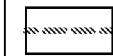
Tree categories (BS 5837:2012)


Category A Trees


Category B Trees


Category C Trees


Category U Trees

 Root Protection Area (RPA) of category A, B and C trees

A	20.03.18	ZW	ECUS	Preliminary
REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT

DRAWING STATUS: For Planning



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Job
LAND TO THE REAR OF BAIRDS FARM SHOP, LITTLEHAMPTON

Title
**Figure 4
Tree Survey and Tree Constraints Plan**

By ZW	Date Mar 2018	Scale @ A2 1:500	Drg. no. 9238-ARB-01
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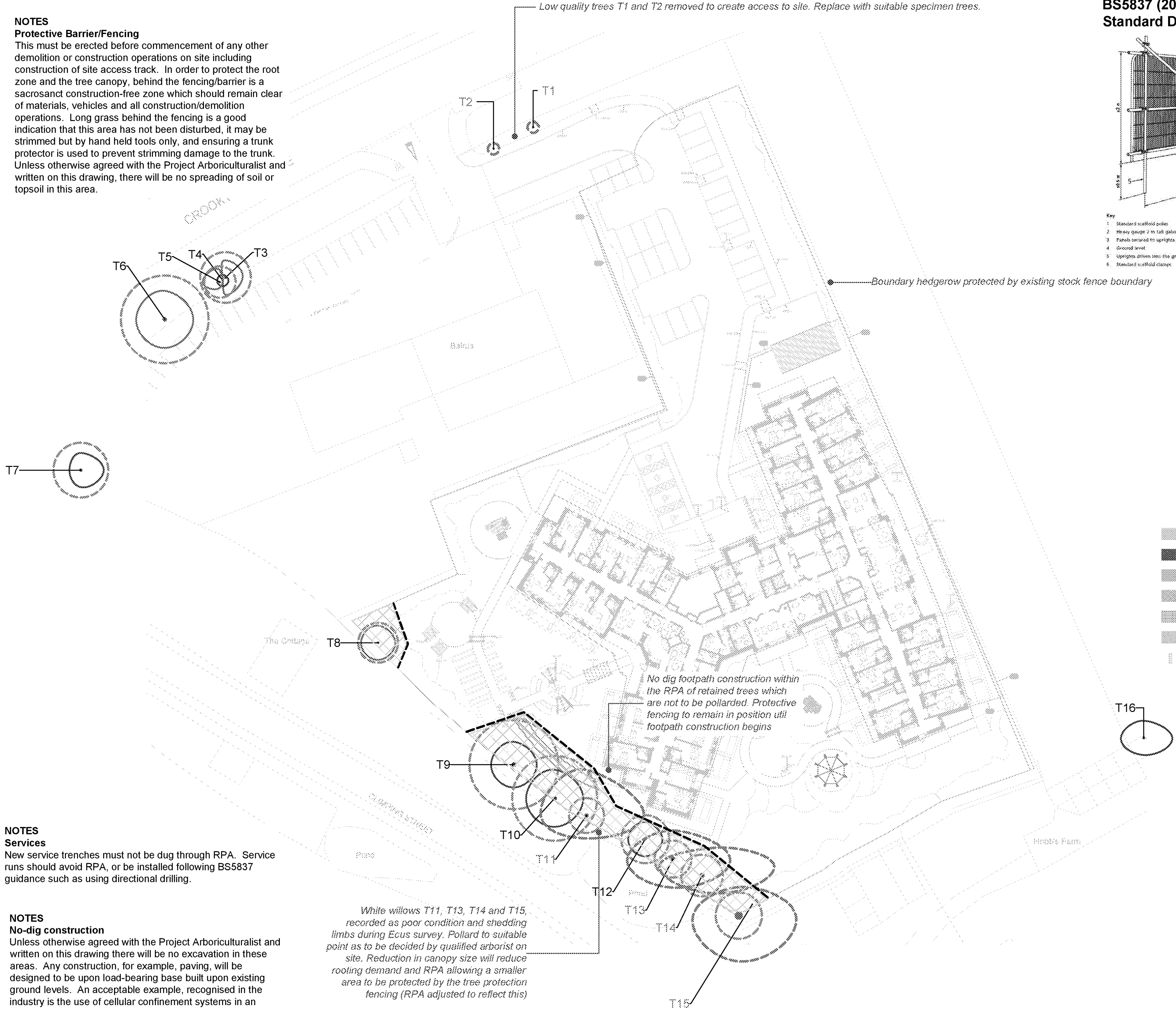
The original version of the drawing was produced in colour. Monochrome copies should not be relied upon.

0m 10m 20m 50m
SCALE BAR 1:500

NOTES

Protective Barrier/Fencing

This must be erected before commencement of any other demolition or construction operations on site including construction of site access track. In order to protect the root zone and the tree canopy, behind the fencing/barrier is a sacrosanct construction-free zone which should remain clear of materials, vehicles and all construction/demolition operations. Long grass behind the fencing is a good indication that this area has not been disturbed, it may be strimmed but by hand held tools only, and ensuring a trunk protector is used to prevent strimming damage to the trunk. Unless otherwise agreed with the Project Arboriculturalist and written on this drawing, there will be no spreading of soil or topsoil in this area.



NOTES

Services

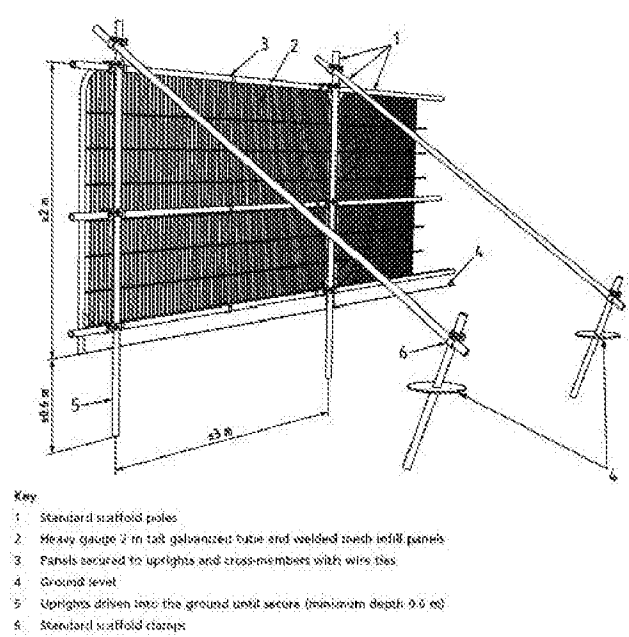
New service trenches must not be dug through RPA. Service runs should avoid RPA, or be installed following BS5837 guidance such as using directional drilling.

NOTES

No-dig construction

Unless otherwise agreed with the Project Arboriculturalist and written on this drawing there will be no excavation in these areas. Any construction, for example, paving, will be designed to be upon load-bearing base built upon existing ground levels. An acceptable example, recognised in the industry is the use of cellular confinement systems in an appropriate way to form temporary or permanent hard surfacing. Edge restraints must be considered at an early stage as no excavation for foundations is acceptable in 'no-dig construction' areas. It may be that the 'no-dig construction' techniques are used beyond the minimum area so that excavations for foundations for edge restraints can be dug outside the 'no-dig' areas.

BS5837 (2012) Tree Protective Fencing Standard Detail.



GENERAL NOTES - TREE PROTECTION PLAN

- Drawing for Planning purposes only
- Refer to arboricultural report produced by ECUS Ltd titled 9328 Land at rear of Bairds Farm Shop BS:5837 Tree Survey, AIA, AMS
- Based on a Tree Survey provided by
- Building layout and masterplan provided by Hunters on drawing number M9316-HUN-ZZ-SL-DR-A-03-0020-B.
- Refer to Engineer's details for level and drainage information.
- Check all dimensions on site.
- Do not scale from this drawing.
- Report any discrepancies and omissions to Ecus Ltd.
- This drawing is Copyright.

3RD-PARTY INFORMATION

NB This drawing includes information provided by independent surveyors and / or consultants, to whom all queries shall be made. Ecus Ltd can accept no liability for its context or accuracy.

KEY

Trunk location from topographic survey

Trunk location approximated by ECUS

Category A Trees

Category B Trees

Category C Trees

Existing tree to be removed

Root Protection Area (RPA) of trees to be retained

Protective Barrier*
- BS5837 (2012), clause 6.2.2

No-dig construction*
- BS5837:2012, clause 7.4.2

Construction Exclusion Zone

*See note on drawing about Protective Fencing and No-dig construction.

C	20.08.20	PS	ECUS	Updated Layout
B	08.05.18	PS	ECUS	Revised site layout and no dig
A	13.04.18	PS	ECUS	Preliminary
REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT

DRAWING STATUS: For Planning

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Job

LAND TO THE REAR OF BAIRDS FARM SHOP, LITTLEHAMPTON

Title

Figure 5
Tree Protection Plan

By	Date	Scale @ A2	Drg. no.
PS	April 2018	1:500	9238-ARB-02

The original version of the drawing was produced in colour. Monochrome copies should not be relied upon.

