



High Street, Shafton– BS5837:2012 Tree Survey, Arboricultural Impact Assessment and Arboricultural Method Statement

**Vistry Partnerships Yorkshire
Limited, Homes England**

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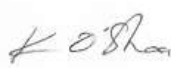
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Homes England**

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BS 5837:2012 Tree Survey Arboricultural Impact Assessment
and Arboricultural Method Statement**

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Executive Summary

On behalf of Vistry Partnerships Yorkshire Limited, Homes England (the Client), Ecus Limited (Ecus) has carried out the initial tree survey to BS 5837:2012 '*Trees In Relation To Design, Demolition and Construction- Recommendations*' in July 2020 at High Street, Shafton. A subsequent re survey of the site was carried in June 2022. 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).

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 BS 5837:2012, and is an important part of the methodologies described in this report.

The survey recorded 7 tree groups and 51 individual trees.

None of the trees are protected by Barnsley Council Tree Preservation Order (TPO). The site is not located within a Conservation Area.

The Client proposes the construction of 40 residential dwellings with associated hard and soft landscaping. This will require the removal of 5 tree groups and 45 trees, including 3 classified U category trees, 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 Works;
- Protective fencing;
- Change of level within the RPA;
- Installation of power supply services; and
- Excavation for soft landscaping.

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:

- Replacement tree planting to compensate the loss of trees.

For ready reference, Figure 1.1 (Chapter 1) is a simplified version of the 'Design and Construction Process and Tree Care' table outlined in BS 5837:2012. The table clearly identifies processes and obligations expected at the various stages of the construction project. BS 5837:2012 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

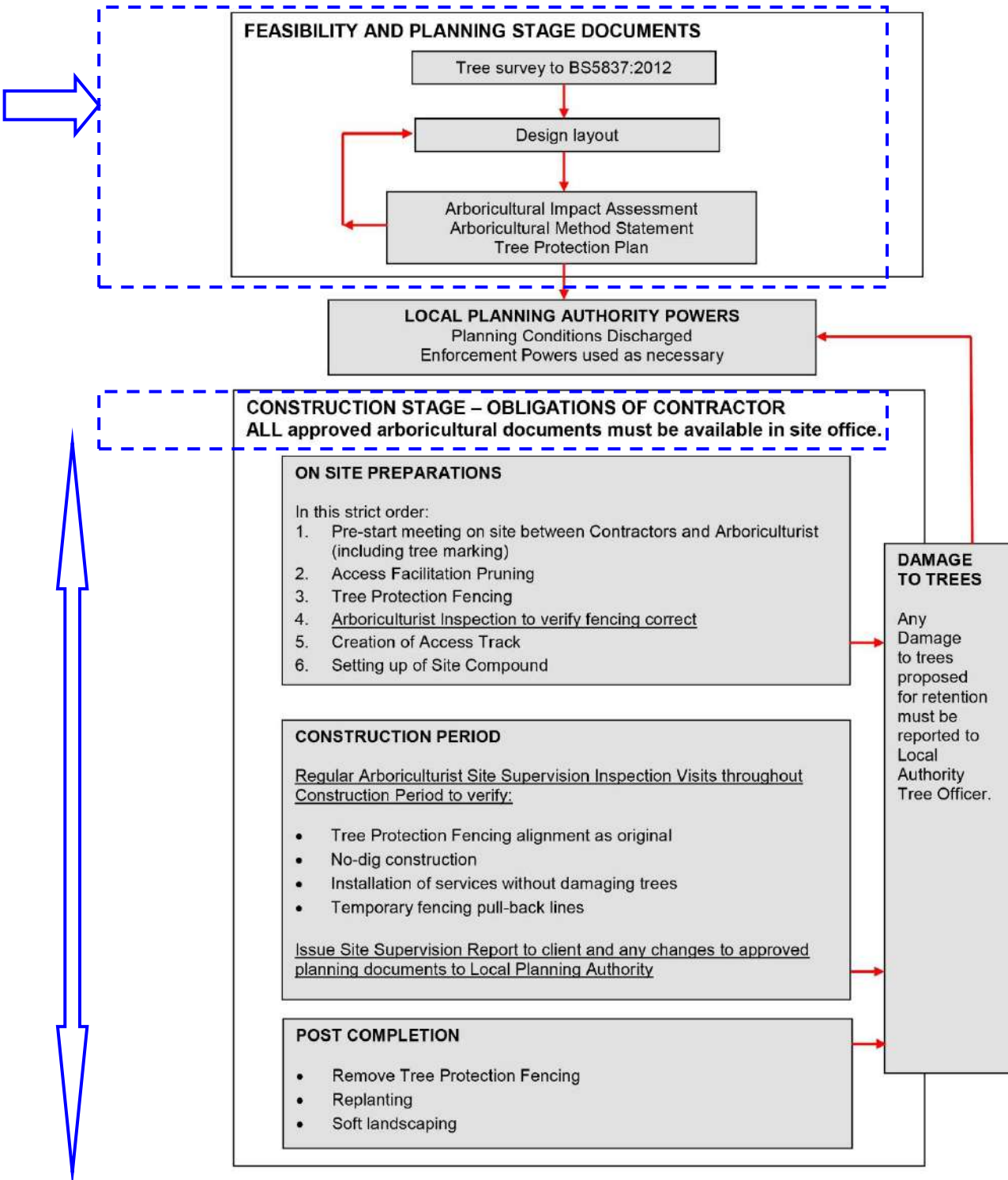


Figure 1.1 - The Design and Construction Process and Tree Care

1.1.1.1 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

- 1.2.2 Ecus Limited (Ecus) was commissioned by Vistry Partnerships Yorkshire Limited, Homes England (the Client) to undertake a tree survey of the site at High Street, Shafton (centred on Ordnance Survey National Grid Reference (OSNGR) SE 39386 10893). The site location is shown on Figure 1.2.

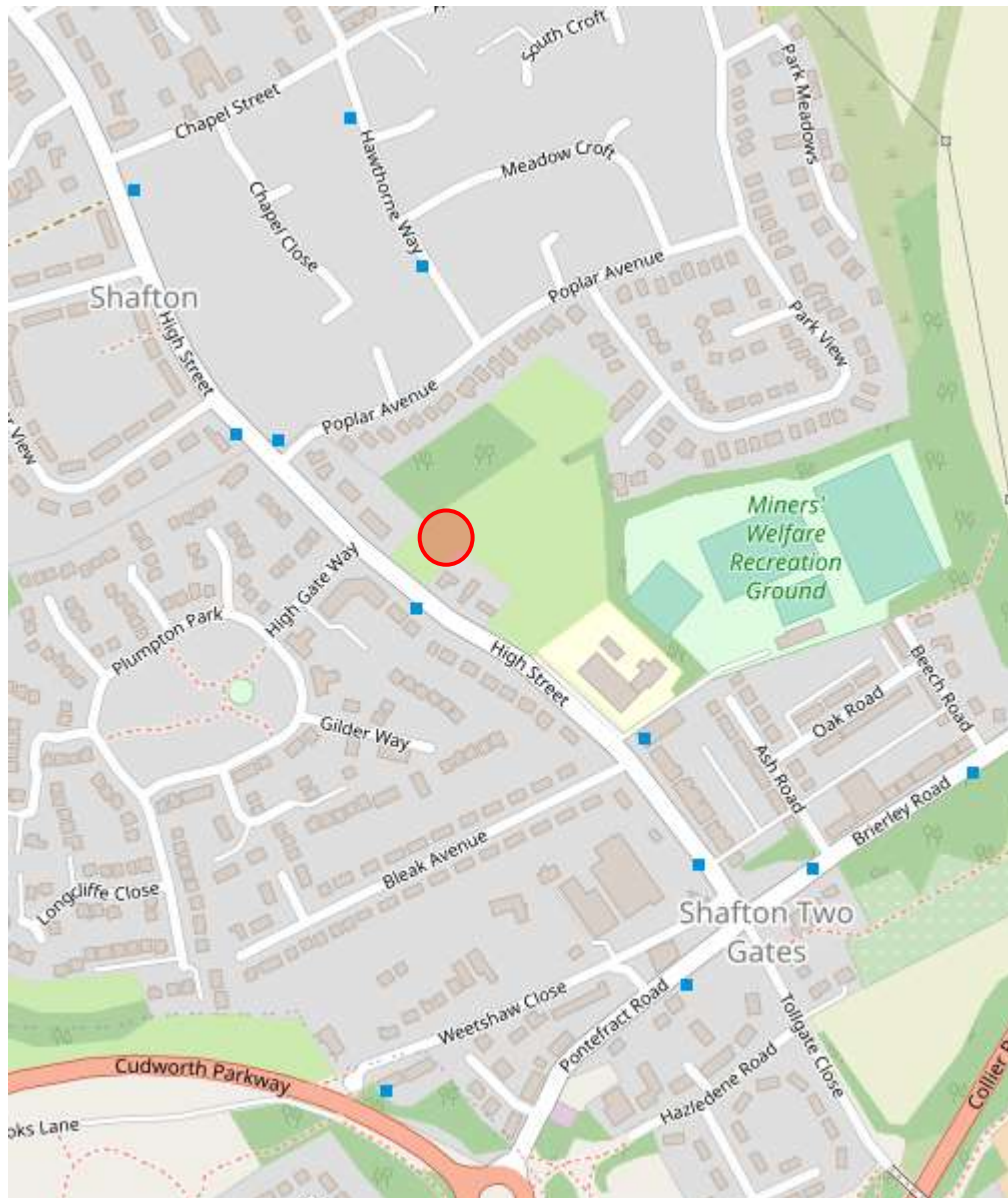


Figure 1.2 – Location Plan
© OpenStreetMap contributors

- 1.2.3 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 (TPO) and Conservation Area status by checking the map information available on Barnsley Council website www.Barnsley.gov.uk.

- 1.3.1 This check confirmed that there are no TPOs on any of the trees surveyed. The site is not within a Conservation Area.

Felling Licence

- 1.3.2 The felling of trees is regulated in England by the Forestry Act 1967 (the Act). The Forestry Commission is the government regulator that enforces the provisions of the Act.

- 1.3.3 The felling of growing trees in England is restricted under section 9 of the Act. It requires that felling is either authorised by a felling licence issued by the FC or the felling activity is exempt from the need for a licence.

- 1.3.4 There are many exceptions to the need for a licence, based on the type of the tree, the location of the tree, the size of the tree, the nature and scope of the felling activity and the person responsible for the felling. These are primarily set out in section 9 of the Act as well as the Forestry (Exceptions from Restriction of Felling) Regulations 1979.

- 1.3.5 The most relevant exemption is;

'Section 9 - Requirement of licence for felling (1) A felling licence granted by the appropriate forestry authority shall be required for the felling of growing trees, except in a case where by or under the following provisions of this Part of this Act this subsection is expressed not to apply...

(d) is immediately required for the purpose of carrying out development authorised by planning permission granted or deemed to be granted under the Town and Country Planning Act 1990 or the enactments replaced by that Act, or under the Town and Country Planning (Scotland) Act 1997.

- 1.3.6 Advice from a suitably qualified arboriculturist should be sought before any felling takes place onsite.

Ancient Woodland/Veteran Trees

- 1.3.7 The site is not listed in the Ancient Woodland Inventory, as shown on the Multi-Agency Geographical Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk). This is a spatial dataset that describes the geographic extent and location of Natural Environment and Rural Communities Act (2006) Section 41 habitats of principal importance.

- 1.3.8 The site does not contain any recorded veteran trees as shown on the Ancient Tree Inventory maintained by the Woodland Trust (ati.woodlandtrust.org.uk).

2. Tree Survey Methodology

2.1 Site survey

2.1.1 Ecus carried out an initial tree survey in July 2020 when the trees were in leaf, with subsequent re-survey of the site carried out in May 2022. The tree survey was a ground based visual inspection carried out by a suitably qualified arboriculturist. 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 originally carried out by Peter Simpson, MICFor, MArborA in July 2020, with a re-survey of the site carried out by Drew Leeper, TechArborA in May 2022.

2.1.3 Weather on the day of the survey was dry and clear. Weather conditions on the day of the survey allowed for a thorough inspection of all trees included in this survey.

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; or
 - 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; and
 - OM = Over mature – declining or moribund trees of low vigour.
- Condition category in accordance with BS 5837:2012 'Trees In Relation To Design, Demolition and Construction- Recommendations'. The categories listed are defined as per BS 5837:2012 and briefly are:
 - Category U = Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years;
 - Category A = Those of high quality and value, best trees with a long expected safe life;
 - Category B = Those of moderate quality and value; and
 - Category 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 BS 5837:2012 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.

- 2.1.4 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 (RPA) potentially extending into the site.
- 2.1.5 A full topographic survey of the site was provided; this was used as the basis for producing the tree survey plan.
- 2.1.6 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 RPA and is calculated according to the formulae set out in BS 5837:2012 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.

2.3 Ash Die Back (*Hymenoscyphus fraxineus*)

- 2.3.1 A large number of trees on the site are common ash, in various stages of their life cycle.
- 2.3.2 Ash die back (ADB) also known as Chalara or Chalara dieback of ash, is a disease of ash trees caused by a fungus called *Hymenoscyphus fraxineus*. ADB causes leaf loss, crown dieback and bark lesions in affected trees. Once a tree is infected the disease is usually fatal, either directly or indirectly by weakening the tree to the point where it succumbs more readily to attacks by other pests or pathogens, especially *Armillaria* fungi, or honey fungus.
- 2.3.3 It has caused widespread damage to ash populations in continental Europe, where experience indicates that it can kill young ash trees quite quickly, while older trees can resist it for some time, until prolonged exposure or another pest or pathogen attacking them in their weakened state, eventually causes them to succumb.
- 2.3.4 Many of the trees on the site were observed to have symptoms of ADB with the young trees particularly affected. It is to be assumed that the majority of the ash trees present on site will be lost, or severely disfigured by the disease.
- 2.3.5 It is becoming increasingly difficult to assign ash trees a retention category using the BS5837:2012 standards. The general advice from public bodies is to retain ash trees and see how the disease develops within the local population. However, if clear signs of ADB are found on sites, it is highly likely that all the ash trees on that site will succumb in a relatively short period. It would be unreasonable to consider an ash tree a significant constraint to a site, if it is to die within a short period of time.
- 2.3.6 Evidence from other parts of the country suggest that infected trees rapidly lose structural integrity and are more prone to branch shedding and total collapse. Furthermore, ash, as a species is known for its inability to retain even small deadwood, which it sheds regularly as it appears in the crown.
- 2.3.7 The Tree Council has produced a document giving guidance on how to deal with ADB to tree

owners and managers. 'Ash dieback: an Action Plan Toolkit (Summer 2019)'¹. This document gives guidance on assessing the danger posed by the trees infected by ADB. As suggested in the document, Ecus has adopted the Suffolk County Council Ash Health Assessment System (Appendix 3). The document is included in the appendix, and the methodology will not be repeated here other than to state the system categorises ash trees with the symptoms in 4 categories:

Ash Health Class (AHC) 1 – 100 – 75% Canopy (Vitality Class 0)

Ash Health Class (AHC) 2 – 75% -50% Canopy (Vitality Class 1)

Ash Health Class (AHC) 3 – 50% - 25% Canopy (Vitality Class 2)

Ash Health Class (AHC) 4 – 25% - 0% Canopy (Vitality Class 3)

- 2.3.8 Highways England has concluded that any trees which fall within AHC 3 and 4 require management and it seems reasonable to follow a similar system. The priority of that management depends on the severity of the tree's decline with trees slipping over from AHC 2 into AHC 3 requiring work as part of a program of regular works. As the trees progress (decline) towards class 4, action becomes more urgent to abate any hazard, assuming the tree is in a high risk area.
- 2.3.9 This report has taken into account the high number of infected ash trees on the site, and has assumed that none will survive longer than 10 years. A number of the trees are showing such significant signs of infection that they are recommended for removal and it may be pertinent to remove all ash at the pre-development stage while tree and site conditions allow for the safest working environment.
- 2.3.10 Tree Survey Results The site is approximately 1.25 Hectares (ha) and comprises an area of private land consisting of two grassland fields, an area of old fruit trees and secondary woodland, hedgerows and areas of scrub, tall ruderal and short perennial vegetation. Scattered trees and a dry pond were also present at the site. The foundations and rubble of buildings were present at the site; a review of historic aerial imagery shows that all buildings were demolished between 2016 and 2018.
- 2.3.11 The north, east and part of the west boundaries all consist of domestic properties with gardens that back on to the site. The southern boundary is formed of Shafton Primary School. The site is level and views of the site are limited by the boundary vegetation and surrounding buildings. As a result, the trees it contains are only visible to the general public from High Street, where the current hedge block the majority of the site from view.
- 2.3.12 There is no public access to the site with little evidence of any persons using the site for recreation.

¹ <https://treecouncil.org.uk/wp-content/uploads/2019/11/Tree-Council-Ash-Dieback-Toolkit-2.0.pdf>

3. Tree Survey Results

3.1 General Site Description

- 3.1.1 The site is approximately 1.25 Hectares (ha) and comprises an area of private land consisting of two grassland fields, an area of old fruit trees and secondary woodland, hedgerows and areas of scrub, tall ruderal and short perennial vegetation. Scattered trees and a dry pond were also present at the site. The foundations and rubble of buildings were present at the site; a review of historic aerial imagery shows that all buildings were demolished between 2016 and 2018.
- 3.1.2 The north, east and part of the west boundaries all consist of domestic properties with gardens that back on to the site. The southern boundary is formed of Shafton Primary School. The site is level and views of the site are limited by the boundary vegetation and surrounding buildings. As a result, the trees it contains are only visible to the general public from High Street, where the current hedge block the majority of the site from view.
- 3.1.3 There is no public access to the site with little evidence of any persons using the site for recreation.

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 3.1 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 RPA of each tree and tree group.
- 3.2.2 Seven tree groups and 51 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 RPA of the trees.
- 3.2.3 The vast majority of the trees onsite are of low individual quality with many pioneer species rapidly colonising the north western area of the site following cessation of any maintenance. Some areas of the site are heavily overgrown with bramble, making access to closely inspect some of the trees hard or impossible.
- 3.2.4 Two of the highest quality trees on the site are located on the northern boundary which actually runs south west to north east. Sycamores *Acer pseudoplatanus* T004 and T007 are, A category trees. Showing excellent health and vigour, the trees have high and well developed canopies. Both have dense epicormics growth at their base, and this should be removed to allow the basal flair of both trees to be inspected for any defects.
- 3.2.5 To the north of sycamore T007 is a wild cherry *Prunus avium* T009. With a straight clear stem and an airy canopy this tree is typical of the species and worthy of a B category, though it is somewhat suppressed by the surrounding A category trees. Immediately to its north is sessile oak *Quercus petraea* T011. This is the best tree on the site and has excellent form with a high, airy canopy and well developed branch structure. The tree has a long life expectancy and properly managed could be expected to live another 100 years plus.
- 3.2.6 To the south of these boundary trees is an area of dense bramble with tree group G048. In parts the vegetation is impenetrable and some trees are not accessible. The core of this tree group appears to have been an orchard, or area of fruit trees. Many remain, though all are unmanaged and many are in poor condition. The area has now become dominated by early mature sycamore, willow *Salix sp.* and hawthorn *Crataegus monogyna*.

- 3.2.7 The larger individuals plotted on the topographical survey have been recorded as part of this survey. Most are of little merit, being typical of trees which rapidly colonise fallow sites. T008 is a sycamore of good form and vigour and has been given a B category. Similarly T018, a wild cherry has good form and vigour and has been given a B category both trees are found on the northern edge of G048.
- 3.2.8 Roughly in the centre of the site is T043. Two closely growing field maples *Acer campestre* form a single canopy. Unusually large for the species, this is a good quality grouping and has been given a B category.
- 3.2.9 The southern boundaries are formed of sections of hawthorn with occasional elder G042. Long and unmanaged, the hedgerow is now a line of small individual trees typical of the species development once management lapses. These group sections are heavily overgrown in bramble and close inspection of the bases was not possible. The hedges are useful screen for the site, but the quality is C category. The western boundary hedge G059 has more recently been managed, with the stocks pollarded to around 2 m and now regrowing gappy and single species, this hedge is also C category.
- 3.2.10 While the trees in the north west of the site are individually rarely above a C category, there is some merit in the trees as a collective and they do form an area of continuous canopy. As such, the importance of these trees in providing ecosystem services should be acknowledged and if considered as a collective the group would be worthy of a B category.

Table 3.2: Summary of Tree Survey Findings.

Category A	Category B	Category C	Category U
T004, T007 - Sycamore	T008 - Sycamore	7 Groups 41 Trees	T027, T032 – Hawthorn
T011 – Sessile oak	T009, T018 – Wild Cherry		T046 - Sycamore
	T043 – Field maple		
Total 3 Trees	Total 4 Trees	Total 7 Groups 41 Trees	Total 3 Trees

3.3 Tree Constraints and General Design Advice

- 3.3.1 The A category trees T004, T007 and T011 have high, open canopies on the site side of their crowns. This means it would be possible to incorporate these trees into gardens or open spaces if appropriate protection is given to their rhizospheres. The remaining trees on site are either of low quality, or have developed rapidly as part of a secondary colonisation of the site and their form and species characteristics mean they should be considered less of a constraint to any development.

4. Arboricultural Impact Assessment (AIA)

4.1 Introduction

- 4.1.1 A BS5837:2012 Arboricultural Impact Assessment (AIA) has been carried out for trees present across the site. This methodology evaluates the direct and indirect effects of the Proposed Development and where necessary recommends mitigation. The British standard states, *"The assessment takes account of the effects of any tree loss required to implement the design, and any potentially damaging activities proposed in the vicinity of retained trees. Such activities might include the removal of existing structures and hard surfacing, the installation of new hard surfacing, the installation of services, and the location and dimensions of all proposed excavations or changes in ground level, including any that might arise from the implementation of the recommended mitigation measures. In addition to the impact of the permanent works, account has been taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil."*
- 4.1.2 As well as an evaluation of the extent of the impact on existing trees, the AIA assessment should include where necessary:
- a) the tree survey;
 - b) trees selected for retention, clearly identified and marked on a plan with a continuous outline; (19268-ARB-01)
 - c) trees to be removed, also clearly identified and marked on a plan with a dashed outline or similar; (19268-ARB-02)
 - d) trees to be pruned, including any access facilitation pruning, also clearly identified and labelled or listed as appropriate; (Table 5.1)
 - e) areas designated for structural landscaping that need to be protected from construction operations in order to prevent the soil structure being damaged;
 - f) evaluation of impact of proposed tree losses;
 - g) evaluation of tree constraints and draft tree protection plan;
 - h) issues to be addressed by an arboricultural method statement, where necessary in conjunction with input from other specialists.
- 4.1.3 To ensure clarity and consistency Ecus has adopted a similar approach to evaluating impacts on the tree as would be used in undertaking an Environmental Impact Assessments (EIA). The methodology used assesses the sensitivity of the receptor and the magnitude of change to give a significance of any affect. The detailed methodology is outlined in Appendix 2.

4.2 Development Proposals

- 4.2.1 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 the Client (ref: Edward Architecture 0812-EA-A-P002-S).
- 4.2.2 The Client proposes the construction of 40 residential dwellings with associated hard and soft landscaping.
- 4.2.3 Construction will be in a single phase using standard construction methodologies and materials.

4.3 Arboricultural Impact Assessment

- 4.3.1 The arboricultural impact assessment plan is shown on figure 4.1, appendix 5.

Direct Impact from Development

- 4.3.2 The development plan indicates that 5 tree groups and 42 trees, as well as 3 trees designated category U 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.
- 4.3.3 The tree removals represent a loss of 82% of all the trees and groups on the site. This represents a significant loss of tree cover at a site level. However it should be noted that the majority of the trees lost are concentrated within a small area of the site, with the remainder of the site consisting of open grassland. The layout of the scheme does allow for two A category trees to be retained, as well as one of the four B category trees to be retained.
- 4.3.4 Apart from the one A category tree and three B category trees the remaining removals are all low quality C category trees. The tree population on the site is considered to be of medium sensitivity to change. As the scheme is retaining the best category trees from a generally low quality tree stock, the impact of the scheme on the tree population is considered to be a low magnitude of change. Therefore, without mitigation the adverse effect of the proposed development on the tree population is considered minor.
- 4.3.5 If good quality, climate resilient tree planting of both small and large canopied trees can be provided within the new development and managed into healthy maturity then the overall effect of the development on tree population could be considered medium term. With the correct tree planting and management there will be long term beneficial effects of the scheme.
- 4.3.6 Once constructed, the large trees on the northern boundary should be far enough from the new build environment to not come into conflict with it. As T007 and T011 are large mature trees, there overall size should not be expected to increase dramatically so future pruning is unlikely to be necessary. Therefore the residual effect of the development on the retained trees is considered not significant.

Removal of Trees for Amenity and Safety Reasons (T027, T032 & T046)

- 4.3.7 Three trees on site have been assessed as being “unsuitable for retention”. Unless otherwise agreed with the developer/owner, these trees should be removed to ensure the safety of the site during construction and operation of the development/ improve the amenity spaces within the site.

Summary

- 4.3.8 Table 4.1 below summarises the impact the proposed development may have on existing trees:

Table 4.1: Summary of Tree removals

Category A	Category B	Category C	Category U
T004 - Sycamore	3 Trees	38 Trees 5 Groups	3 Trees
Total 1 Tree	Total 3 Trees	Total 38 Trees 5 Groups	Total 3 Trees

4.4 Recommendations

- 4.4.1 As the development proposals assume the removal of 5 groups and 45 trees growing within the site, no protection measures will be required for those trees.
- 4.4.2 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;
 - Change of level within the RPA;
 - Installation of power supply services; and
 - Excavation for soft landscaping.
- 4.4.3 It is recommended that replacement tree planting is carried out within suitable locations within the site. The trees should be planted at minimum 12-14 cm standard size. Proposed tree species should be suitable for the spatial constraints of their location. Recommended tree species include large and small canopied trees such as sweet gum *Liquidambar styraciflua*, red oak *Quercus rubra* and limes *Tilia sp.*
- 4.4.4 Tree planting and establishment should be carried out in accordance with BS 8545:2014 '*Trees: From Nursery to Independence in the Landscape – Recommendations*'.
- 4.4.5 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 BS 5837:2012

- 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 BS 5837:2012 '*Trees in Relation to Design, Demolition and Construction-Recommendations*' is that the protective fencing is erected before any other operation. However, it is noted that the fencing provides an unnecessary and potentially dangerous restriction to essential tree works and therefore tree works can be carried out before fencing is erected.

5.2 General

- 5.2.1 The Arboricultural Method Statement should be read in conjunction with Figure 5.1 Tree Protection Plan in Appendix 5. The Arboricultural Method Statement (AMS) 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 5.5) and the RPAs 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 (T007 & G037)

- 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, as part of construction works 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 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
T007	Remove epicormics from base and inspect basal area	Inspect tree for any defects
G037	Trimming back of scrub/small trees to allow easement of attenuation basin and erection of fencing	To allow easement of attenuation basin and erection of fencing

- 5.4.3 All tree works should be carried out in accordance with BS 3998:2010 '*Tree Works-Recommendations*'.
- 5.4.4 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.
- 5.4.5 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.
- 5.4.6 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.

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. All these trees need to be protected from all construction operations by a protective barrier (fencing to BS 5837:2012 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 BS 5837:2012. The detailed alignment is shown in Figure 5.1 Tree Protection Plan in Appendix 5.
- 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/demolition works on site.

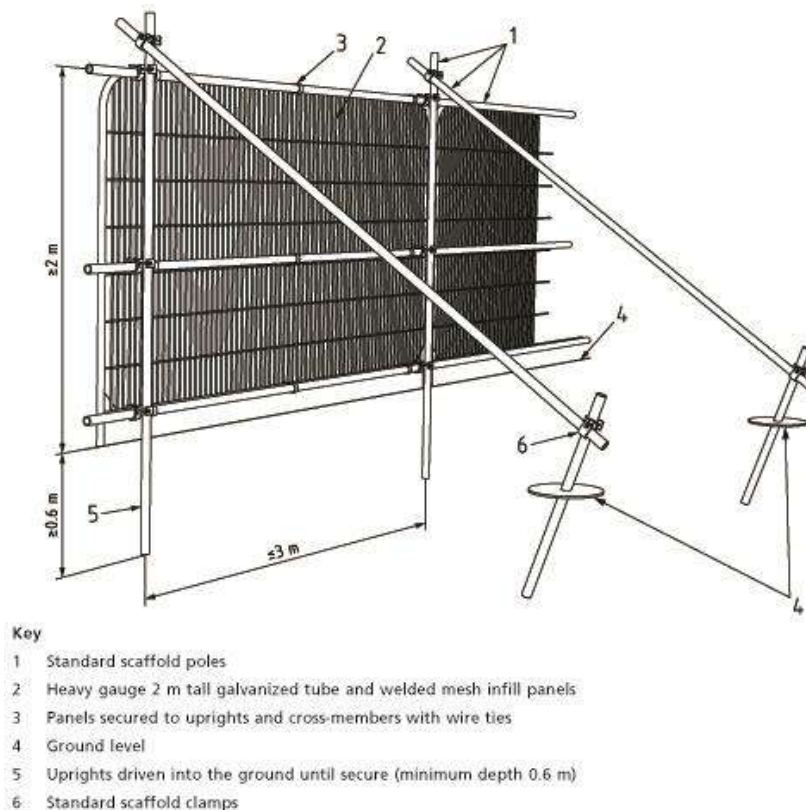


Figure 5.4: Default Specification for Protective Barrier to BS 5837:2012

- 5.5.4 The default specification for protective barrier is shown in Figure 5.2 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

Fence construction within RPAs

- 5.7.1 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, and using metal post support spikes or if using concrete mix, post holes should be lined with an impermeable membrane to prevent contact between tree roots and potentially damaging chemicals in the concrete.
- 5.7.2 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

- 5.7.3 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.
- 5.7.4 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.

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 BS 5837:2012 'Trees In Relation To Design, Demolition And Construction- Recommendations'.
- 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. Banks-person 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; and
 - 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, 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 National Joint Utilities Group (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 – BS 5837:2012 Tree Survey Schedule

Key:	Measurements	Age – Class	Overall Condition	BS 5837 2012 : 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	ADB – Ash Die Back	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)	DED – Dutch Elm Disease		
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)
T001	Cultivar Apple (<i>Malus domestica</i>)	6	280	1	3	3	2.5	0	Mature	10+ Years	Fair	Minor decay in lower stem, pruned clear of structure	Remove for development	C2	3.36	36
T002	Rowan (<i>Sorbus aucuparia</i>)	7	170	4	1.5	2	2	2	Mature	10+ Years	Poor	Suppressed by larger trees, biased crown to north over TP land, decay in lower stem	Remove for development	C2	2.04	13
T003	Leyland Cypress (<i>Cupressocyparis leylandii</i> X)	10	240, 340,	2	2	2	2	2	Mature	20+ Years	Fair	Two individuals growing closely together to form one crown	Remove for development	C2	4.992	79

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 (m²)
T004	Sycamore (<i>Acer pseudoplatanus</i>)	17	600	6.5	6.5	6.5	6.5	3	Mature	40+ Years	Good	Dominant tree, showing good health and vigour, dense epicormic growth at base prevents close inspection of basal flare	Remove for development	A2	7.2	163
T005	Silver Birch (<i>Betula pendula</i>)	15	280	2.5	2.5	2.5	2.5	1	Early Mature	20+ Years	Good	Typical of species	Remove for development	C2	3.36	36
T006	Sycamore (<i>Acer pseudoplatanus</i>)	12	120, 120,	2	2	2	2	1	Semi Mature	20+ Years	Fair	Growing in dense bramble so not able to inspect closely, snapped lower branch, still attached. Tree of limited merit	Remove for development	C2	2.04	13
T007	Sycamore (<i>Acer pseudoplatanus</i>)	17	600	7	7	7	7	3	Mature	40+ Years	Good	Dominant tree, showing good health and vigour, dense epicormic growth at base prevents close inspection of basal flare	Remove epicormic growth and inspect base	A2	7.2	163

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)
T008	Sycamore (<i>Acer pseudoplatanus</i>)	15	410	3.5	4	4	3.5	3	Early Mature	40+ Years	Good	Showing good health and vigour, epicormic growth at base	Remove for development	B2	4.92	75
T009	Wild Cherry (<i>Prunus avium</i>)	17	320	4	2	4.5	2	4	Mature	20+ Years	Fair	Typical of species	-	B2	3.84	45
T010	Rowan (<i>Sorbus aucuparia</i>)	4	140	2	2	2	2	0	Mature	10+ Years	Poor	Suppressed, poor form	-	C2	1.68	9
T011	Sessile Oak (<i>Quercus petraea</i>)	17	810	8	8	8	8	6	Mature	40+ Years	Good	A fine open canopied tree, some minor lower branches, but good canopy clearance on site side in excellent health and vigour	-	A2	9.72	296
T012	Cultivar Apple (<i>Malus domestica</i>)	9	440	0.5	3.5	4	3.5	2	Mature	20+ Years	Fair	Large unmanaged fruit tree, typical of age and species	Remove for development	C2	5.28	88
T013	Cultivar Apple (<i>Malus domestica</i>)	6	160	0.5	4	0.5	0.5	2	Mature	20+ Years	Fair	Large unmanaged fruit tree, lost major co dominant, crown now unbalanced to set, and resting in neighbouring tree	Remove for development	C2	1.92	11

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)
T014	Cultivar Apple (<i>Malus domestica</i>)	5	160	3	3	0.5	0.5	2	Mature	20+ Years	Fair	Large unmanaged fruit tree, suppressed canopy, typical of species and age	Remove for development	C2	1.92	11
T015	Common Hawthorn (<i>Crataegus monogyna</i>)	7	300	2	3.5	1.5	0	3	Mature	10+ Years	Poor	Leans east, large decay pocket in main stem at 1 m to 2 m, likely not significant due to trees sheltered location below oak. Bird box	-	C2	3.6	41
T016	Sycamore (<i>Acer pseudoplatanus</i>)	5	90, 80,	0.5	1.5	1.5	0.5	0	Semi Mature	20+ Years	Fair	Poor form, competing with hawthorn	Remove for development	C2	1.44	6
T017	Cultivar Apple (<i>Malus domestica</i>)	8	260	2	2.5	3	2.5	1.5	Mature	20+ Years	Fair	Large fruit tree, unmanaged, typical of species and age	Remove for development	C2	3.12	30
T018	Wild Cherry (<i>Prunus avium</i>)	17	300	3	3	3	3	3	Mature	20+ Years	Fair	Typical of species	Remove for development	B2	3.6	41
T019	Leyland Cypress (<i>Cupressocyparis leylandii</i> X)	12	140, 140,	1.5	1.5	1.5	1.5	1.5	Mature	20+ Years	Poor	Suppressed by cherry, of no merit	Remove for development	C2	2.376	18
T020	Wild Cherry (<i>Prunus avium</i>)	15	220	4	4	4	4	3	Mature	20+ Years	Fair	Typical of species, spreading habit	Remove for development	C2	2.64	21

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)
T021	Goat Willow (<i>Salix caprea</i>)	15	360#	2	3.5	9	5	0	Mature	20+ Years	Poor	Partially fallen, untidy tree, of poor form	Remove for development	C2	4.32	58
T022	Sycamore (<i>Acer pseudoplatanus</i>)	16	280, 250,	5	4.5	2	5	2	Early Mature	20+ Years	Fair	Typical of species, some deadwood	Remove for development	C2	4.5	64
T023	Sycamore (<i>Acer pseudoplatanus</i>)	16	180, 200,	3	3	3	3	2	Early Mature	20+ Years	Fair	Typical of species, some deadwood	Remove for development	C2	3.228	32
T024	Sycamore (<i>Acer pseudoplatanus</i>)	16	140, 120, 170,	1	2.5	2.5	2.5	2	Early Mature	20+ Years	Fair	Typical of species	Remove for development	C2	3.012	28
T025	Sycamore (<i>Acer pseudoplatanus</i>)	16	280	4.5	2.5	4	2.5	2	Early Mature	20+ Years	Fair	Typical of species, ivy on stem, fence occluded in base	Remove for development	C2	5.82	106
T026	Sycamore (<i>Acer pseudoplatanus</i>)	16	340	4.5	4.5	4.5	2.5	2	Early Mature	20+ Years	Fair	Typical of species, ivy on stem, fence occluded in base	Remove for development	C2	4.08	53
T027	Common Hawthorn (<i>Crataegus monogyna</i>)	6	120, 120, 130,	3	3	3	3	2	Over Mature	<10 years	Poor	Moribund and collapsing	Remove Remove for development	U	0	0
T028	Sycamore (<i>Acer pseudoplatanus</i>)	12	120	2	1	1	1	2	Semi Mature	20+ Years	Fair	Small tree, number of other smaller stems in same area	Remove for development	C2	1.44	6
T029	Sycamore (<i>Acer pseudoplatanus</i>)	12	120	2	1	1	1	2	Semi Mature	20+ Years	Fair	Small tree, number of other smaller stems in same area	Remove for development	C2	1.44	6

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)
T030	Leyland Cypress (<i>Cupressocyparis leylandii</i> X)	10	200, 160, 140,	2.5	2.5	2.5	2.5	0	Mature	10+ Years	Fair	Multi stemmed from base	Remove for development	C2	3.504	38
T031	Sycamore (<i>Acer pseudoplatanus</i>)	16	280	2	4	4	2	2	Early Mature	20+ Years	Fair	Swept stem to south	Remove for development	C2	3.36	36
T032	Common Hawthorn (<i>Crataegus monogyna</i>)	6	250, 250,	1.5	4.5	4.5	0	0	Over Mature	<10 years	Poor	Collapsed and moribund	Remove for development	U	0	0
T033	Common Hawthorn (<i>Crataegus monogyna</i>)	6	200	2.5	2.5	2.5	2.5	0	Mature	20+ Years	Fair	Growing in dense bramble, unable to inspect closely, measurements estimated	Remove for development	C2	2.4	18
T034	Goat Willow (<i>Salix caprea</i>)	8	100, 100, 100, 100,	3.5	3.5	3.5	3.5	0	Semi Mature	20+ Years	Fair	Multi stemmed from base, typical of species	Remove for development	C2	2.688	23
T035	Not in Use															
T036	Not in use															

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)
G037	Group of 5 Common Hawthorn (<i>Crataegus monogyna</i>)	5	Ave. 200	As per plan				0	Early Mature	20+ Years	Fair	Dense bramble contains approximately 5 thorns, typical of species and location	Prune/trim back scrub/young trees to allow easement of attenuation basin and erection of TP fencing	C	0	86
T038	Common Hawthorn (<i>Crataegus monogyna</i>)	5	200	2.5	2.5	2.5	2.5	0	Early Mature	20+ Years	Fair	Dense crown dbh estimated	Remove for development	C2	2.4	18
T039	Common Ash (<i>Fraxinus excelsior</i>)	9	300	5	5	5	5	2	Mature	<10 years	Poor	ADB AHC 2	Remove for development	C2	3.6	41
G040	Group of Common Hawthorn (<i>Crataegus monogyna</i>) Elder (<i>Sambucus nigra</i>)	5	Ave. 150	As per plan				0	Mature	20+ Years	Fair	Semi mature hawthorn with dense young to semi mature self-set elders.	-	C	0	188
T041	Common Ash (<i>Fraxinus excelsior</i>)	12	280	3.5	3.5	3.5	3.5	2	Early Mature	<10 years	Fair	Apparently off site, and no access or clear view, number of similar stems close by. Other ash stem has ADB	Remove for development	C2	3.36	36

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)
G042	Group of Common Hawthorn (<i>Crataegus monogyna</i>) Common Holly (<i>Ilex aquifolium</i>) Elder (<i>Sambucus nigra</i>)	7	Ave. 200	As per plan				0	Mature	20+ Years	Fair	Discontinuous remains of boundary hedge, long unmanaged and now growing as small trees, dbhs of 200 mm assumed, many multi stemmed.	Remove for development	C2	0	1057
T043	Field Maple (<i>Acer campestre</i>)	12	340, 320,	5	5	5	5	1	Mature	40+ Years	Fair	Two closely growing stems, forming one crown	Remove for development	B2	5.604	99
T044	Sycamore (<i>Acer pseudoplatanus</i>)	16	200, 200, 200,	3.5	3.5	3.5	0.5	1	Early Mature	20+ Years	Fair	Typical of species, apple crown rubbing on stem	Remove for development	C2	4.152	55
T045	Cultivar Apple (<i>Malus domestica</i>)	7	240	0	1	2	4	1	Mature	10+ Years	Poor	Large unmanaged fruit tree, large decay cavity at base, canopy rests on sycamore	Remove for development	C2	2.88	26
T046	Sycamore (<i>Acer pseudoplatanus</i>)	17	480	5.5	5.5	5.5	5.5	4	Mature	<10 years	Poor	Epicormics at base, significant occluded union at 2 m, with weeping region below.	Remove for development	U	0	0
T047	Sycamore (<i>Acer pseudoplatanus</i>)	15	280, 240,	3	3	2	3	0	Semi Mature	20+ Years	Fair	Two stems forming one crown	Remove for development	C2	4.428	61

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)
G048	Group of Cultivar Apple (<i>Malus domestica</i>) Wild Cherry (<i>Prunus avium</i>) Common Hawthorn (<i>Crataegus monogyna</i>) Sycamore (<i>Acer pseudoplatanus</i>)	10	Ave. 200	As per plan				0	Mature	20+ Years	Fair	Heavily overgrown area of unmanaged fruit trees, with typical pioneer species establishing within. Approximately 10 fruit trees with stems of around 200 mm dbh, other trees typically around 150 to 200 mm. Difficult access, so not inspected closely	Remove for development	C2	0	1599
T049	Sycamore (<i>Acer pseudoplatanus</i>)	12	220	3	3	3	0	1	Early Mature	10+ Years	Poor	Vandalised stem	Remove for development	C2	2.64	21
T050	Wild Cherry (<i>Prunus avium</i>)	12	140	2	0	2	0	1	Early Mature	10+ Years	Poor	Vandalised stem, suppressed	Remove for development	C2	1.68	9
T051	Wild Cherry (<i>Prunus avium</i>)	12	240	2	2	2	2	1	Early Mature	10+ Years	Poor	Suppressed	Remove for development	C2	2.88	26
T052	Sycamore (<i>Acer pseudoplatanus</i>)	14	300, 160,	0	2	4	2	2	Early Mature	20+ Years	Poor	Former pollard at 4 m	Remove for development	C2	4.08	53

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)
T053	Wild Cherry (<i>Prunus avium</i>)	16	510	4.5	4.5	4.5	4.5	4	Mature	20+ Years	Fair	Epicormic at base, thinning canopy, dominant tree of group	Remove for development	C2	6.12	117
T054	Leyland Cypress (<i>Cupressocyparis leylandii</i> X)	12	420	2	2	2	2	2	Mature	10+ Years	Fair	Typical of species of no merit	Remove for development	C2	5.04	79
T055	Goat Willow (<i>Salix caprea</i>)	7	240, 200,	2	2	2	2	1.5	Early Mature			Pollarded at 2 m now re-growing crown	Remove for development	C	3.744	43
T056	Sycamore (<i>Acer pseudoplatanus</i>)	10	240	2	2	2	2	0		20+ Years	Fair	Growing within a cluster of smaller sycamore stems	Remove for development	C2	2.88	26
G057	Group of around 10 Sycamore (<i>Acer pseudoplatanus</i>)	10	Ave 150	As per plan				0	Semi Mature	20+ Years	Fair	Dense cluster of multi stemmed sycamore, typical of species and of little merit. Approximately 10 stems of around 150 mm	Remove for development	C2	0	195
G058	Group of Common Hawthorn (<i>Crataegus monogyna</i>)	6	Ave 200	As per plan				0	Mature	20+ Years	Fair	Remains of boundary hedge, long unmanaged, heavily overgrown with bramble, dbh of 200 mm assumed	Remove for development	C	0	224

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)
G059	Group of Common Hawthorn (Crataegus monogyna)	4	Ave 150	As per plan				0	Early Mature	20+ Years	Poor	More recently managed hedgerow, pollarded stocks, now re-growing, discontinuous with a number of gaps	Remove for development	C2	0	140
T060	Sycamore (Acer pseudoplatanus)	10	160	2	2.5	2	2	2	Semi Mature	20+ Years	Fair	Of no great merit	Remove for development	C2	1.92	11

Appendix 2 – Site Photographs



Plate 1: General view of G048 looking east



Plate 2: Sycamore T008 looking north west



Plate 3: Looking towards north west corner. T003 middle



Plate 4: southern edge of G048 looking east



Plate 5: Sycamore T007 looking south



Plate 6: Sessile oak T011 centre looking north east

Appendix 3 – Arboricultural Impact Assessment Methodology

8. Arboricultural Impact Assessment

8.1 Introduction

- 8.1.1 A BS5837 arboricultural impact assessment has been carried out for trees present across the Site. This methodology evaluates the direct and indirect effects of the Proposed Development and where necessary recommends mitigation. The standard states, *"The assessment takes account of the effects of any tree loss required to implement the design, and any potentially damaging activities proposed in the vicinity of retained trees. Such activities might include the removal of existing structures and hard surfacing, the installation of new hard surfacing, the installation of services, and the location and dimensions of all proposed excavations or changes in ground level, including any that might arise from the implementation of the recommended mitigation measures. In addition to the impact of the permanent works, account has been taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil."*
- 8.1.2 There are no published criteria, guidance or methodologies for the assessment of effects of development on forestry, trees or woodland. The Forestry Commission published 'Environmental Impact Assessment for Forestry Projects' in February 2019 however this is concerned with forestry operations and is not relevant to trees on development sites. As a result, the assessment of effects is made based on professional judgement, with reference to:
- the sensitivity of the tree population present in the study area taking account of the degree and rate of change in the tree population, both in the recent past and that anticipated in the near future, and therefore the susceptibility/vulnerability of the tree population to change; the quality of the tree population (based on the categorisation method outline in BS5837:2012 broadly based on amenity value and useful life expectancy) and the extent to which it is rare or distinctive, the value attributed to the tree population through designations;
 - magnitude of change and extent of tree removal, impact of proposed development on retained trees and impact of any required tree work;
 - duration and reversibility - timescale of effect (days/weeks/months/years) until recovery. Permanent effects are described as such, and likelihood of recovery is detailed where appropriate; and
 - adverse/beneficial - if the effect will be beneficial or detrimental to the feature.
- 8.1.3 The effect of tree removal is normally considered to be of an adverse nature; however indirect beneficial effects in some areas may arise where the introduction of a proposed development allows for the removal of ecologically habitat-poor or discretionary trees. This may be followed up by detailed landscape masterplans, ecological and woodland management plans or schemes of compensatory planting to replace lost trees with more beneficial individuals.
- 8.1.4 Baseline survey methodologies and data sources used to inform this assessment, including the BS5837:2012 tree surveys.
- 8.1.5 BS5837:2012 is the accepted standard for the management of trees on development sites. The standard offers advice on the assessment of impacts of a scheme on trees, based on a tree survey carried out to the same BS5837 specifications.
- 8.1.6 As well as an evaluation of the extent of the impact on existing trees, the arboricultural impact assessment has included:
- a) the tree survey;
 - b) trees selected for retention, clearly identified (e.g. by number) and marked on a plan with a continuous outline;

- c) trees to be removed, also clearly identified (e.g. by number) and marked on a plan with a dashed outline or similar;
- d) trees to be pruned, including any access facilitation pruning, also clearly identified and labelled or listed as appropriate;
- e) areas designated for structural landscaping that need to be protected from construction operations in order to prevent the soil structure being damaged;
- f) evaluation of impact of proposed tree losses;
- g) evaluation of tree constraints and draft tree protection plan;
- h) issues to be addressed by an arboricultural method statement, where necessary in conjunction with input from other specialists.

8.2 Sensitivity of Receptors

8.2.1 Four categories of sensitivity are defined in Table 9.1:

Table 9.1: Definitions of Sensitivity Levels of Trees/Woodland/Forestry

Value	Definition
Very High	Receptor has little or no ability to absorb change without altering its present character, is of very high environmental value, or of international importance.
High	- Highly valued, subject of national designation e.g. Ancient Woodland Category, veteran and heritage trees - Particularly rare or distinctive in a national context; or - Considered susceptible to small changes.
Medium	- Valued more locally, subject to local designation; - Mainly B and C category trees - Rare or distinctive in a regional context; and/or - Are tolerant of moderate levels of change
Low	- Generally, more commonplace, not designated; - Mainly C category trees - Considered potentially tolerant of noticeable change; or - Undergoing substantial development such that their character is one of change.
Negligible	- Low quality, insignificant trees, mainly C and U category - Considered tolerant of noticeable change; or - Having undergone substantial development such that their character is one of change.

8.3 Magnitude of Change

- 8.3.1 The magnitude of change has been assessed with reference to the four categories defined in Table 9.2:

Table 9.2: Definitions of Magnitude of Change Levels

Magnitude	Definition
High	A noticeable change to the tree population over a wide area or an intensive change over a limited area.
Medium	Small changes to the tree population over a wide area or noticeable change over a limited area.
Low	Very small changes to the tree population over a wide area or small changes over a limited area.
Negligible	No discernible change to the tree population.

8.4 Significance of Effect

- 8.4.1 The significance of the effect is calculated by combining the sensitivity of the receptor (Table 9.1) with the magnitude of change (Table 9.2) in Table 9.3 below.

Table 9.3: Framework for Assessment of the Significance of Effect

Magnitude of Change	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Appendix 4 – Suffolk County Council Ash Die Back Canopy Description



The Issue

Identifying the symptoms of Ash Dieback in large trees can be difficult, so a system was needed to enable easy description of the current state of an Ash Tree. Tree Canopy assessment has been widely used since the late 1980's across Europe based on work produced in Switzerland in 1986. In 1990 the Forestry Commission produced a book – '[Assessment of Tree Condition](#)' to enable a standard system for describing the condition of a tree based on the percentage of existing canopy remaining.

Using this methodology Suffolk County Council undertook to describe the health of an Ash in Suffolk.

The steps undertaken

During the summer of 2013/14 Suffolk County Council assessed and photographed Ash across the county. They determined that there were 4 useful categories to describe Ash canopies. The categories chosen were

- 100% full canopy,
- 75% canopy,
- 50% canopy
- and 25% canopy.

These are represented photographically in the pictures at the end of this Case Study.

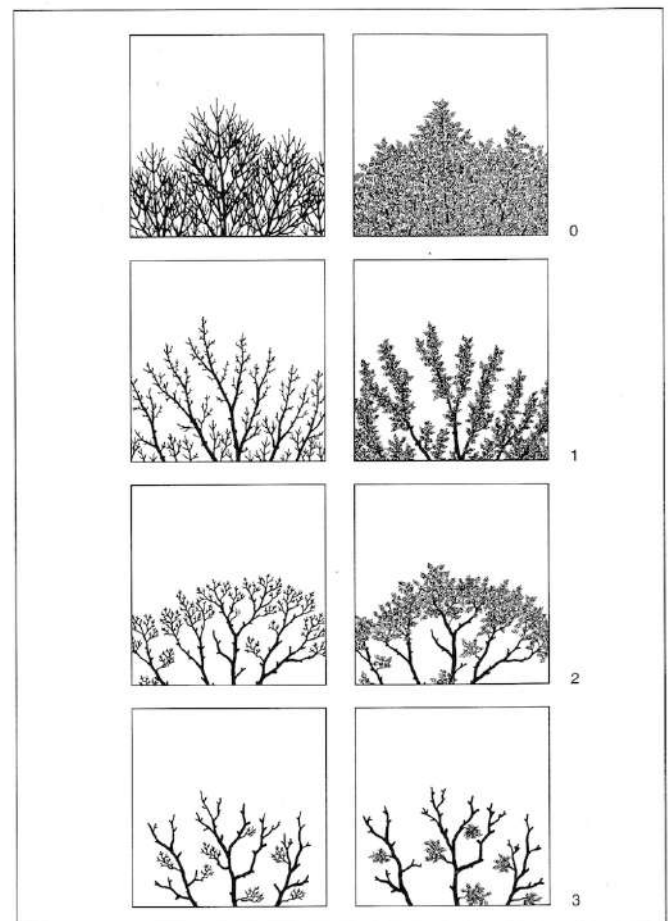
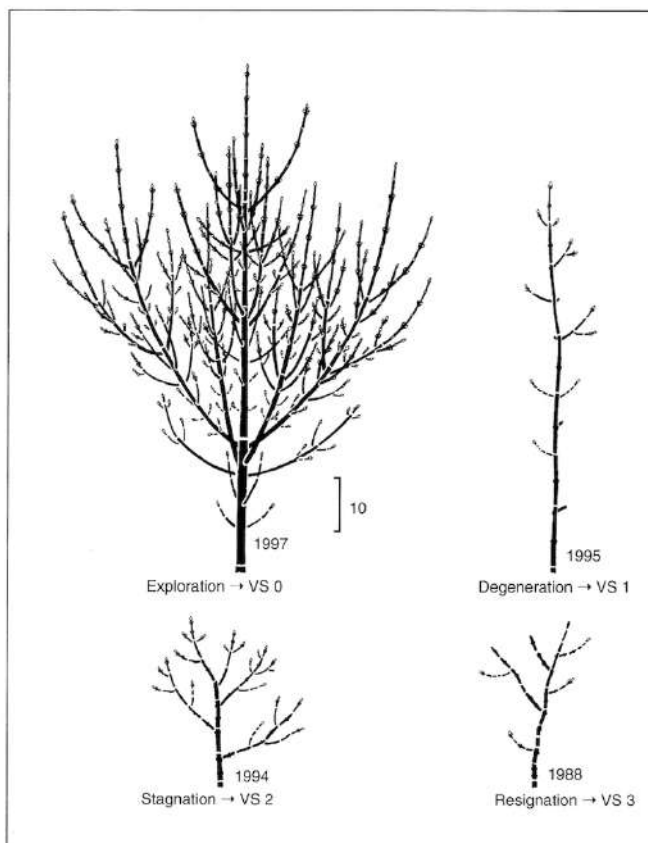
These 4 classes fit with work undertaken in Germany by Professor Andreas Roloff who has been describing the state of vitality of European Trees. He also uses 4 categories – described as

- Vitality Class 0: Healthy vigorous trees showing treetop shoots in the exploration phase: both the main axes and part of the lateral twigs consist of long-shoots. For this reason, a regular net-like branching pattern is developed, which reaches deep into the interior of the crown. The crowns are equally closed and domed, and do not show any greater gap unless a stronger intervention has occurred, such as pruning measures, because such a gap is closed quickly by the intensive ramification. In summer, a dense foliage arises without any greater gap.
- Vitality Class 1: Weakened trees show treetop shoots in the degeneration phase. Thus, spears/"fox tails" are formed, rising above the canopy. The leaves on these spears are dense and grow all around them (at the top of the lateral short-shoots or shortshoot chains). The crowns make a frazzled impression on the outside, and have a fastigiated appearance, because the airspace between the spears is not completely filled by leaves and twigs, and the crown has a spiky outline. Inside the crown, the branching pattern, and hence the foliage, is quite dense. In this vitality class, straight percurrent main axes of the treetop branches are still dominant, but the crowns no longer look as intact as in class 0 because of the spears shooting out of the canopy.
- Vitality Class 2: In obviously less vigorous trees, the treetop shoots begin to build short-shoots in the stagnation phase. The leafless state could be designated as the claw stage, because the short-shoot chains in the outside of the crowns grow longer, are predominant, and stretch claw-like to the light. These short-shoot chains, growing too long, break off in summer in thunderstorms and heavy rains, and strew the forest floor in

declining stands. Under normal circumstances, trees get rid of parts of their unimportant twigs in the inner and lower crown parts in this way. However, if the treetop shoots themselves are declining, the self-pruning of twigs progresses into the outskirts of the crown, and the crowns become thin from the inside outwards. The cause for this occurrence is not premature leaf fall, but broken short-shoot chains, a lack of shoots, and dead buds and twigs. The branching pattern shows a bushy and lumpy accumulation in the periphery of the crown. This accumulation causes summer and winter bushy crown structures and greater gaps. The crown periphery still has hardly any straight percurrent branches.

- Vitality class 3: In considerably damaged or declining trees of the crowns finally fall apart by the breaking off of larger branches and the dieback of whole crown parts. The tree seems to consist only of more or less surplus sub-crowns, dispersed randomly in the airspace and forming whip-like structures. The treetop is often dying back or is already dead, because the treetop shoots grew in the retraction phase.

These 4 vitality classes are shown below for Ash.



The work in Germany and Suffolk complements each other and establishes the ability to be able to assign an ash tree to 1 of 4 categories, which describe the trees current health or vitality. This is a simple and useful method for describing the current state of an Ash's health.

The Outcome

Using this 4 category framework, allows a tree to be assigned to a category, showing its current state of health, enabling data on the tree to be collected. The suggestion going forward is that these 4 classes are used as described as:

Ash Health Class 1 – 100 – 75% Canopy (Vitality Class 0)

Ash Health Class 2 – 75% -50% Canopy (Vitality Class 1)

Ash Health Class 3 – 50% - 25% Canopy (Vitality Class 2)

Ash Health Class 4 – 25% - 0% Canopy (Vitality Class 3)

Figure 1: Photos of Dieback of ash trees



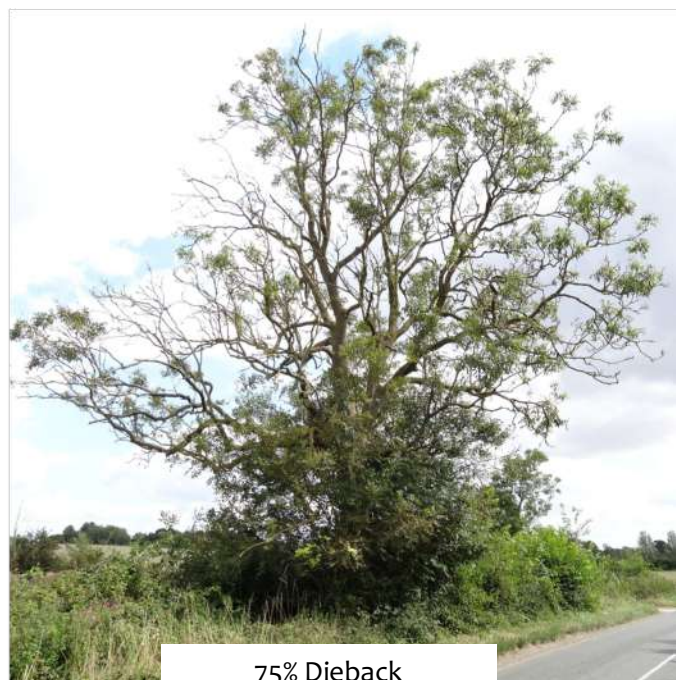
0% Dieback - Healthy Crown



25% Dieback

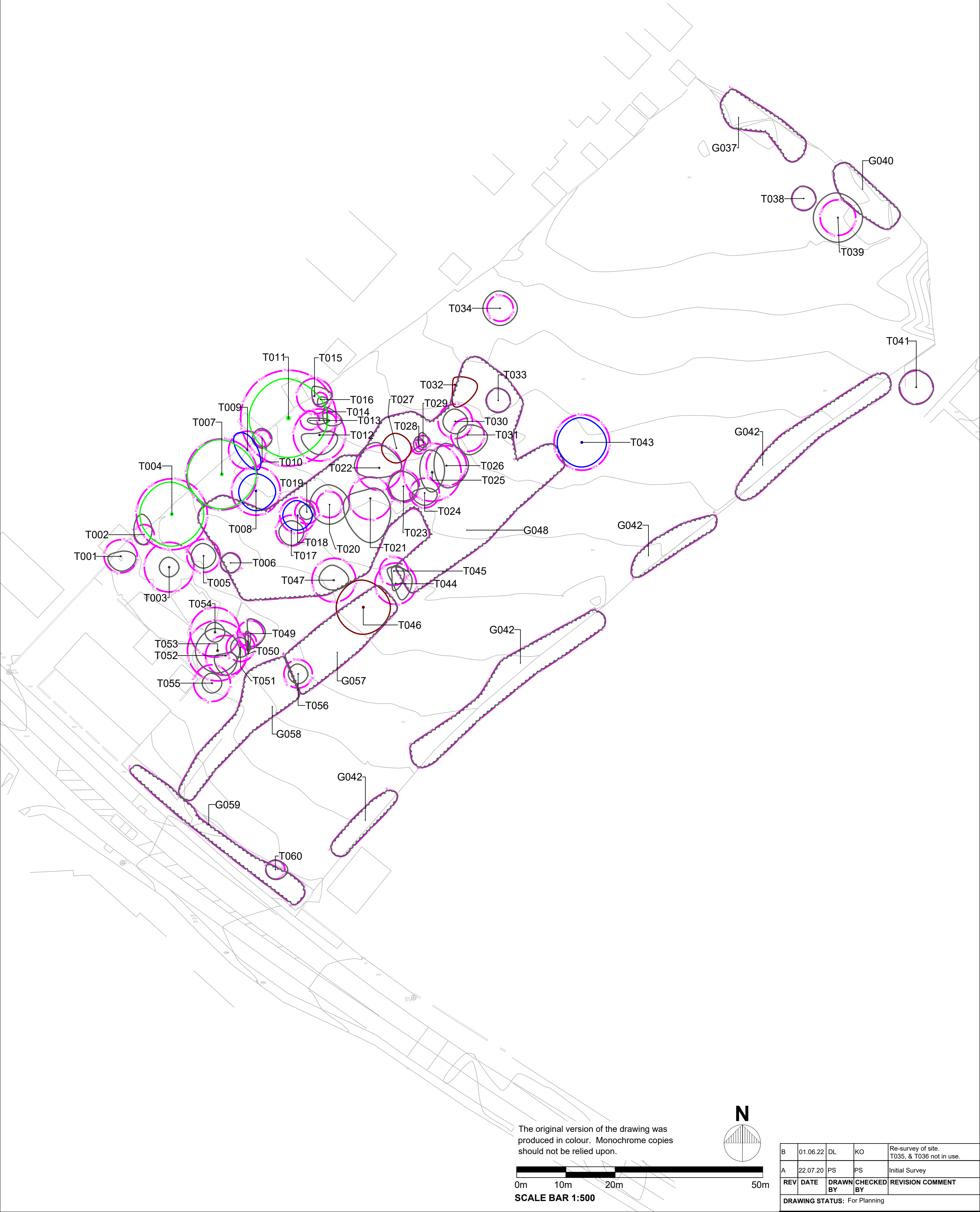


50% Dieback



75% Dieback

Appendix 5 – Figures



GENERAL NOTES - TREE SURVEY

- Drawing for Planning purposes only.
- Refer to arboricultural report produced by ECUS Ltd titled High Street, Shafton BS5837:2012 Tree Survey AIA, AMS
- Based on topographic survey provided by RJP dated March 2020.
- Check all dimensions on site.
- Do not scale from this drawing.
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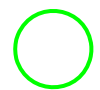


Trunk location from topographic survey



Trunk location approximated by ECUS

Tree categories (BS 5837:2012)



Category A Trees



Category B Trees



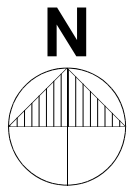
Category C Trees



Category U Trees



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



B	01.06.22	DL	KO	Re-survey of site. T035, & T036 not in use.
A	22.07.20	PS	PS	Initial Survey
REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT

DRAWING STATUS: For Planning

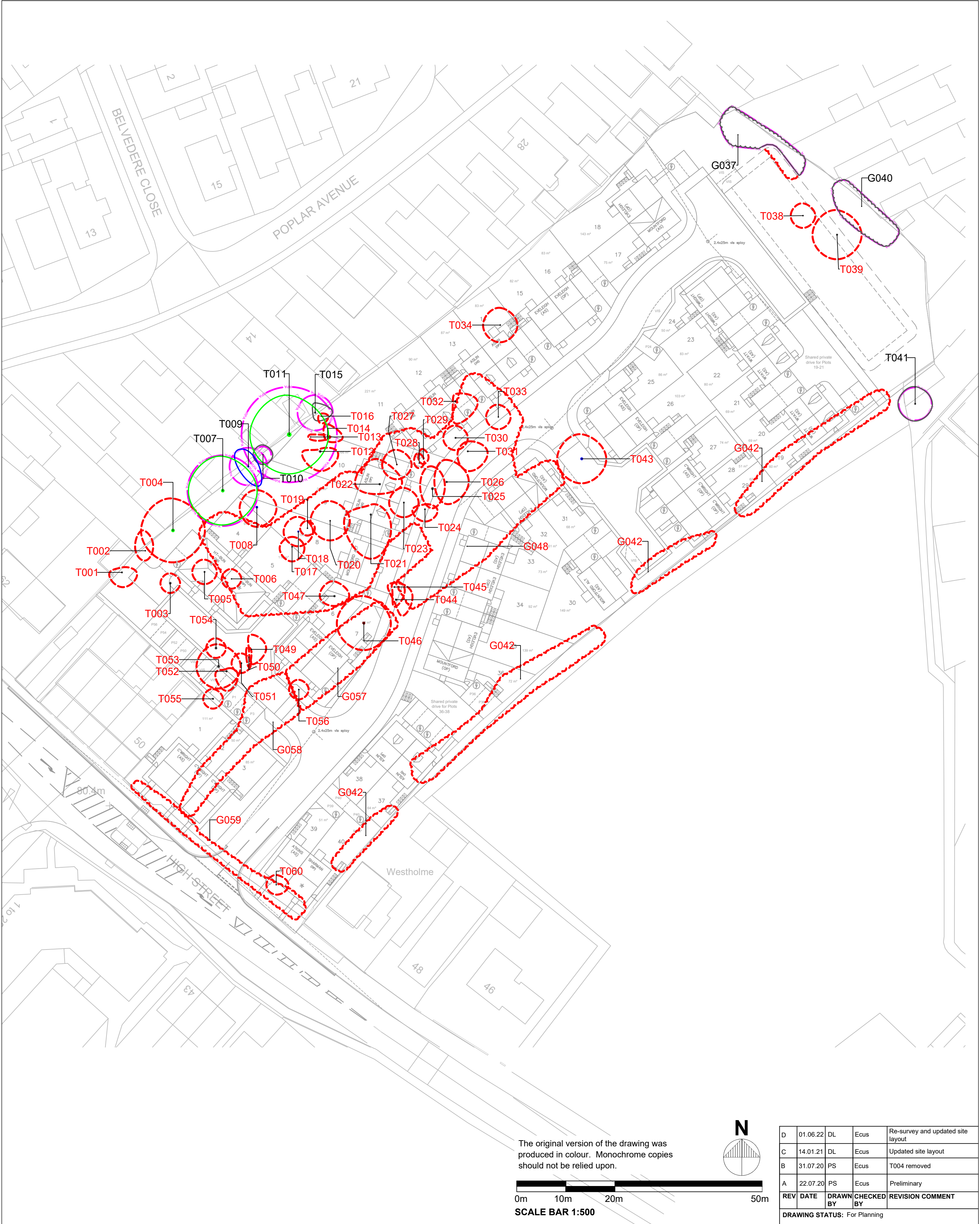


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Job
High Street Shafton

Title
Figure 3.1
Tree Survey and Tree Constraints Plan

By PS	Date July 2020	Scale @ A2 1:500	Drg. no. 19268-ARB-01
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GENERAL NOTES - Arboricultural Impact Assessment

- Drawing for Planning purposes only
- Refer to arboricultural report produced by ECUS Ltd titled High Street Shafton BS5837:2012 Tree Survey AIA, AMS
- Based on topographic survey provided by RJP dated March 2020.
- Building layout and masterplan provided by Edward Architecture on drawing number 0812-EA-A-P002-S.
- Refer to Engineer's details for level and drainage information.
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Trunk location from topographic survey

Trunk location approximated by ECUS

Tree categories (BS 5837:2012)

Category A Trees

Category B Trees

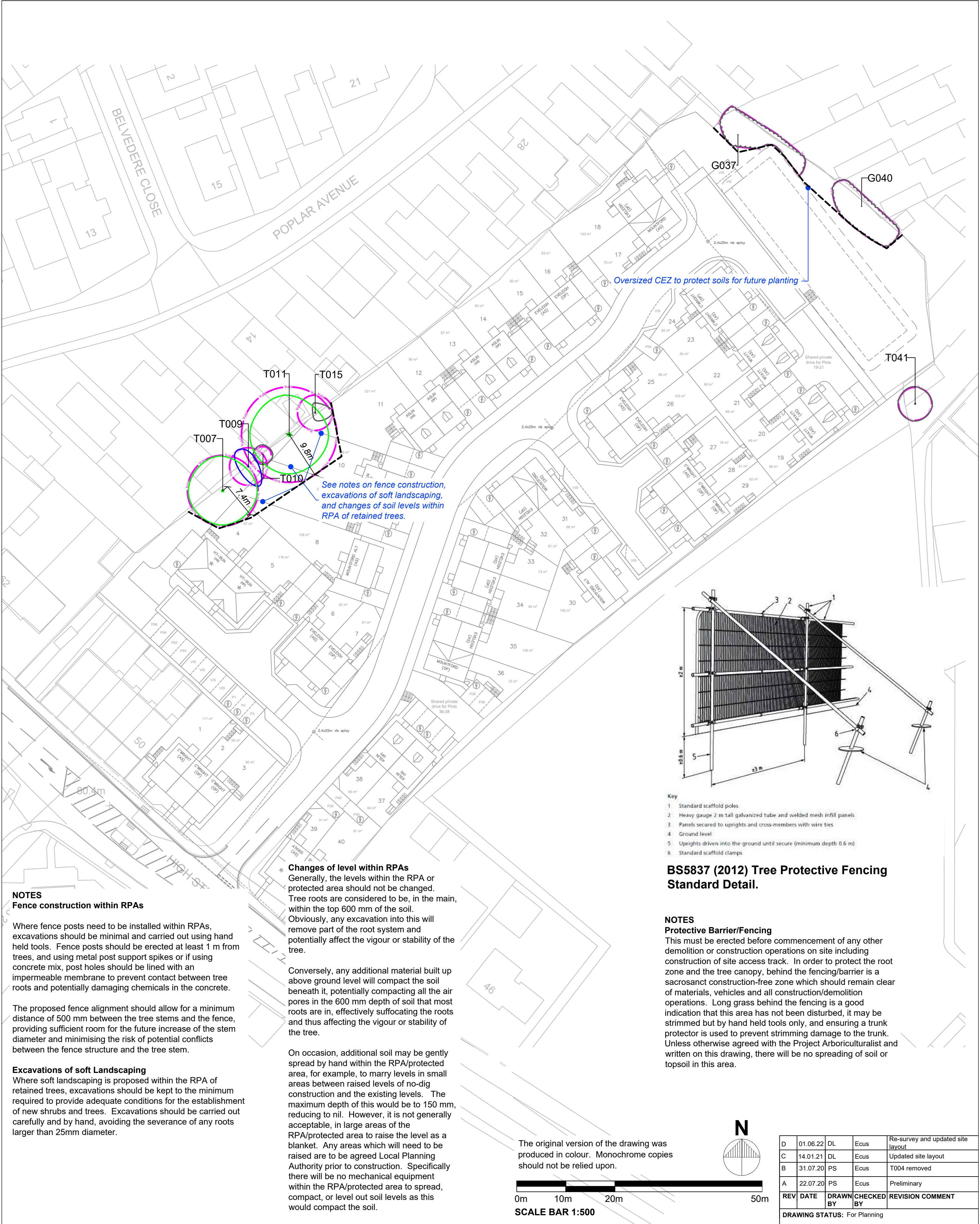
Category C Trees

Existing tree to be removed

Root Protection Area (RPA) of trees to be retained

D	01.06.22	DL	Ecus	Re-survey and updated site layout
C	14.01.21	DL	Ecus	Updated site layout
B	31.07.20	PS	Ecus	T004 removed
A	22.07.20	PS	Ecus	Preliminary
REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT
DRAWING STATUS: For Planning				

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Job High Street Shafton			
Title Figure 4.1 Arboricultural Impact Assessment			
By PS	Date July 2020	Scale @ A2 1:500	Drg. no. 19268-ARB-02



NOTES
Fence construction within RPAs

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, and using metal post support spikes or if using concrete mix, post holes should be lined with an impermeable membrane to prevent contact between tree roots and potentially damaging chemicals in the concrete.

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.

Excavations of soft Landscaping

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.

Changes of level within RPAs

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.

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.

BS5837 (2012) Tree Protective Fencing Standard Detail.

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.

GENERAL NOTES - Tree Protection Plan

- Drawing for Planning purposes only
- Refer to arboricultural report produced by ECUS Ltd titled High Street Shafton BS5837:2012 Tree Survey AIA, AMS.
- Based on topographic survey provided by RJP dated March 2020.
- Building layout and masterplan provided by Edward Architecture on drawing number 0812-EA-A-P002-S.
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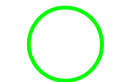
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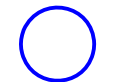
Trunk location from topographic survey

Trunk location approximated by ECUS

Tree categories (BS 5837:2012)



Category A Trees



Category B Trees



Category C Trees

Root Protection Area (RPA) of trees to be retained

Protective Barrier*
- BS5837 (2012), clause 6.2.2

*See note on drawing about Protective Fencing

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



SCALE BAR 1:500

D	01.06.22	DL	Ecus	Re-survey and updated site layout
C	14.01.21	DL	Ecus	Updated site layout
B	31.07.20	PS	Ecus	T004 removed
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REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT
DRAWING STATUS: For Planning				

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Title Figure 5.1 Tree Protection Plan			
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