BS5837:2012 -Trees in relation to design, demolition and construction. Arboricultural matters in relation to trees at The Grange, Infield Rd, Glatton.

Prepared by: East Midlands Tree Surveys Ltd.

Date: 17/10/2024

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1. Instructions

This report was commissioned by TMV Architects with instruction to carry out an inspection of trees located at the above address in line with *BS5837:2012 Trees in relation to design, demolition and construction - Recommendations.*

The objectives of this report are as follows:

1. To make an assessment of the trees' condition and identify any faults.
2. To provide Tree Constraints along with recommendations in line with BS5837:2012.
3. To provide an Arb Impact Assessment with tree protection measures and an Arb Method Statement in line with BS5837:2012.

2. Information supplied

EMTS were supplied with the following documents.

Title	Format	Provider
454 Site location and block plan	DWG	TMV Architects

Our plans are based on the above DWG files which were imported into our mapping software for revision.

3. Introduction

This document has been prepared to fulfil the requirements for the proposal in accordance with the Department for Communities and Local Government guidance on information requirements and validation and is set out in compliance with British Standard 5837 Trees in relation to design, demolition and construction recommendations 2012.

The initial tree survey is considered to be compliant with BS5837:2012.

All trees considered likely to be affected by the proposal were surveyed and the details are given in Appendix 1 Table.

A copy of the proposed layout has been provided.

Whilst the plans within this report are all to scale in terms of visual presentation, it is not possible to measure within each plan.

The tree numbers referred to in this report are the same as shown on the tree survey schedule and plan.

Only those trees directly implicated by the proposed installation have been assessed.

This report addresses the arboricultural issues relating to the proposed development at



the above site and identifies the arboricultural implications of the proposed development with a view to protecting the trees during the construction works by setting out the tree protection methods, construction techniques and working practices that are to be adopted on this site.

If all the guidelines and principles outlined in this report are not adhered to, as with all development sites, there is a risk that the construction activities will result in damage to and potentially the death of the retained trees. Damage to the trees will significantly increase the risk of their health declining and may increase the risk of their complete or partial failure.

The success of the recommendations set out in this report is dependent on the development adhering to the principles set out within, which are to be approved and enforced by the Local Planning Authority (LPA). If the recommendations contained within this document are acceptable to the LPA then it is suggested that they be controlled by standard planning conditions.

This report has been prepared to meet planning requirements and as such is not considered to be a condition survey, any obvious actionable defects will however be picked up as part of the assessment.

4. Site description

The site consists of a semi-mature tree frontage onto Infield Rd with access to the property.

5. Tree survey findings

The tree details can be found at Appendix 1.

6. Tree Constraints

The Tree Constraints can be found at Appendix 2.

7. Arboricultural Impact Assessment.

The proposed layout plan at Appendix 3 shows that the RPAs of retained trees along the frontage and some of those behind will be impacted upon in order to install the new wall and railings.

Quite clearly, a standard foundation cannot be used without compromising the roots of all of the trees along the frontage and potentially, some of those behind.

As such, it is considered that a pile and beam system will need to be utilised.

It is advised that a Structural Engineer is consulted with in order to arrive at an appropriate design/method statement in line with the generic guidance below.

1. Piles – the method of installation, be the piles driven or augured, will require some form of protection against ground compaction in tree protection zones. This is usually achieved with a piling mat of some form of bearing material (e.g. road planings) rolled onto geotextile membrane, which in turn should be laid over a woodchip mulch to dissipate ground loading and provide a visual demarcation to the existing ground level

when the mat is taken up. Whether the mat needs to be taken up after the operation will depend on circumstances, but it is usually good practice to do so.

The other factor is headroom. Clearly some judgement of clearance to trees is required. This can be carried out by either pruning or tying back branches, once the design is finalised the Structural Engineer should advise on required working space in relation to the proposed construction.

The main loss of root mass from pile installation is the pile cap, as this usually has to be under the ground surface level. Calculations as to the area of roots lost must include a "plume" of loss roots extending away from the tree from each pile cap to the edge of the Root Protection Area. Depending upon the soil type and other site circumstances this plume may be three or four times the area of the pile cap if entirely within the Root Protection Area.

2. Beams – referred to as ground beams. Normally a ground beam will be designed to have its top edge more or less level with the ground. The principle of root protection is the recognition that the majority of the assimilative root mass is shallow, averaging no more than 60 centimetres in depth. Where a beam crosses a tree protection zone it must not be any deeper than can be accommodated in an excavation of an absolute maximum of 10 centimetres in depth. This allows for positive contact with the ground to provide a barrier to rodents.

Where the soil is shrinkable there may be a need for a compressible zone beneath the beam, often 15–20 centimetres. That roots might be severed to this depth is unacceptable. An acceptable method is to use some form of expanded polystyrene as the compressible material that can be cut or inserted between roots. The "trench" is opened using either a water jet or compressed air jet so that roots are not severed. (This former method can be messy but can be contained using tarpaulin screens). An assessment of the exposed roots can then be made to determine a sensible degree of pruning. This must strike the correct balance between retaining as much root material as possible whilst allowing the compressible material to be structurally coherent.

The other factor with a ground beam that protrudes above ground level is its architectural or cosmetic appearance. It is possible to attach some form of bonded finish, but it is also practical to cast or weld a ledge extending outwards at ground level to support facing brickwork or other material. Building up a sloping shoulder of soil may only be possible in exceptional circumstances. Ducted rainwater to the underneath may also be necessary if the building covers a significant proportion of the Root Protection Area.

3. Tree pruning/overhead workspace - It is suggested that the roadside trees and up the existing driveway are all crown lifted to 3m, this will provide ample workspace.

Thereafter, the site manager in conjunction with the representative for the appointed pile and beam company will assess workspace. Branches will preferably be tied back, if pruning is required, this will be approved by either EMTS or the LPA.

4. Gate posts – these will be hand dug, if any roots greater than 25mm are encountered, the hole will be repositioned. Any roots less than 25mm will be severed with a clean, sharp hand tool.



If the situation arises whereby roots greater than 25mm have to be severed, EMTS will be contacted to advise.

The dug holes will be lined with polythene if a concrete mix is used.

As a general concept, if roots are encountered during any of these works, then they must be worked around or pruned back carefully and sensitively to beyond the work area using hand tools such as pruning saw or secateurs. The pruning/cutting of roots greater than 20mm diameter must be carried out under the supervision of an arboriculturist. The cuts should be left clean with the smallest surface area possible without rips. Roots left exposed for more than one working day should be covered by damp sacking or similar to prevent drying and re-buried as soon as possible thereafter.

5. Anti-compaction measures –

Ground compaction measures will be required as the majority of the works will be within the RPAs of the trees.

8. Arboricultural Method Statement & Tree Protection detail.

8.1 Sequenced Methods of Demolition, Construction and Tree Protection

With reference to relevant published guidance, the methodology of this statement follows a logical sequence essential to the efficacy of the protection measures. Reference may include: British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations; British Standard BS3998:2010 Tree Work. It is essential to the successful implementation of the principles set out in this document that effective supervision and enforcement are put in place from the outset.

8.2 Phase 1 – Undertake tree works.

Crown raise all roadside and driveway trees to 3m.

Tree work requires skilled operators to perform pruning tasks in order to maintain the health and safe useful life expectancy of the trees, it is strongly recommended that construction staff DO NOT carry out any tree works.

Additional to this, a legal Duty of Care requires that all works specified should be carried out by qualified arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health and Safety Executive guidelines. All works should be carried out in accordance with British Standard BS3998:2010 Recommendations for Tree Work.

Particular care needs to be addressed in dealing with legally protected species such as nesting birds and roosting bats which are protected under the Wildlife and Countryside Act 1981 (as amended) from intentional harm and killing and applies to roosting and hibernating bats and active bird nests. The protection of bird nests applies between mid-February to August inclusive.

8.3 Phase 2 - Tree Protection Fencing

The Tree Protection Plan can be found at Appendix 4.

Fence run 1 will start 2m from the proposed new gate post and is to follow the existing gravel drive, thereafter, encompassing the remainder of the trees within the group terminating at the western boundary.

Fence run 2 will also start 2m from the proposed gate post follow the existing drive and cut across under the trees to the eastern boundary roughly at the indicated position.

The specification will be as per figure 3 of BS 5837:2012 (see Appendix 5) in order to minimise the risk of damage to roots.

The fencing to remain in place throughout the installation phase.

Outside the fenced zone, no materials or chemicals should be stored at any time, no fires should be lit, no pedestrian or vehicle traffic, and level changes within these areas should be kept to an absolute minimum. Every effort should be taken to protect a maximum possible area of the root system.

Clear notices are to be fixed to the outside of the fencing with words such as

'TREE PROTECTION AREA – NO ACCESS OR WORKING WITHIN THIS AREA'.

See Appendix 6. These notices shall be A3 in size, laminated and fixed to the fencing using suitable aids such as tie wires.

The existing hard standing is to be used for the storage of materials during the construction Phase.

8.4 Ground protection measures.

Outside of the site along the frontage, the RPAs will be protected by either hired in sheets 1.2-1.5m wide depending on product, or, 4 inches of wood chip on top of scaffold boards.

This prescription will be guided by the machinery that installs the piles.

If these measures can not work do to moving machinery on a slope, the appointed pile company will provide an alternative Method Statement to the LPA covering anti-compaction measures.

The site agent, all contractors and other relevant personnel are to be informed of the role of the Tree Protection Fencing and their importance.

A copy of the Tree protection Plan & Method Statement to be kept on site at all times.

An arboriculturist should be consulted where required during the construction process to address any issues that might arise regarding tree retention, protection, and management. It is the responsibility of the site owner, manager, and main contractor to ensure that any tree protection or other relevant planning conditions, or TPO's are adhered to. A breach of a planning condition or TPO may result in enforcement action by the LA.

[redacted]

17/10/2024

[redacted] **– Director, East Midlands Tree Surveys LTD.**

Tech Cert (Arbor A), NDF For

East Midlands Tree Surveys

Appendix 1 - Tree Survey Data

BS5837 Report

TMV Architects

The Grange, Infield Road, Glatton

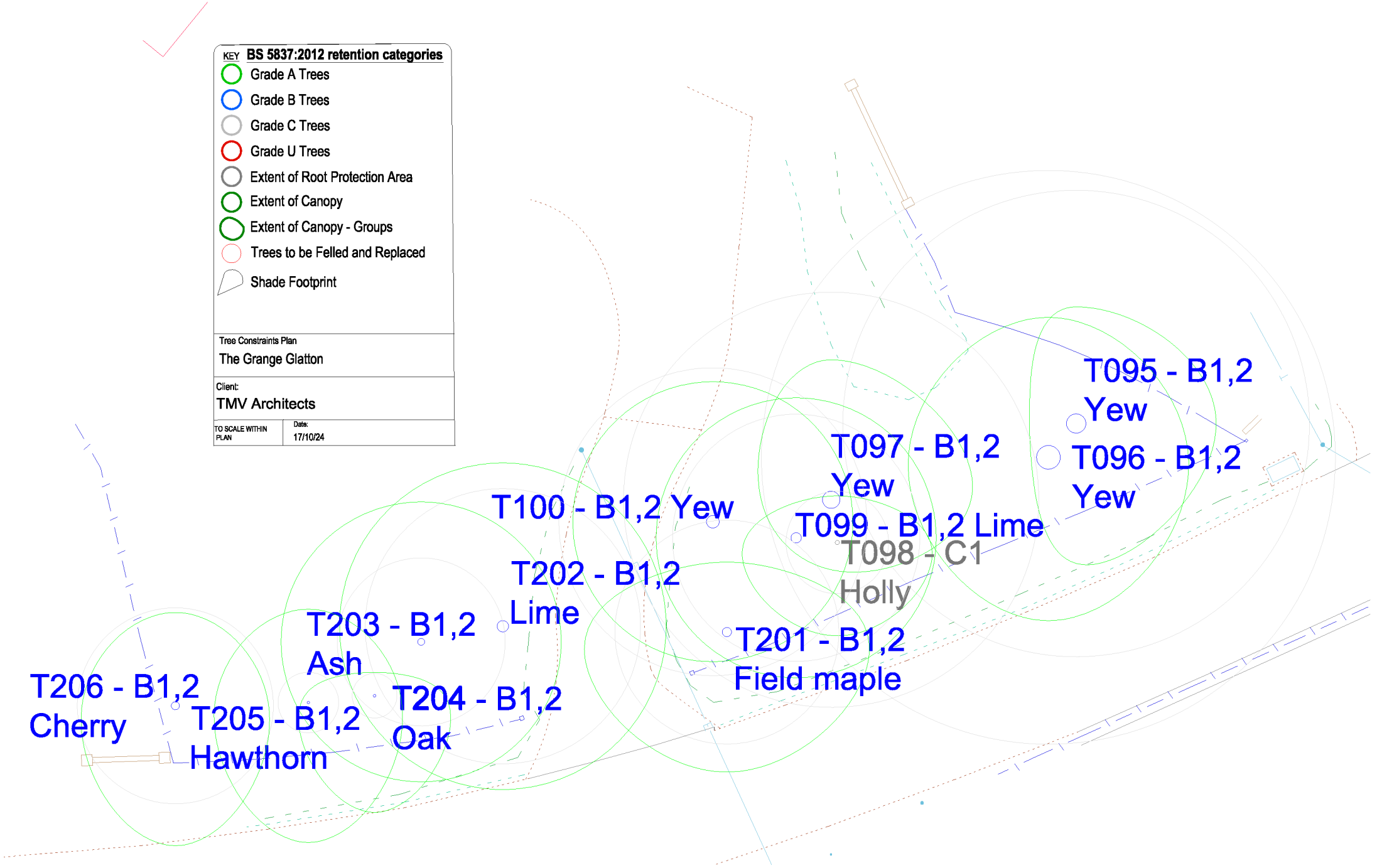


Retention Category	No. trees	Rem. Contrib.	No. trees
B	11	20+ Years	1
C	1	40+ Years	11
Total	12		

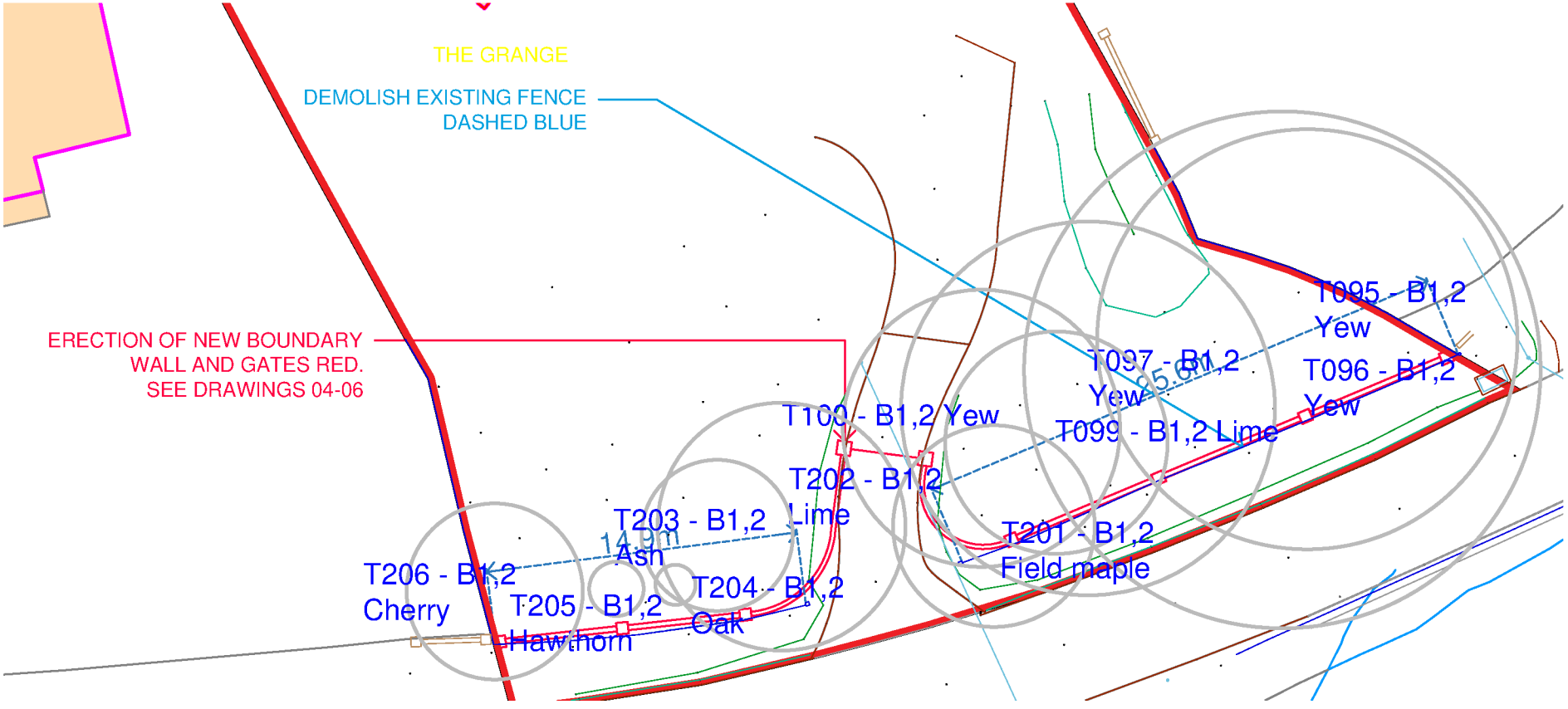
Ref.	Species	Full Structure	Measurements	Survey Notes	Retention Category	RPA	Condition	Recommendations
T095	Yew *(Taxus sp.)*	Tree 3 stems	Height (m): 10 3 stems, avg.(mm): 480 Spread (m): 5N, 6E, 6S, 2W Crown Clearance (m): 1 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Trunk - codominant at 1.8m Trunk - ivy/climber Trunk - old pruning wounds/stubs Crown - suppressed Crown - minor deadwood < 100mm Crown - major deadwood >100mm Poor form	B1,2	Radius: 10.0m. Area: 314 sq m.	Physiological Cond: Good Structural Cond: Fair Public Visual Amenity value: High	Sever ivy at base.
T096	Yew *(Taxus sp.)*	Tree 3 stems	Height (m): 16 3 stems, avg.(mm): 590 Spread (m): 6N, 6E, 7S, 6W Crown Clearance (m): 1 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Trunk - codominant at 2m Trunk - ivy/climber Trunk - old pruning wounds/stubs	B1,2	Radius: 12.3m. Area: 475 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	Sever ivy at base.
T097	Yew *(Taxus sp.)*	Tree 3 stems	Height (m): 13 3 stems, avg.(mm): 430 Spread (m): 6N, 6E, 3S, 3W Crown Clearance (m): 1 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Trunk - codominant at 1.6m Trunk - ivy/climber Trunk - old pruning wounds/stubs Crown - asymmetric Crown - part suppressed	B1,2	Radius: 8.9m. Area: 249 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	Sever ivy at base.
T098	Holly *(Ilex sp.)*	Tree	Height (m): 7 Stem Diam(mm): 180 Spread (m): 2N, 4E, 4S, 4W Crown Clearance (m): 2 Life Stage: Mature Rem. Contrib.: 20+ Years	Crown - minor deadwood < 100mm Crown - thin foliage Appears to be in decline Trunk - leaning >30° Crown - suppressed	C1	Radius: 2.2m. Area: 15 sq m.	Physiological Cond: Poor Structural Cond: Poor Public Visual Amenity value: High	No action required.
T099	Lime *(Tilia sp.)*	Tree	Height (m): 20 Stem Diam(mm): 440 Spread (m): 6N, 6E, 6S, 6W Crown Clearance (m): 0 Life Stage: Mature Rem. Contrib.: 40+ Years	Trunk - codominant at 4m Crown - minor deadwood < 100mm Trunk - old pruning wounds/stubs Trunk - epicormics/suckers	B1,2	Radius: 5.3m. Area: 88 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	Epicormic removal.
T100	Yew *(Taxus sp.)*	Tree 3 stems	Height (m): 15 3 stems (mm): 270,240,410 Spread (m): 6N, 6E, 6S, 6W Crown Clearance (m): 2 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Trunk - codominant at 1m Trunk - ivy/climber Trunk - old pruning wounds/stubs	B1,2	Radius: 6.6m. Area: 137 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	Sever ivy at base.
T201	Field maple *(Acer campestre)*	Tree	Height (m): 15 Stem Diam(mm): 400 Spread (m): 3N, 6E, 6S, 6W Crown Clearance (m): 2 Life Stage: Mature Rem. Contrib.: 40+ Years	Trunk - codominant at 3m Trunk - ivy/climber	B1,2	Radius: 4.8m. Area: 72 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	Sever ivy at base.
T202	Lime *(Tilia sp.)*	Tree 2 stems	Height (m): 20 2 stems (mm): 330,360 Spread (m): 7N, 7E, 7S, 7W Crown Clearance (m): 0 Life Stage: Mature Rem. Contrib.: 40+ Years	Trunk - codominant at ground level Crown - minor deadwood < 100mm Trunk - old pruning wounds/stubs Trunk - epicormics/suckers	B1,2	Radius: 5.9m. Area: 109 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	Epicormic removal.

Ref.	Species	Full Structure	Measurements	Survey Notes	Retention Category	RPA	Condition	Recommendations
T203	Ash *(Fraxinus sp.)*	Tree	Height (m): 18 Stem Diam(mm): 300 Spread (m): 6N, 6E, 6S, 6W Crown Clearance (m): 4 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Trunk - ivy/climber Trunk - leaning 15° to 30° Crown - suppressed due to competition	B1,2	Radius: 3.6m. Area: 41 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	No action required.
T204	Oak *(Quercus sp.)*	Tree	Height (m): 12 Stem Diam(mm): 80 Spread (m): 1N, 3E, 5S, 3W Life Stage: Young Rem. Contrib.: 40+ Years	Crown - suppressed	B1,2	Radius: 9.6m. Area: 290 sq m.	Physiological Cond: Good Structural Cond: Good Public Visual Amenity value: High	No action required.
T205	Hawthorn *(Crataegus sp.)*	Tree	Height (m): 8 Stem Diam(mm): 110 Spread (m): 4N, 4E, 6S, 4W Crown Clearance (m): 2 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Crown - minor deadwood < 100mm Trunk - old pruning wounds/stubs	B1,2	Radius: 1.3m. Area: 5 sq m.	Physiological Cond: Fair Structural Cond: Fair Public Visual Amenity value: High	No action required.
T206	Cherry *(Prunus sp. 'Cherry')*	Tree	Height (m): 10 Stem Diam(mm): 350 Spread (m): 4N, 4E, 6S, 4W Crown Clearance (m): 2 Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Unable to survey effectively due to heavy ivy/vegetation Trunk - ivy/climber Crown - asymmetric Crown - suppressed	B1,2	Radius: 4.2m. Area: 55 sq m.	Physiological Cond: Fair Structural Cond: Fair Public Visual Amenity value: High	Sever ivy at base.

Appendix 2. Tree Constraints Plan



Appendix 3. Arb Impact Assessment



Appendix 4. Tree Protection plan

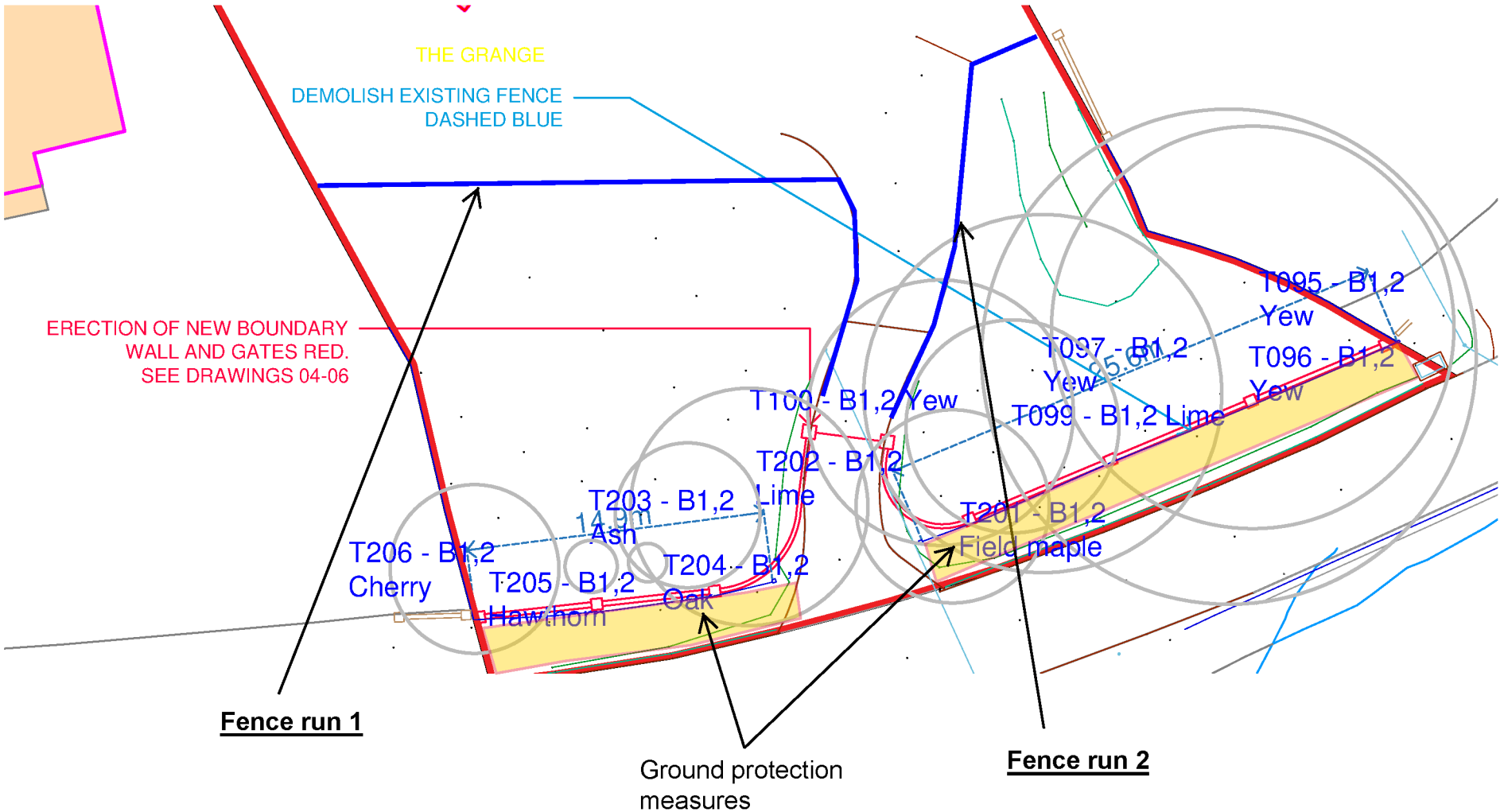
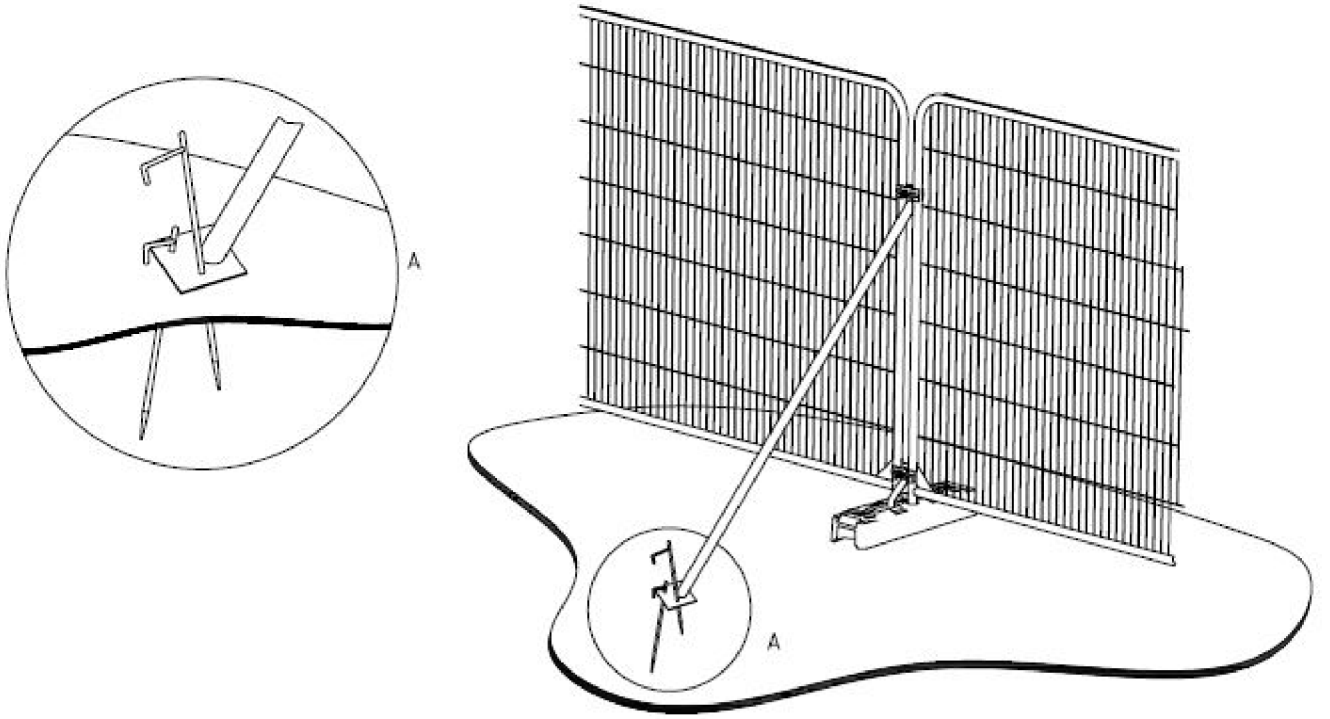
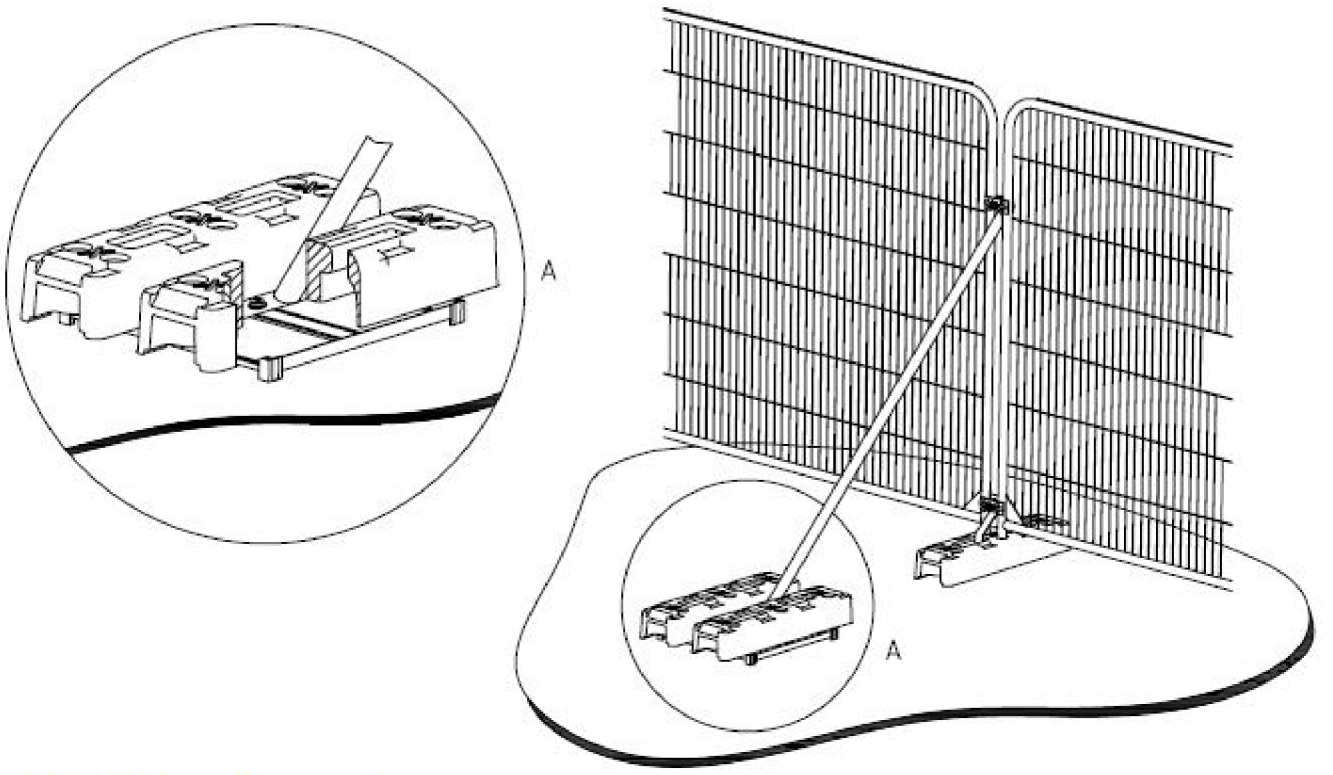


Figure 3 Examples of above-ground stabilizing systems



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Appendix 6. Signs





Appendix 7. Tree survey

The trees were assessed objectively using 'Visual Tree Assessment' (VTA) techniques from the ground. VTA is a methodology, employed by arboriculturists, to evaluate the structural integrity of a tree, relying on observation of a trees biomechanical and physiological features; this is the method generally adopted and is appropriate in this instance. The survey includes an individual tree number listed sequentially, tree Species in both its common and botanical name, its height, stem diameter measured at 1.5m from ground level, spread of the radius of the crown by cardinal points, height of the crown above ground level, age classification its general condition and any general conditions structural or biological defects noted during the survey. An estimate of the remaining safe life expectancy (SLE) and the category as defined in BS 5837:2012 Recommendations cascade chart for tree quality assessment.

The root protection area (RPA) will be calculated from the stem diameter and this will identify the area which will require special protection during the works.

Trees on the site have been divided into one of four categories (based on the cascade chart for tree quality assessment). These are classed as A, B, C or U (Section 4 of BS 5837) within the table in Appendix 1, Table 2. This gives an indication as to the tree's importance in relation to the site, the local landscape and, also, the value and quality of the existing trees on site. This assists informal decisions concerning which trees should be removed or retained should development occur. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).

Categories A, B and C cover trees that should be a material consideration in the development process, each with three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural (nature conservation) values. Category U trees may have no significant landscape value, but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. In assigning trees to the A, B or C categories, and the presence of any serious disease or tree–related hazard is taken into account. If the disease is considered fatal and/or irremediable, or likely to require sanitation for the protection of other trees it may be categorised as U with a recommendation for work or even removal, even if they are otherwise of considerable value.

Category (A): Trees whose retention is most desirable and are of high quality and value. These trees are considered to be in such a condition as to be able to make a lasting contribution (a minimum of 40 years) and may comprise:

(i) Trees which are particularly good examples of their species especially rare or unusual, or essential components of groups or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue);



(ii) Trees, or groups of trees which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups);

(iii) Trees or groups of significant conservation, historical, commemorative or other value (e.g. Veteran or wood-pasture trees).

Category (B): Trees whose retention is considered desirable and are of moderate quality and value. These trees are considered to be in such a condition as to make a significant contribution (a minimum of 20 years) and may comprise:

(i) Trees that might be included in the high category but because of their numbers or slightly impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage), are downgraded in favour of the best individuals;

(ii) Trees present in numbers such that they form distinct landscape features and attract a higher collective rating than they would as individuals. Individually these trees are not essential components of formal or semi-formal arboricultural features, or trees situated mainly internally to the site and have little visual impact beyond the site;

(iii) Trees with clearly identifiable conservation or other cultural benefits.

Category (C): Trees that could be retained and are considered to be of low quality and value. These trees are in an adequate condition to remain until new planting could be established (a minimum of ten years) or are young trees with a stem diameter below 150 mm and may comprise:

(i) Trees not qualifying in higher categories;

(ii) Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value and or trees offering low or only temporary screening benefit;

(iii) Trees with very limited conservation or other cultural benefits.

Category (U): Trees that are considered to have no significant landscape value, but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. These trees will be in such a condition that any existing value would be lost within 10 years and which should in the current context be ignored or removed for reasons of sound arboricultural management. Trees within this category are:

(i) Trees that have a serious irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees;

(ii) Trees that are dead or are showing signs of significant, immediate or irreversible overall decline;



(iii) Trees infected with pathogens of significance to the health and or/safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality.

All U Category (poor quality) trees should generally be removed for reasons of sound arboricultural practice or health & safety, irrespective of any development proposals, unless they offer particular conservation value to the site, in which case this will be highlighted in the survey schedule along with appropriate recommendations.

As regards the C category trees, it may not always be possible or even desirable to retain low quality trees within the context of a proposed development, unless in such a location that they do not represent a significant constraint on the design brief. Young trees, and those with a stem diameter of less than 150mm, will normally be placed in the C category, unless it is considered that they are of especially good form or are of a species that is particularly rare, in which case they may be upgraded.

All A & B Category trees (high & moderate quality) will under normal circumstances be retained on development sites, and should ideally influence and inform the conceptual design, site layout, and in some cases the specific construction methods to be used – The root protection area and/or crown spread of these trees will generally form a construction exclusion zone, although under certain circumstances it may be possible to build or operate within these areas providing that appropriate measures and specifications have been formally agreed between the local planning authority, the consulting arborist and the developer/client.

The Soil type was not assessed.

This report is valid for two years from the date of site inspection. The condition of trees can change following severe weather conditions, the effects of diseases and pests, and other abiotic factors.

Appendix 8. Legal Constraints

Where Local Planning Authorities can assess trees as beneficial to the wider community in terms of their amenity value, they may be protected by a Tree Preservation Order (TPO).

In certain areas classified as Conservation Areas, all trees with a stem diameter of 75mm (measured at 1.5m above ground) are protected by Conservation Area legislation. The LPA must be given notice of any work intended so they can visit the site and then either protect the tree(s) with a TPO or allow the works to go ahead. Their decision must be made within a six-week period. If no decision is made within the six-week period, the work may be carried out, providing it is done within a two-year period.

If trees protected by a TPO or within conservation areas are cut-down, topped, lopped, uprooted or wilfully damaged or destroyed, the owner of the tree(s) and the contractor responsible for the work can both be legally prosecuted. The current maximum fine is £20,000 per tree at the Magistrates Court or unlimited fine at the Crown Court.



Trees that are dead or dangerous are exempt from legislation. It is common good practice to notify the LPA of intention to carry out work to trees that fall into these categories, preferably with some notice (e.g. one working week).

A leaflet produced by the DTLR (Protected Trees), covers the issues raised by this legislation.

Any works prescriptions for protected trees can be dealt with by way of inclusion into a Planning Application for development purposes; this avoids the need to make a separate tree application.

A check with the Local Planning Authority has not been carried out.

Statutory wildlife obligations: The Wildlife and Countryside Act 1981 as amended by the Countryside and The Habitat Regulations 2012 and The Conservation of Habitats and Species Regulations 2017 provide statutory protection to birds, bats and other species that inhabit trees. All tree work operations are covered by these provisions and advice from an ecologist should be obtained before undertaking any works that might constitute an offence.

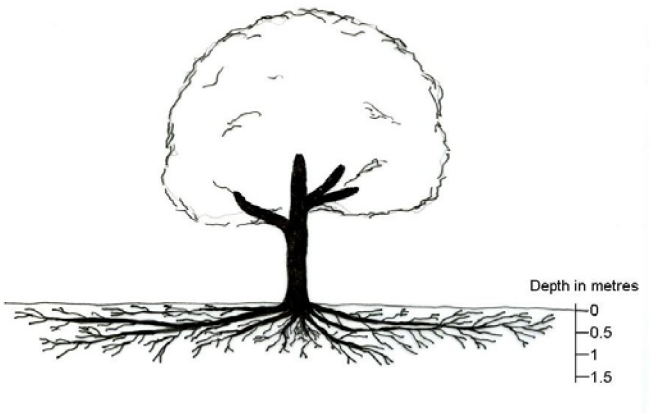
Appendix 9. Arboricultural considerations in relation to development.

Rooting structure

Rooting structure is a key issue when dealing with trees and development. To ensure the survival of trees the British Standard Institute has introduced the concept of a Root Protection Area (RPA). The RPA is an area surrounding a tree that contains sufficient rooting volume to ensure the tree's survival and is represented in square metres. (BS5837 2012 discusses the extent and for of a trees root system.)

The following diagram represents the typical rooting pattern of a tree. Note that 90% of the trees roots are usually located within the top 1m of soil and that roots may spread well beyond the canopy. Therefore, no works are allowed within the RPA. Even a small trench 0.5 metres deep to accommodate a cable or drain may lead to the loss of the tree. When work is proposed or is absolutely necessary within the RPAs of retained trees the proposals will only be considered if supported by an agreed robust and realistic Arboricultural Method Statement, following recommendations within BS 5837 2012.

Typical rooting structure of a tree



To successfully integrate trees into a development it will be necessary to allow enough space in the design to allow trees to mature and flourish and to agree protection measures during the entire construction phase. Trees should be considered at the earliest design stage to allow them to be successfully integrated into new development, a survey of trees on and adjacent to the site should be one of the first steps in the design process.

How can trees be damaged?

Compaction of the soil

When soil is compacted, the soil structure is damaged by removing the spaces between soil particles preventing the exchange of gases and uptake of nutrients by trees. The storage of materials, including bricks, soil, gravel and cement, and the movement of vehicles can cause compaction. One vehicle movement can cause sufficient compaction to damage a tree. Compacted ground may alter soil drainage, resulting in the ground becoming waterlogged. The storage of materials and the movement of vehicles within RPAs will only be permitted when it is shown to be absolutely necessary and supported by an agreed robust and realistic Arboricultural Method Statement.

Excavations

Excavations within the RPA are likely to cause root severance. This may lead to loss of vigor, reduced uptake of water and nutrients, allow access for decay organisms and may compromise the tree's stability. Under exceptional circumstances, where excavation may be justified, hand digging will be required and the presence of an arboricultural consultant to supervise the works will be required on site.

Ground level changes

Both reduction and raising of soil levels can be detrimental even if this is only by a few centimeters. Reducing ground levels may sever roots and can increase the drainage of a site thereby reducing water availability. Raising ground levels can cause compaction and suffocate roots. There will be a presumption against the changing of ground levels within RPAs. Changing of ground levels within RPAs will only be permitted when it is

shown to be absolutely necessary and supported by an agreed robust and realistic Arboricultural Method Statement.

Impact damage

This can be caused by machinery and includes torn branches, and damage to bark and trunk. Damaged areas of trees can allow the entry of decay organisms and reduced vigour. There will be a presumption against the movement of machinery and equipment within RPAs. The movement of machinery and equipment will only be permitted when it is shown to be absolutely necessary and supported by an agreed robust and realistic Arboricultural Method Statement.

Soil contamination

This can be caused by the spillage of oil, fuel and chemicals, mixing cement or other materials. To prevent leaching through the soil where significant tree roots can be found, all chemicals should be kept in a safe storage area downhill from trees at least 10m from the RPA. There will be a presumption against the storage of chemicals within 10m of the RPAs of retained trees and storage will only be permitted when it is shown to be absolutely necessary and supported by an agreed robust and realistic Arboricultural Method Statement.

Fires

Conducted and radiated heat as well as flames will damage trees resulting in the loss and damage to both major and fibrous roots, and damage to the trees vascular system under the bark even if the bark does not appear burnt. Keep fires a minimum of 10m from the outer crown spread of any retained trees or vegetation. If this clearance is not achievable, all waste must be disposed of off-site.

Appendix 10. Biosecurity advice

Please see the Forestry Commission's latest guidance in relation to biosecurity.

Biosecurity measures are a series of precautionary steps designed to reduce the risk of transmission of harmful organisms and must address 'movement pathways' for such organisms. In the context of the following guidance, good biosecurity practice refers to ways of working that minimise the risk of contamination and the spread of pests and invasive plants. Unless stated otherwise, the term "pest" should be taken to include all invertebrate, bacterial or fungal organisms that are harmful to trees. The term does not refer to other threats to trees such as deer or grey squirrels. https://www.forestresearch.gov.uk/documents/5498/FC_Biosecurity_Guidance_Y6HQJHZ.pdf