

Arboricultural Assessment & Method Statement
East Leigh House, Bartons Road, Havant

David Cashman DipArb CUEW FArborA MICFor

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The logo for Barrell Tree Consultancy. It features the word "barrell" in a bold, lowercase, sans-serif font. To the right of the text is a stylized graphic of a tree with a purple trunk and branches. Below the word "barrell" is the text "TREE CONSULTANCY" in a smaller, uppercase, sans-serif font.

barrell
TREE CONSULTANCY

Report purpose, validation statement and tree protection plan

Report purpose

This is a BS 5837 compliant arboricultural assessment report providing sufficient information for the Local Planning Authority ("LPA") to consider the effect of the proposed development on local character from a tree perspective. It includes an analysis of how trees will be affected and an arboricultural method statement describing how retained trees will be protected and managed during the development activity. It is fully in line with the BS 5837 advice relating to the planning application stage of the process highlighted in Table B1 reproduced below:

Table B.1 Delivery of tree-related information into the planning system

Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention/removal plan (draft)
Planning application	Tree survey (in the absence of pre-application discussions) Tree retention/removal plan (finalized) Retained trees and RPAs shown on proposed layout Strategic hard and soft landscape design, including species and location of new tree planting Arboricultural impact assessment	Existing and proposed finished levels Tree protection plan Arboricultural method statement - heads of terms Details for all special engineering within the RPA and other relevant construction details
Reserved matters/ planning conditions	Alignment of utility apparatus (including drainage), where outside the RPA or where installed using trenchless method Dimensioned tree protection plan Arboricultural method statement – detailed Schedule of works to retained trees, e.g. access facilitation pruning Detailed hard and soft landscape design	Arboricultural site monitoring schedule Tree and landscape management plan Post-construction remedial works Landscape maintenance schedule

Validation statement

For LPA validation purposes, this report includes:

- a **BS 5837 compliant tree survey**, including a tree protection plan showing the location of the existing trees, their categorisation, the location of the new structures and hard surfacing, and the tree protection measures;
- an **arboricultural assessment** in Section 1, which describes how the development proposal will affect local character from a tree perspective;
- an **arboricultural method statement** in Section 2 describing the tree protection and management measures, and how they should be implemented; and
- two **appendices** in Section 3 setting out the background administrative information and a schedule of tree information.

Report purpose, validation statement and tree protection plan

The tree protection plan

More specifically, the tree protection plan is based on the provided information and it should only be used for dealing with the tree issues. It shows:

- the existing trees numbered, with high/moderate categories (A & B) highlighted in green triangles and low/unsuitable categories (C & U) highlighted in blue rectangles;
- the circular interpretation of root protection areas ("RPA") of category A, B and C trees (grey circles);
- the trees to be removed indicated by a red number and crown outline;
- the location of the construction exclusion zone ("CEZ"), which is the area of restricted access, to be protected by temporary barriers (fencing and/or ground protection); and
- the location of precautionary areas outside the CEZ where limited, but careful access is permitted.

Summary

1. The development proposal

The development proposal by Mildren Homes Central Limited is to retain and make alterations to the existing building and construct a 9 unit mixed use residential development within the grounds at East Leigh House, Bartons Road, Havant. Planning consent was granted by Havant Borough Council on 27 January 2017, (Council reference: APP/16/01077). This report provides additional information as set out within planning condition number 9 of that consent.

2. Background administrative information

Our instructions, how we prepared this report and other relevant background information is explained in Appendix 1. All the trees that could be affected were inspected and that information is listed in Appendix 2.

3. Table 1: Summary of category A, B and C trees to be removed, pruned or protected using special precautions

	British Standard 5837 Category		
	A (High quality)	B (Moderate quality)	C (Low quality)
Remove	-	-	G5, G6, G7, G8, G9, 10, G13, G15, 16, 17, 32, G39, 40, 41, 42, 43
Prune	-	-	-
Protect using special precautions	-	1, 2, 4, 24, 25	-

G = Group

Note: Category U trees are in such poor condition they would be removed irrespective of development and they are not included in this summary.

4. Table 2: Summary of the impact on local character of tree removal and proposed mitigation

	Tree number(s)	Impact on local character	Mitigation
Remove	G6, G7, G8, 10, G13, G39, 40, 41, 42, 43	Limited impact: Visible in glimpses from outside the site, but not individually prominent. Removal will be noticeable in the immediate vicinity in the short term, but there will be no significant visual impact in the wider setting beyond the short term.	New tree planting
	G5, G9, G15, 16, 17, 32	No impact: Low category and not important. Limited pruning will have no significant visual impact.	New tree planting

5. Table 3: Extra precautions in addition to primary protection using barriers (fencing and ground protection)

Activities requiring extra precautions	Tree number(s)
Pollution control near retained trees	All trees
Cranes near retained trees	All trees
Installation of new surfacing and/or upgrading of existing surfacing in RPAs	1, 2, 4, 24, 25
Installation of new services and/or upgrading of existing services in RPAs	All trees

Note: The detailed analysis explaining how these trees will be protected is provided in Section 2 of this report. The approximate locations of the protective measures are shown on the tree protection plan. It is likely that some details of the tree protection will need to be refined in response to a planning condition, once consent is issued.

6. Enhancement through new tree planting

Summary

In order to increase the contribution of trees to local character, a comprehensive new landscape scheme is included as part of the proposal including new extra heavy-standard and semi-mature trees to be planted around the site in sustainable locations. The new trees would have the potential to reach a significant height without excessive inconvenience to adjacent occupants, representing an overall enhancement of tree cover in the area.

7. Overall assessment of how the development proposal will affect local character from a tree perspective

This proposal will result in the loss of several trees that are all low category because of their poor condition or small size. There is plenty of space for tree planting and a comprehensive new tree planting scheme using extra heavy standard and semi-mature stock is included as part of the proposal. The size of these new trees and their future growth will significantly enhance the contribution of this site to local character and more than compensate for the loss of existing trees. The construction activity may affect further trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the development proposal will have no significant impact on the contribution of trees to character in the wider setting. Indeed, the new sustainable planting proposals will increase the potential of the site to contribute to local character well beyond the short term.

Section 1

Arboricultural assessment

This arboricultural assessment has taken account of all the recommendations set out in 5.4 of BS 5837 (reproduced courtesy of BSI below).

5.4 Arboricultural impact assessment

5.4.1 The project arboriculturist should use the information detailed in 5.2 and 5.3 to prepare an arboricultural impact assessment that evaluates the direct and indirect effects of the proposed design and where necessary recommends mitigation.

5.4.2 The assessment should take 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 should be taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil.

NOTE Scaled cross-sections and other drawings might be required to demonstrate the feasibility of the proposals (see Annex B).

5.4.3 As well as an evaluation of the extent of the impact on existing trees, the arboricultural impact assessment should include:

- a) the tree survey (see 4.4);
- 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 (see 5.2) and draft tree protection plan (see 5.5);
- h) issues to be addressed by an arboricultural method statement (see 6.1), where necessary in conjunction with input from other specialists.

Section 1: Arboricultural assessment

8. Relevant background information that has influenced this assessment – strategic and policy considerations

The Climate Change Act (2008) sets out a statutory strategic need to adapt to climate change at a national and local level, which is reiterated through the emphasis on sustainability in the National Planning Policy Framework. It is now widely accepted that trees offer significant climate adaptation benefits to the built environment where people live and work. These benefits include, amongst others, the buffering of temperature extremes and the buffering of rainwater runoff, which can significantly reduce the adverse impacts of climate change.

Additionally, there is an increasing body of research providing reliable evidence that trees impart other significant health-related benefits to the people that live and work near them. These benefits include, amongst others, the potential to improve psychological wellbeing by reducing stress and anxiety through the relaxing nature of their presence. It seems that access to greenspace and trees makes people happier and encourages them to take more exercise, which has a direct and positive impact on physical health and wellbeing. On a subtler level, the ecological enhancement that can be achieved through appropriate tree management makes a positive contribution to environmental sustainability.

These concepts are explored and set into a built-environment context in the recent Trees and Design Action Group's publications *Trees in the Townscape: A Guide for Decision Makers* and *Trees in Hard Landscapes: A Guide for Delivery*. Furthermore, specific advice on planting new trees is provided in British Standard 8545 (2014) *Trees: from nursery to independence in the landscape – Recommendations*. We have given significant weight to the guidance set out in these documents, which is reflected in the analyses in this report.

In line with these references, we agree with and support the general principle that more and bigger trees will deliver more benefits from their presence. Although this must be applied with balance and intelligence, it nonetheless remains an important guiding principle in the planning process and it has been an influential consideration in our analysis on this site.

9. Relevant background information that has influenced this assessment – future pressure to fell

If trees are retained or planted too close to occupied buildings and/or garden amenity space, it is sometimes claimed that they can cause excessive shade or anxiety, which interferes with the normal use of the property. In extreme cases, this can result in pressure from future owners to fell or severely prune, thus reducing the long-term contribution of the trees to local character. However, in our experience, these problems are extremely rare and there is very little evidence that such pressures ever result in any significant harm to the wider setting. Indeed, there is an increasing body of evidence that the benefits from trees close to occupied areas significantly outweigh any disadvantages caused by shade or anxiety. Furthermore, important trees can be protected using tree preservation orders, which come with an overarching presumption to retain protected trees unless the normal use of the property is harmed to a significant extent. To our knowledge, there is no published evidence to support that trees are being lost to the detriment of local character for these reasons. We have considered these concerns in our analysis for this site and my conclusions take full account of those important issues. In this case, there are no trees close enough to proposed occupied buildings where they are likely to interfere with their normal use.

10. Trees to be protected through the use of special precautions

All the retained trees will be protected from damage using barriers (fencing and ground protection). Additionally, in the precautionary area shown on the tree protection plan with the yellow highlighting, special precautions relating to the management of existing and new structures, surfacing, landscaping and services will be required. These precautions are explained in the arboricultural method statement in Section 2 of this report. If the precautions set out in

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this arboricultural method statement are implemented as described, these trees can be successfully retained without any adverse impact on them or on visual amenity.

11. Table 4: The impact of tree removal on local character

Tree number(s)	Impact of tree removal
G5, G9, G15, 16, 17, 32	• No impact: These trees are well within the site and are not prominent as a skyline feature from any public viewpoints. Despite having the potential for long term retention, they have very little potential to contribute to local character because of the backdrop of large trees to be retained. These significant retained trees will buffer any loss to the extent that there will be no impact on local character.
G6, G7, G8, 10, G13, G39, 40, 41, 42, 43	• Limited impact: These trees are visible in glimpses from outside the site but not individually prominent. Their loss will be noticeable in the immediate vicinity in the short term, but there will be no significant impact on local character in the wider setting in the medium to long terms.

Note: Trees categorised as U are in such poor condition that they have been assessed as needing removal for management reasons irrespective of any development proposals. Removal of any category U trees will be a management decision; the loss will not be caused by this proposal and it should not be considered as a direct impact.

12. New tree planting to mitigate tree removals

To mitigate the loss of trees, a comprehensive new tree planting scheme is included using new extra heavy-standard and semi-mature trees to be planted around the site in sustainable locations. The final selection of species, size and location are flexible and open to amendment if necessary. The new trees would have the potential to reach a significant height without excessive inconvenience and be sustainable into the long term, significantly improving the potential of the site to contribute to local character.

13. Summary of the impact on local character

This proposal will result in the loss of several trees that are all low category because of their poor condition or small size. There is plenty of space for tree planting and a comprehensive new tree planting scheme using extra heavy standard and semi-mature stock is included as part of the proposal. The size of these new trees and their future growth will significantly enhance the contribution of this site to local character and more than compensate for the loss of existing trees. The construction activity may affect further trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the development proposal will have no significant impact on the contribution of trees to character in the wider setting. Indeed, the new sustainable planting proposals will increase the potential of the site to contribute to local character well beyond the short term.

Section 2

Arboricultural method statement

This arboricultural method statement has taken account of all the recommendations set out in 6.1 of BS 5837 (reproduced courtesy of BSI below).

6.1 Arboricultural method statement

6.1.1 A precautionary approach towards tree protection should be adopted and any operations, including access, proposed within the RPA (or crown spread where this is greater) should be described within an arboricultural method statement, in order to demonstrate that the operations can be undertaken with minimal risk of adverse impact on trees to be retained.

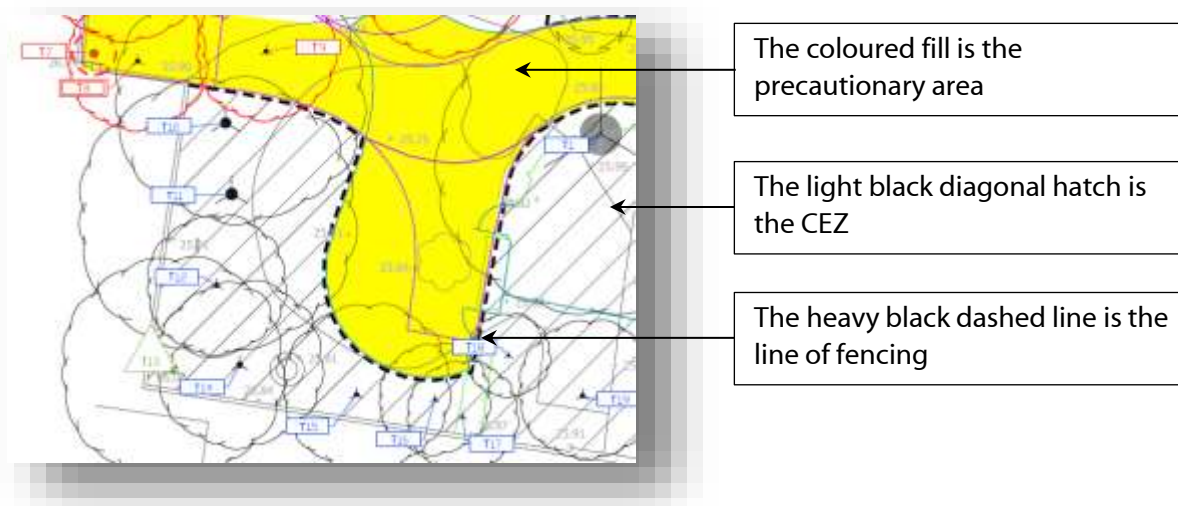
6.1.2 The arboricultural method statement should be appropriate to the proposals and might typically address some or all of the following, incorporating relevant information from other specialists as required:

- a) removal of existing structures and hard surfacing;
- b) installation of temporary ground protection (see **6.2.3**);
- c) excavations and the requirements for specialized trenchless techniques (see **7.7.2**);
- d) installation of new hard surfacing – materials, design constraints and implications for levels;
- e) specialist foundations – installation techniques and effect on finished floor levels and overall height;
- f) retaining structures to facilitate changes in ground levels;
- g) preparatory works for new landscaping ;
- h) auditable/audited system of arboricultural site monitoring, including a schedule of specific site events requiring input or supervision.

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14. Identification of areas to be protected

The tree protection plan (typical annotation illustrated below) shows all the areas where protective measures are necessary. The construction exclusion zone ("CEZ") boundary is shown on the plan as the heavy dashed black line, with the lighter diagonal hatching behind. If necessary, further precautionary areas outside the CEZ are shown on the plan as a coloured fill, where a high level of care is required.



15. Construction method statement (heads of terms summary)

A construction method statement is a description of how operations that may affect trees will be carried out to minimise any adverse impact on them. The details of how the site will be managed are construction and contractual matters that can only be finalised once the post-consent detailed planning begins. For that reason, at this stage in the planning process, it is only possible to list a heads of terms summary of the issues that will require more detailed consideration once consent is issued. The issues that may require further clarification on this site include:

1. The order of work on site, including demolition, site clearance and building work.
2. Erection and maintenance of security hoarding near trees.
3. Who will be responsible for protecting the trees on site.
4. Detailed proposals for inspecting and supervising the tree protection, and how problems will be reported and solved.
5. How accidents and emergencies involving trees will be managed, including accidental damage to roots and their treatment.
6. Details of facilitation pruning and access into site. What size vehicles will be used under canopies and will large machinery be lifted over trees.
7. The parking arrangements for workers and visitors.
8. A schedule of emergency contact numbers.
9. Areas for loading and unloading of materials and storage of materials and plant.
10. Where site facilities will be located and when will they be installed.
11. How machinery and equipment (such as excavators, cranes and their loads, concrete pumps and piling rigs) will enter, move on, work on and leave the site.
12. Wheel washing facilities near trees.
13. Measures to control the emission of dust and dirt during construction near trees.
14. Recycling and storage of waste near trees.
15. Details of earthworks, grading and mounding and removal of spoil, including any planned lowering or raising of ground levels.
16. Details of installation of new no-dig surfacing and areas where this will happen.
17. Precise services locations, including the method of excavation when near trees.
18. Proposed locations of site facilities/crane location/material storage/loading bays etc.

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19. How post-construction damage through compaction to soil near existing trees and new trees will be ameliorated.

Note: It is not our role as arboricultural consultants to detail the timing and implementation of these measures, although we can input into the process and will need to confirm that the final proposals will not adversely affect retained trees.

16. Arboricultural supervision

An arboricultural consultant should be appointed by the developer to advise on the tree management for the site and to attend:

- a pre-commencement meeting before any work starts;
- regular supervision visits to oversee the agreed tree protection; and
- further supervision visits as necessary to oversee any unexpected works that could affect trees.

More specifically, the form and purpose of the supervision should be as follows:

- **Pre-commencement meeting:** A pre-commencement meeting should be held on site before any of the site clearance and construction work begins. This would normally be attended by the site manager, the arboricultural consultant and a local planning authority ("LPA") representative. In the event that a LPA representative declines to be present, the arboricultural consultant should inform the LPA in writing of the details of the meeting. All tree protection measures detailed in this document should be fully discussed so that all aspects of their implementation and sequencing are understood by all the parties. This should include agreeing the form and location of the most appropriate combination of fencing and/or ground protection to be used as barriers for the CEZ. Any agreed clarifications or modifications to the consented details will be recorded and circulated to all parties in writing. This meeting is where the details of the programme of tree protection should be agreed and finalised, which should then form the basis of any supervision arrangements between the arboricultural consultant and the developer.
- **General site management:** It is the developer's responsibility to ensure that the details of this arboricultural method statement and any agreed amendments are known and understood by all site personnel. Copies of the agreed documents should be available on site and the site manager should brief all personnel who could have an impact on trees on the specific tree protection requirements. This should be a part of the site induction procedures and written into appropriate site management documents.
- **Ongoing supervision of operations that could affect trees:** Once the site is active, the arboricultural consultant should visit at an interval agreed at the pre-commencement site meeting. This would normally be every two to four weeks for general supervision, but could be at a longer interval if agreed between the parties. The supervision arrangement should be sufficiently flexible to allow the supervision of all sensitive works as they occur. The arboricultural consultant's initial role is to liaise with the developer and the LPA to ensure that protective measures are fit for purpose and in place before any works start on site. Once the site is working, that role should switch to monitoring compliance with arboricultural planning conditions and advising on any tree problems that arise or modifications that become necessary.

17. Summary of the tree issues to be project managed by the supervising arboriculturist

In overview, it is anticipated that arboricultural input is likely to be needed for the following operations:

1. Pre-commencement meeting
2. Preliminary tree felling and pruning
3. Installation of CEZ barriers (fencing and/or ground protection)
4. Pollution control near retained trees
5. Load restrictions near retained trees

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6. Excavation in RPAs
7. Installation of new surfacing and/or upgrading of existing surfacing in RPAs
8. Installation of new services and/or upgrading of existing services in RPAs
9. Removal of protective measures
10. Tree planting and general landscaping

18. Table 5: Suggested programme of arboricultural supervision during the development process

Finalising tree management details after consent, but before work starts	
Action	Arboricultural input
Pre-commencement site meeting with supervising arboriculturist, site manager and the LPA representative (if appropriate)	• Meeting on site • Agree detail of supervision requirements, i.e. frequency of visits and reporting • Review any updated proposals • Review tree protection, if already installed
Site operations before work starts on site	
Action	Arboricultural input
Tree works carried out	• Review the site requirements with the tree work contractor
Installation of tree protection for agreement by the LPA	• If appropriate, preparation of any revised plans and specifications for agreement by the LPA • Photographs showing relevant aspect of installed tree protective measures • Liaise with the contractor installing protection until satisfactorily completed
Demolition	• Liaise with the demolition contractor about tree protection
Operations that could affect trees during construction	
Action	Arboricultural input
Installation of new special surfacing within RPAs, but outside barriers	• Meeting with contractor for briefing before installation, with further supervision visits as necessary at the discretion of the arboricultural consultant
Removal of barriers and ground protection	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant • NOTE: This should only be authorised once there is no risk of RPA damage from the construction activity
Installation of new special surfacing inside barriers after barriers have been removed	• Meeting with contractor for briefing before installation, with further visits as necessary at the discretion of the arboricultural consultant
Installation of new services	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant
Operations that could affect trees after construction is completed	
Action	Arboricultural input
New tree planting	• Check tree size, species, quality, handling, site preparation and planting comply with the specification
Soft and hard landscaping	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant
Tree planting maintenance	• Liaise with landscape contractor to check maintenance complies with the specification

The precise order and timing of some of these operations may change due to site operating requirements, but all operations that could affect trees should remain under arboricultural supervision.

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19. Tree works

In most situations, the tree works need to be carried out before the main construction activity starts. Tree works, based on our assessment of the proposal and the original site inspection, are set out in the work recommendations column of the tree schedule in Appendix 2. The location of each tree by number is shown on the tree protection plan and any to be removed are indicated with a red number and red crown outline. All tree works must be reassessed before any site activity starts as part of the standard risk management process.

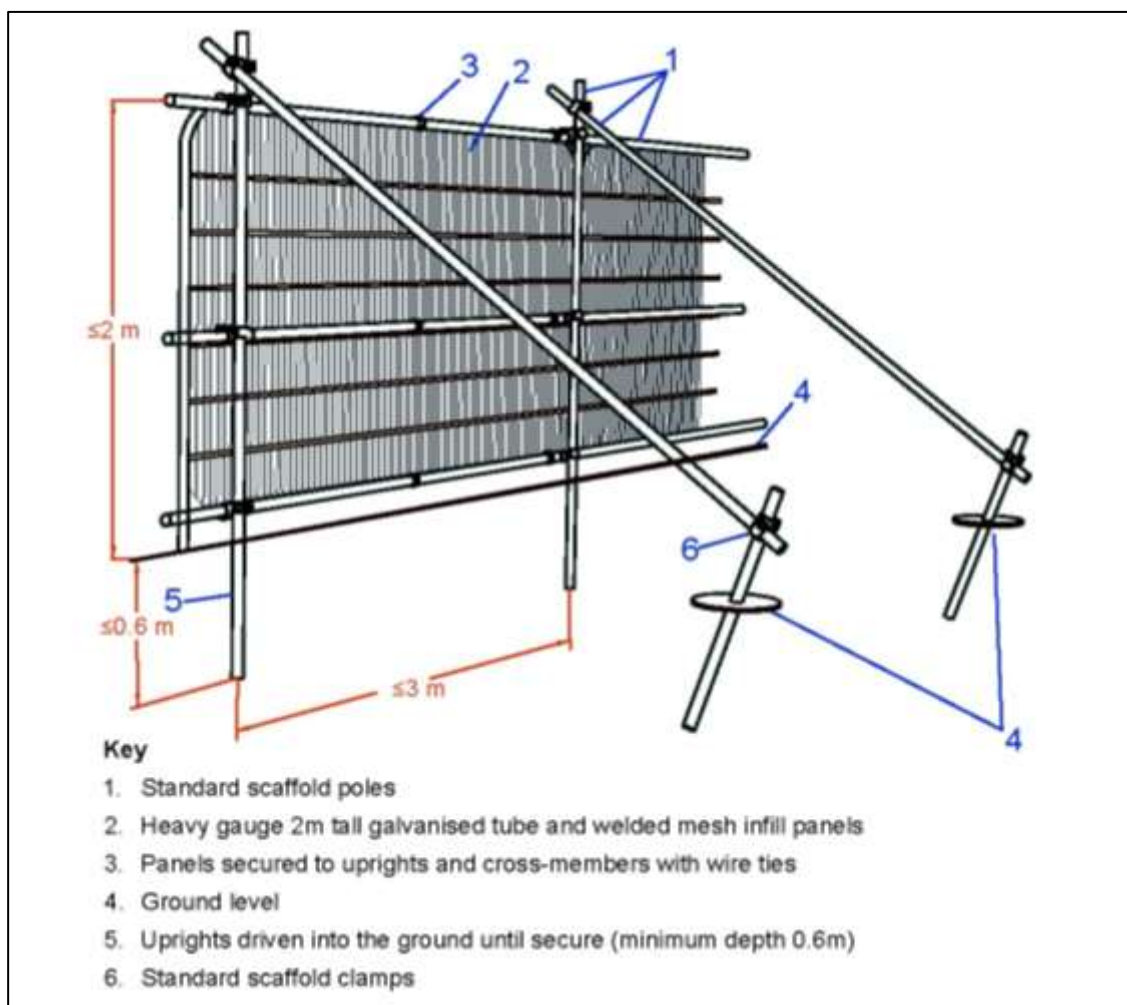
20. Primary tree protection using fencing

The CEZ is the RPA surrounding retained trees that must be protected from any disturbance by the construction activity. In practice, this can be done by any combination of fencing and ground protection, to be finalised and agreed at the pre-commencement meeting. Whether the CEZ is protected by fencing or ground protection, all the protective measures should be installed before the start of any site works that could affect trees. No protective measures should be removed or temporarily dismantled without consulting the supervising arboriculturist. Furthermore, the condition of all the protective measures should be regularly monitored to ensure they remain fit for purpose. The main means of preventing damage to trees and their RPAs in the CEZ are fencing, barriers and ground protection.

Protective fencing should be installed at the locations shown on the tree protection plan by the heavy black dashed line. If agreed with the LPA, fencing can be set back to improve access, provided the exposed ground is protected with ground protection. Various fencing options are illustrated in Fencing images 1–6. The minimum specification for the fencing should be as described in figure 2 of BS 5837 (Fencing image 1) or an equivalent design that effectively restricts access to the RPA it protects.

The precise form of the fencing can vary, provided it is fit for purpose in that it effectively restricts access and damaging activities within the RPA that it encloses. More specifically, behind the fencing, there should be no vehicular access; no fires; no storage of excavated debris, building materials or fuels; no mixing of cement; no service installation or excavation; no raising or lowering of soil levels; and no excessive cultivation for landscape planting. Any variations to these restrictions should be agreed by the supervising arboriculturist.

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Fencing image 1: Recommendations taken from figure 2 of BS 5837.



Fencing image 2: Heras fencing wired to scaffold braced posts is a robust and effective interpretation of the BS specification.



Fencing image 3: Close up of bracing detail, essential for increasing the stability of the vertical framework.

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Fencing image 4: Board specification on secure wooden posts is a suitable alternative to the standard braced scaffold design.

Where individual trunks or branches are vulnerable to impact damage, a framework of scaffold or wood can be constructed to provide protection (Fencing images 5 and 6).



Fencing image 5: A scaffold-braced framework surrounding the trunk reduces the risk of accidental impact.



Fencing image 6: Board secured to scaffold framework adds another layer of protection for vulnerable trunks and branches

21. Primary tree protection using ground protection

Where it is not practical to protect the CEZ by the use of fencing alone, BS 5837 (6.2.3) allows for the fencing to be set back and the soil protected by ground protection. This allows improved access during construction, with the ground protection preventing damage to the CEZ outside the protection of the fencing. A range of methods can be used, including retaining existing hard surfacing or structures that already protect the soil, installing new materials, or a combination of both. Whatever the choice of method, the end result must be that the underlying soil (rooting environment) remains undisturbed and retains the capacity to support existing and new roots. Ground protection images 1–8 illustrate a range of practical surface coverings that can effectively protect CEZs of retained trees.



Ground protection image 1: Heavy-duty plywood set onto a compressible woodchip layer and pinned into position is suitable to spread the loading from pedestrian access.



Ground protection image 2: Spreading soil excavated from footings is an effective way of buffering the plywood surface from the wear of light vehicles.

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Ground protection image 3: Plywood fixed to a wood frame is another effective method of protecting soil from pedestrian compaction.



Ground protection image 4: A scaffold framework attached to the main scaffold fencing can be used to support either scaffold planks or plywood to create an elevated platform with a gap beneath.



Ground protection image 5: Cellular products are a very effective means of providing ground protection where heavy vehicle use is expected. Here, it is being used to temporarily widen an existing road, to be removed once the construction is finished.



Ground protection image 6: Custom designed sectional tracks can be joined to support very heavy traffic use through sensitive areas.



Ground protection image 7: A combination of retaining existing surfacing and using temporary construction cabin accommodation can be a very effective means of preventing damage to sensitive areas.



Ground protection image 8: Steel plates can be an effective way of temporarily reinforcing weak surfacing over a construction access during the development activity.

On this site, all the precautionary areas annotated with yellow shading on the tree protection plan should be protected with ground protection while vulnerable to damage, in line with the above examples. Where appropriate, any existing hard surfacing can be retained and utilised. Any surfacing to be retained that is disrupted during the course of the construction activity can be replaced, reconditioned or upgraded as necessary. This work should be subject to arboricultural supervision.

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22. Extra precautions – pollution control near retained trees

The following guidance should be applied wherever risk assessment identifies a significant risk of chemical pollution.

Spilt chemicals that can soak into RPAs will kill existing roots and may prevent new roots growing, so provision must be made to minimise the risk of contamination to soil within the normal risk management protocols for the site. This would normally include means of containing spillages and procedures for clearing them up if they occur (Pollution image 1). All cement mixing and vehicle washing points must be located outside RPAs, with provision to contain any spillages. Where the contours of the site create a risk of polluted water or toxic liquids running into RPAs, a precautionary measure of bunding or a frame, sealed with heavy-duty plastic sheeting sufficient to prevent contamination (Pollution image 2), must be used to contain accidental spillages.



Pollution image 1: Where fuel or other chemicals are stored on site, it is now standard practice to have emergency spillage kits available to restrict the environmental impact of accidents.



Pollution image 2: Soil bunding or a supporting framework covered in heavy-duty plastic sheeting is essential where there is a risk of spillages contaminating RPAs. This specifically applies to cement mixing areas and vehicle washing facilities.

23. Extra precautions – installation of new surfacing in RPAs

The following guidance will be applied to trees 2, 3, 4, 24 and 25 which are shown on the tree protection plan.

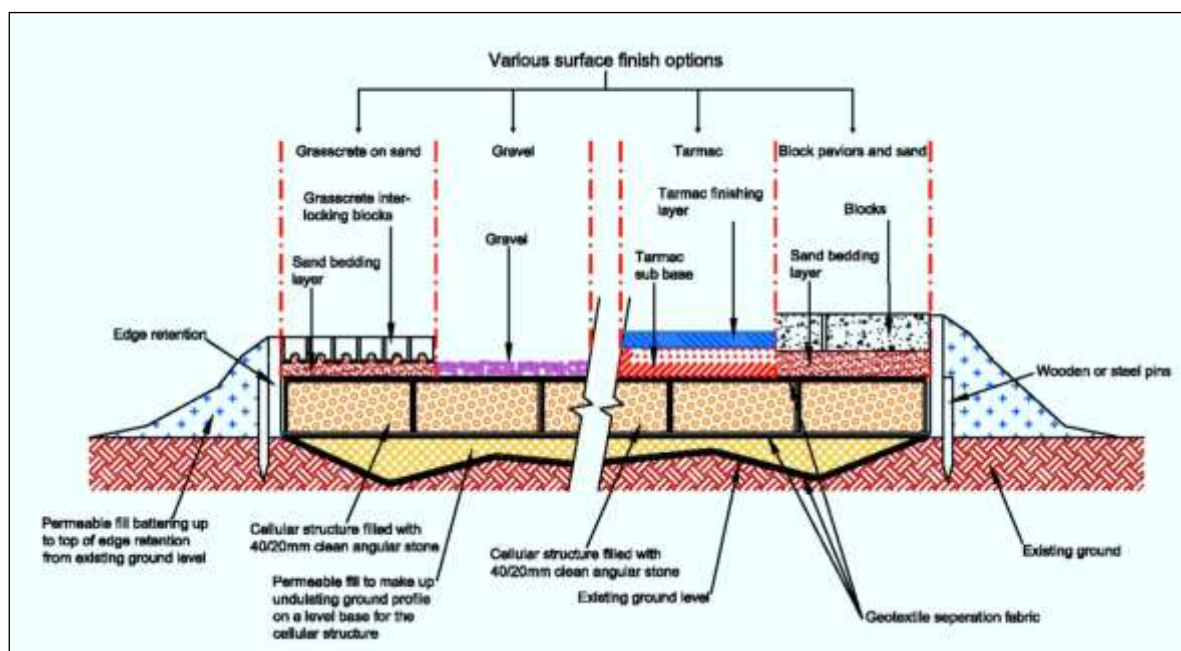
BS 5837 (7.4) confirms that new surfacing can be installed within RPAs, but it has to be carried out with care. These operations are potentially damaging to trees because they may require changes to existing ground levels, resulting in localised soil structure degradation and/or disrupt the efficient exchange of water and gases in and out of the soil. Older trees are much more prone to suffer from such changes than young and maturing trees. Adverse impact on trees can be reduced by minimising the extent of these changes in RPAs. Generally, the most suitable surfacing will be relatively permeable to allow water and gas movement, load spreading to avoid localised compaction and require little or no excavation to limit direct damage. The actual specification of the design is an engineering issue that needs to be considered in the context of the bearing capacity of the soil, the intended loading and the frequency of loading. The detail of product and specification are engineering issues and must be provided by appropriate specialists.

Cellular confinement systems

BS 5837 (7.4.2.) sets out that no-dig, three dimensional cellular confinement systems can be used as the basis for extending hard surfacing into RPAs. It is our experience (www.barrelltreecare.co.uk/case-studies/SurfacingNearTrees.pdf) that this type of surfacing can be installed in the majority of situations without any significant adverse impact on adjacent trees, provided that proper consideration is given to all the circumstances. Most of our experience is with the CellWeb system supplied by Geosynthetics Ltd (www.geosyn.co.uk) and because of its sustained good performance over time, this is our preferred choice of product. The product is

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made from heavy-duty plastic that can be pulled apart to open into cells. These are then filled with washed stone, after the product is spread over the ground and pinned in place. This forms a base layer that acts as a floating raft, spreading the load across the whole construction width. The base layer can be topped with a variety of finishes as illustrated in New surfacing image 1. New surfacing images 2 and 3 show the product spread over the ground and then filled with stone to produce the base layer.



New surfacing image 1: This conceptual cross-section illustrates the structural elements of the system and the multiple surfacing options that can be used with it.



New surfacing image 2: The three-dimensional cells are opened up, spread across the area to be surfaced and pinned in place ready for the stone filling.



New surfacing image 3: The stone-filled cells spread the load of traffic and the geotextile membrane on the ground prevents migration of the stone into the soil profile.

Dealing with undulating surfaces and establishing a tolerable level of excavation

The precise location and depth of roots within the soil is unpredictable and will often only be known when careful digging starts on site. Ideally, all new surfacing in RPAs should be no-dig, i.e. requiring no excavation whatsoever, but this is rarely possible on undulating surfaces. New surfacing normally requires an evenly graded sub-base layer, which can be made up to any high points with granular, permeable fills such as crushed stone or sharp sand. This sub-base must not be compacted as would happen in conventional surface installation. Some limited excavation is usually necessary to achieve this and need not be damaging to trees if carried out carefully and large roots are not cut. Tree roots and grass roots rarely occupy the same soil volume at the top of the soil profile, so the removal of an established turf layer up to 5cm is unlikely to be damaging

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to trees. However, this may not be possible where there is no grass because tree roots may grow right up to the soil surface. In some situations, it may be possible to dig to a greater depth depending on local conditions, but this would need to be assessed by an arboriculturist if excavation deeper than 5cm is anticipated.

On undulating surfaces, finished gradients and levels must be planned with sufficient flexibility to allow on-site adjustment if excavation of any high points reveals large unexpected roots near the surface. If the roots are less than 2.5cm in diameter, it would normally be acceptable to cut them and the gradient formed with the preferred minimal excavation of up to 5cm. However, if roots over 2.5cm in diameter are exposed, cutting them may be too damaging and further excavation may not be possible. If that is the case, the surrounding levels must be adjusted to take account of these high points by filling with suitable material. If this is not practical and large roots have to be cut, the situation should be discussed with the supervising arboriculturist before a final decision is made.

Sub-base and finishing layers

Once the sub-base has been formed, the load spreading construction is installed on top without compaction. In principle, the load spreading formation will normally be cellular and filled with crushed stone, although the detail may vary with different products. Suitable surface finishes include washed gravel, permeable tarmac or block pavements set on a sand base (New surfacing image 1). However, for lightly loaded surfacing of limited widths (<3m) such as pedestrian paths, pre-formed concrete slabs may be appropriate if the sub-base preparation is as set out above.

Edge retention

Conventional kerb edge retention set in concrete-filled excavated trenches is likely to result in damage to roots and should be avoided. Edge retention in RPAs must be designed to avoid any significant excavation into existing soil levels (BS 5837, 7.4.3) and there are a number of approaches that are fit for this purpose. For block pavements, the use of pre-formed edging secured by metal pins is effective and can be reinforced by concrete supports as long as there is no excavation into the soil (New surfacing image 4). Railway sleepers (New surfacing image 5) pinned in place or wooden boards (New surfacing image 5) are two options, depending on the expected loading of the surfacing. A permeable soil fill can then be used to batter the grade back down to the existing soil level.



New surfacing image 4: A conventional concrete haunching can be used to retain new surfacing as long as it is not dug into a trench - here it is placed on top of the CellWeb layer.



New surfacing image 5: Although this is only a temporary surface, railway sleepers pinned into the ground can be used to retain the edges of new surfacing.

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New surfacing image 6: Wooden board pinned in place or held in position with backfilled topsoil can provide more informal and rustic surface edging.



New surfacing image 7: In some situations, it may be appropriate to cast a free floating concrete surface directly onto the soil surface provided provision is made to prevent soil contamination while the concrete is being poured, i.e. an impermeable membrane separating the concrete from the soil.

Footpaths and surfacing without a load-spreading base layer

In some situations, limited-width floating concrete rafts constructed directly onto the soil surface may be acceptable for both pedestrian (New surfacing image 7) and vehicular access (New surfacing image 8), but the design must not include any strip-dug supports. If concrete is poured directly, precautions must be taken to ensure that no toxic fluids can contaminate the adjacent soil. Alternatively, elevated paths supported on low impact frames or post supports allow a decking surface to cross sensitive areas (New surfacing images 9 and 10). Where paths are installed very close to trunks, provision must be made for distortion from future root growth by selecting flexible components for the supporting frame and surfacing (New surfacing image 11).



New surfacing image 8: This temporary access for heavy construction traffic on the outer edge of a RPA is a concrete slab cast above ground level and will be removed when the project is completed.



New surfacing image 9: Board walks supported on posts or a light frame are another way of providing pedestrian access across sensitive RPAs (photo courtesy of Philip van Wassenaeer).

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New surfacing image 10: New surfacing can be supported above the ground on posts leaving the soil surface beneath undisturbed.



New surfacing image 11: Where surfacing is needed close to rapidly growing buttress roots, a light metal frame with rubberised surfacing will allow the path to distort without cracking as the roots grow.

24. Extra precautions – installation of new services and/or upgrading of existing services in RPAs

Excavation to upgrade existing services or install new services in RPAs may damage retained trees. Where possible, all services should be outside RPAs and installation in RPAs should only be chosen as a last resort. If installation within RPAs is being considered, as advised in 4.1.3 of the NJUG guidance, the decision should be made in consultation with the LPA or the supervising arboriculturist before any work is carried out. If service installation is agreed within RPAs, the NJUG protocol as set out in 4.1.3 of its guidance should be used to decide the most appropriate method. In summary, this sets out that *“Acceptable techniques in order of preference are; a) trenchless, ... b) Broken trench – hand-dug ... c) Continuous trench – hand-dug”*. If trenchless methods are to be used, there is normally a starting pit and a finishing pit that have to be dug at each end of the service run and these must be outside RPAs (Services image 1). Where a hand-digging option is agreed (Services image 2), any roots discovered during the excavations should be dealt with as explained above. Where possible, backfilled material around excavated services must not be heavily compacted, with specific advice provided in 4.1.5 of the NJUG guidance.



Services image 1: If possible, thrust boring is the preferred option for installing service routes through the RPAs of important trees, but there has to be space at the start and finish to dig substantial working pits.



Services image 2: Continuous trenches dug by hand so that important roots can be retained (with the service ducting threaded beneath) is an effective means of minimising damage (note the ground protection boards with soil piled on top on the left).

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25. Extra precautions – upgrading existing soft landscaping or replacing existing surfacing or structures with new soft landscaping

This guidance should be applied wherever new landscaping is installed near retained trees.

For the purposes of this guidance, soft landscaping includes the re-profiling of existing soil levels and covering the soil surface with new plants or an organic covering (mulch). It does not include the installation of new structures or compacted surfacing, which are considered as substantial works and covered in the preceding sections of this document.

Soft landscaping activity after construction can be extremely damaging to trees. No significant excavation or cultivation, especially by rotovators, should occur within RPAs. Where new designs require levels to be increased to tie in with new structures or the removal of an existing structure has left a void below the surrounding ground level, good quality and relatively permeable top soil should be used for the fill. It should be firmed into place, but not over compacted, in preparation for turfing or careful shrub planting. Ideally, all areas within 1m of tree trunks should be kept at the original ground level and have a mulched finish rather than grass to reduce the risk of mowing damage (Landscaping images 1 and 2).



Landscaping image 1: The RPA of this tree was not effectively protected during construction and excessive compaction of the soil meant it died soon after this turf covered up the damage.



Landscaping image 2: This tree had tarmac parking within its RPA that was removed and replaced with an organic mulch near the trunk and limited no-dig surfacing on the outer edges of its RPA.

26. Removal of protection

All protective barriers must remain in place until the construction activity is finished and there is no realistic risk of damage to the protected soil surfaces.

27. Table 6: Contact details for parties involved in the development

Project partner	Contact details
Developer/Project manager	Mildren Homes Central Limited; 0845 8944690
Project architect	Urban Pulse; 02380 697010
Project arboriculturist	Barrell Tree Consultancy; 01425 651470; info@barrelltreecare.co.uk
LPA tree officer	Jamie Gargett; 02392 474174
LPA planning officer	Not yet confirmed

Section 3 Appendices

Appendix 1: Background administrative information, data collection and any additional relevant information

28. Table 7: Background administrative information

	Background administrative information
Report date & reference	17/05/17 – 15362-AA3-DC
Tree protection plan reference	BT3
Our instructing client	Mildren Homes Central Limited
Our instructions	Visit the site, assess the relevant trees, prepare a schedule of their details, describe the impact of the proposal on those trees and identify the tree protection issues in an arboricultural method statement confined to the heads of terms
Provided documents	Land survey, drawing number 12852, received by email on 29 January 2013 and layout, drawing number 14-1096-050-C, received by email on 17 May 2017
Report author and credentials	Dave Cashman is a Chartered Forester (www.charteredforesters.org) and an AA Registered Consultant (www.trees.org.uk), and fully qualified to undertake the assessments in this report. Further details of his credentials can be found at http://www.barrelltreecare.co.uk/career-summaries/Dave%20CS.pdf .
Report limitations	We have not checked if the trees are protected. If any tree works are proposed before a planning consent is given, then the existence of any statutory protection must be checked with the LPA. This report does not consider ecological or archaeological issues, or any other matter beyond the assessment of the trees.
Technical references	In preparing the analysis in this report, detailed consideration was given to the guidance and advice in the following technical references: • Climate Change Act (2008) www.legislation.gov.uk/ukpga/2008/27/contents • Town and Country Planning Act 1990 http://www.legislation.gov.uk/ukpga/1990/8/contents • National Planning Policy Framework ("NPPF"), published by the DCLG www.gov.uk/government/publications/national-planning-policy-framework--2 • BS 5837 (2012) <i>Trees in relation to design, demolition and construction – Recommendations</i>, BSI http://shop.bsigroup.com/ • BS 8545 (2014) <i>Trees: from nursery to independence in the landscape – Recommendations</i>, BSI http://shop.bsigroup.com/ • BS 3998 (2010) <i>Tree work – Recommendations</i>, BSI http://shop.bsigroup.com/ • <i>Trees in the Townscape: A Guide for Decision Makers</i>, published by the Trees & Design Action Group http://www.tdag.org.uk/ • <i>Trees in Hard Landscapes: A Guide for Delivery</i>, published by the Trees & Design Action Group http://www.tdag.org.uk/ • National Joint Utilities Group (2007) Volume 4, Issue 2: <i>Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees</i> www.njug.org.uk/publications/

Appendix 1: Background administrative information, data collection and any additional relevant information

29. Table 8: Data collection

	Data collection
Date of site visit	31 January 2013 and 14 October 2015
People present during site visit	Dave Cashman
Weather & visibility	Clear, still and dry, with average visibility
Limitations to observations	• Our inspection of the trees for the purposes of assessing their condition and work requirements is made on the basis that they will be annually inspected in the future to identify any changes in condition and review the original recommendations. For these reasons, the tree assessment advice only remains valid for one year from the date that the trees were last inspected. • All observations were of a preliminary nature and did not involve any climbing or detailed investigation beyond what was visible from accessible points at ground level. • Observations of trees outside the site boundaries are confined to what was visible from within the site. • All dimensions were estimated unless otherwise indicated.
Tree location and numbering	Each tree was inspected and the numbering scheme is indicated on the tree protection plan. If appropriate, obvious hedges and groups were identified and numbered. If important trees were found on site that were not included on the provided plan, their approximate positions and canopy extents are indicated on the plan.
Recording of tree data	For each tree and any group or hedge found on site, the information collected was recorded on the tree schedule in Appendix 2 and the tree protection plan.
Compliance of data collection with BS 5837	The data collection is fully compliant with the advice in subsection 4.4.2 of BS 5837. When collecting this information, specific consideration was given to any low branches that may influence future use, age class, physiological condition, structural condition and remaining contribution. Where appropriate, crown spreads were also noted where they differed from those shown on the provided land survey.
Calculation of RPAs	Following the recommendations in Table D1 of BS 5837, the diameter of each tree was rounded up to the next 2.5cm increment, with the radius of a nominal circle and the resultant RPA taken directly from that table. This information is listed for each tree in the tree schedule in Appendix 2.

Appendix 2: Tree schedule and explanatory notes

NOTE: Colour annotation is A & B trees with green background; C & U trees with blue background; trees to be removed in red text.

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
All retained trees & hedges							Carry out safety check and lift to 3-4m over site as necessary. Clip to reform hedges as appropriate.			
T1	Sycamore	14	45	Maturing	Yes	B	-	-	5.4	92
T2	Sycamore	14	40	Maturing	Yes	B	-	-	4.8	72
T3	Yew	7	40	Maturing	-	C	Adjacent to driveway	-	4.8	72
T4	Yew	9	55	Mature	-	B	Just off site	-	6.6	137
G5	Yew, laurel, cypress, bay, cherry	9	50	Mature	-	C	Closely spaced group	Fell	6.0	113
G6	Sycamore	12	70	Mature	-	C	Approximately 12 stems, coppiced, damaged stems	Fell	8.4	222
G7	Sycamore	10	60	Mature	-	C	Severe lean, poor form, major weakness at base, 4 x stems	Fell	7.2	163
G8	Acacia	10	25	Mature	-	C	3 x stems	Fell	3.0	28
G9	Sycamore	13	45	Mature	-	C	Poor form, leaning	Fell	5.4	92
T10	Acacia	14	55	Mature	-	C	Two stems at 0.3m, limited access	Fell	6.6	137
G13	Laurel, bay, buddleia	6	30	Maturing	-	C	-	Fell	3.6	41
G15	Laurel, goat willow	5	60	Maturing	Yes	C	-	Fell	7.2	163
T16	Ash	6	40	Maturing	Yes	C	Growing immediately adjacent to listed wall	Fell	4.8	72
T17	Beech	8	30	Maturing	Yes	C	Growing immediately adjacent to listed wall	Fell	3.6	41
G22	Bay, holly, sycamore, yew, oak	14	60	Mature	-	B	Collective value and screening	-	7.2	163
T23	Yew	10	65	Mature	-	B	-	-	7.8	191

Appendix 2: Tree schedule and explanatory notes

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T24	Oak	9	30	Maturing	-	B	Ivy	-	3.6	41
T25	Cedar	18	125	Mature	-	B	Several dead branches	-	15.0	707
T26	Sycamore	18	65	Mature	-	B	Next door, no access	-	7.8	191
T27	Sycamore	18	60	Mature	-	B	3 x stems, crack in wall adjacent, no access	-	7.2	163
G28	Sycamore	16	50	Maturing	-	C	Next door, several stems, no access	-	6.0	113
T29	Ash	9	45	Maturing	-	B	Close to wall	-	5.4	92
G30	Lime, cherry, ash, cypress	11	100	Maturing	-	C	Coppiced lime stool	-	12.0	452
T31	Cherry	7	60	Mature	-	C	-	-	7.2	163
T32	Bay	8	200	Mature	-	C	Multi stem, poor form	Fell	15.0	707
T33	Poplar	15	50	Maturing	-	C	-	-	6.0	113
T34	Poplar	15	60	Maturing	-	C	-	-	7.2	163
T35	Poplar	15	30	Maturing	-	C	Tall and thin	-	3.6	41
T36	Monterey cypress	14	50	Maturing	-	C	-	-	6.0	113
T37	Monterey cypress	12	45	Maturing	-	C	-	-	5.4	92
T38	Western red cedar	10	45	Maturing	-	B	-	-	5.4	92
G39	Western red cedar, cypress	8	35	Maturing	-	C	-	Fell	4.2	55
T40	Poplar	16	60	Maturing	-	C	Several stems, weak junctions	Fell	7.2	163
T41	Poplar	16	45	Maturing	-	C	Poor form	Fell	5.4	92
T42	Poplar	16	45	Maturing	-	C	Poor form	Fell	5.4	92
T43	Poplar	16	45	Maturing	-	C	Poor form	Fell	5.4	92
T44	Poplar	9	60	Maturing	-	U	Poor form, leaning	Fell for management	7.2	163
G45	Sycamore, cherry	10	45	Maturing	-	C	Ivy, poor form	-	5.4	92

Appendix 2: Tree schedule and explanatory notes

Explanatory Notes

- **Abbreviations:**

G : Group
RPA : Root protection area

- **Botanical tree names:**

Acacia	: <i>Robinia pseudoacacia</i>
Ash	: <i>Fraxinus excelsior</i>
Bay	: <i>Laurus nobilis</i>
Beech	: <i>Fagus sylvatica</i>
Buddleia	: <i>Buddleja davidii</i>
Cedar	: <i>Cedrus deodara</i>
Cherry	: <i>Prunus</i> sp
Cypress	: <i>Cupressus</i> sp
Goat willow	: <i>Salix caprea</i>
Holly	: <i>Ilex aquifolium</i>
Laurel	: <i>Prunus laurocerasus</i>
Lime	: <i>Tilia</i> sp
Monterey cypress	: <i>Cupressus macrocarpa</i>
Oak	: <i>Quercus robur</i>
Poplar	: <i>Populus</i> sp
Sycamore	: <i>Acer pseudoplatanus</i>
Western red cedar	: <i>Thuja plicata</i>
Yew	: <i>Taxus baccata</i>

- **BS 5837 (2012) compliance:** All data has been collected based on the recommendations set out in subsection 4.4 of BS 5837.
- **Tree inspections and site limitations:** Each tree was subjected to a quick visual check level of inspection. Where there is restricted access to the base of a tree, its attributes are assessed from the nearest point of access. Climbing inspections are not carried out during this level of inspection and, if heavy ivy is present, tree condition is assessed from what can be seen from the ground. A separate note is recorded if further investigation may be required to clarify its status.
- **Crown spreads:** Crown spread dimensions are not listed in the tree schedule because they are illustrated on the land survey base to all the plans in this document. Where crown spreads of significant trees on site are found to deviate from those shown on the provided land survey, we have noted it in the text of the report and annotated it on our plans.
- **Dimensions:** All dimensions are estimated unless annotated with a '*'.
- **Species:** Species identification is based on visual observations. Where there is some doubt over tree identity, sp is noted after the genus name to indicate that the species cannot be reliably identified at the time of the survey. Where there is more than one species in a group, only the most frequent are noted and not all the species present may be listed.
- **Height:** Height is estimated to provide a broad indication of the size of the tree.
- **Trunk diameter:** Trunk diameter is estimated or measured and recorded in 2.5cm increments as advised in BS 5837 Table D1. It is measured with a diameter tape unless access is restricted, direct measurement is not possible because of ivy on the trunk or the tree is assessed as poor quality. The point of measurement and the adjustments for stem variations are as advised in Figure C1 of BS 5837.
- **Maturity:** In planning context, maturity provides a simplistic indication of a tree's ability to cope with change and its potential for further growth. For the purposes of this report, young indicates a

Appendix 2: Tree schedule and explanatory notes

potential to significantly increase in size and a high ability to cope with change, maturing indicates some potential to increase in size and a medium ability to cope with change, and mature indicates little potential to increase in size and limited ability to cope with change.

- **Low branches:** Any low branches that would not be feasible for removal during normal management and should be considered as a design constraint are noted here and explained in the notes.
- **Category:** Our assessment automatically considered tree physiological/structural condition (BS 5837, 4.4.2.5h), and so these are not listed separately in the schedule. Additionally, the category accounts for the remaining contribution (BS 5837, 4.4.2.5i) as greater than 40 years for A trees, greater than 20 years for B trees, at least 10 years for C trees and less than 10 years for U trees, so this is also not listed separately in the schedule. Category A, B and C trees are automatically listed as sub-category 1 unless otherwise stated.
- **Notes:** Only relevant features relating to physiological or structural condition and low branches that may help clarify the categorisation are recorded. If there are no notes, then the presumption should be that no relevant features were observed.
- **Tree works:** The recommended tree works are based on the quick visual check level of inspection and only intended to address significant hazards identified during that inspection.
- **Future tree safety inspections:** Due to the time that may elapse between the original survey and the start of development, all trees should be re-inspected as part of the standard risk management process before any works start on site. Our assessment of the trees was carried out on the basis that a re-inspection would be carried out within a year of the assessment visit and our advice on tree condition must be reviewed annually from the date of that visit.



Field House
Fordingbridge Business Park
Ashford Road
Fordingbridge
Hampshire
SP6 1BY

01425 651470
info@barrelltreecare.co.uk
www.barrelltreecare.co.uk