

Arboricultural impact assessment

26 Oakley Wood Road
Bishops Tachbrook
CV33 9RW

Report number H 052

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1 Report limitations

- 1.1 We write as arboriculturists; we have no technical engineering competence.
- 1.2 Our report represents the analysis of our observations following an external assessment of the trees from ground level only. No samples were collected for analysis, and no decay detection devices (such as an increment borer, a micro-resistance recording drill or sonic tomograph) were used during our assessment.
- 1.3 Trees are living organisms and their condition may have changed after we left the site for any one of a variety of reasons, including for example, but not limited to:
 - a natural consequence of their pattern of growth, and/or
 - a response to changes in neighbouring trees and shrubs, from whatever cause, and/or
 - in response to the weather, either an extreme event or a prolonged spell of consistent weather, and/or
 - a consequence of infection or infestation, and/or
 - a consequence of a pollution incident, and/or
 - a response to changes in soil condition or structure.
- 1.4 Our conclusions, and any recommendations flowing from those conclusions, relate to the conditions that were found at the time of the assessment, and are valid for
 - no more than two years from the date of that assessment, or
 - until such time as any work is carried out at the site, either in accordance with the remedial action prescribed or for other reasons which may be outside our control, or
 - until the site is re-surveyed whichever is the sooner.
- 1.5 The opinions expressed, and any recommendations made in this report may be subject to review upon receipt of additional information not currently available.
- 1.6 Our report is not, nor should be taken to be, a thorough assessment of the health and condition of the trees on or adjacent to the site: if such an assessment is required then it is recommended that a separate tree inspection be carried out to comply with the land owner's overall duty of care and to satisfy health and safety requirements.

2 Introduction

- 2.1 The client for this report is Leigh Carter of 26 Oakley Wood Road, Bishops Tachbrook, CV33 9RW.
- 2.2 The brief was to provide an arboricultural impact assessment based upon the development proposal drawing 985 – 05 revision A.
- 2.3 Please refer to Appendix 1 for:
 - an explanation of the need for tree and ground protection measures,
 - generic ground and tree protection measures,
 - general arrangements if the ground must be broken,
 - the treatment of exposed roots, and
 - an arboricultural site monitoring procedure.

3 The development proposal

- 3.1 The site drawings identify the proposed new dwelling, the pre-application advice that has been received notes that “the principle of housing on this site is acceptable.”

4 The fieldwork and our findings

- 4.1 The footprint of the proposed dwelling shown on drawing 985 – 05 revision A will require the removal of one mature Norway spruce, three poor quality Leyland cypress trees and one mountain ash tree. An apple tree nearby will be retained, see Appendix 1.
- 4.2 As the pre-application advice that had been received was encouraging and did not rule out the principle of the development an arboricultural impact has been prepared: no detailed measurements of the trees were taken as it did not seem appropriate to do so.
- 4.3 The four exotic alien conifers sat above a retaining wall and were significant in the local street scene, but they did not make a positive contribution in either visual or ecological terms.
- 4.4 The mountain ash was on the western boundary and was in apparently poor condition with very little leaf cover, the whole tree appeared to have been swamped by the vigorous laurel.
- 4.5 A mature apple tree was identified for retention in the rear garden of 26 Oakley Wood Road and will require protection from avoidable harm during the development. The tree had a stem diameter of approximately 450 mm, and so the radius of its root protection area was 5.4 m.

5 Discussion

- 5.1 The four exotic conifers provided a mass of yellow-green foliage in the street scene, but the tree species are not locally native, and the angular Norway spruce and brooding mass of the Leyland cypress were not considered to be attractive, and so together they had a negative impact upon the local amenity.
- 5.2 The mountain ash tree appeared to be in poor condition and of poor form, the tree provided very little public amenity.
- 5.3 We are of the opinion that there should be no objection to the removal of the four exotic conifers and the mountain ash to facilitate the development. To provide some mitigation for their loss new tree planting will be provided in strategic locations to be determined on site along the eastern boundary fence to the rear of the proposed dwelling. Species that are suitable for a small garden should be considered, a list of such species is presented in Tree Species Selection for Green Infrastructure published by the Trees & Design Action Group.
- 5.4 The retained apple tree’s RPA will extend across the property boundary toward the new dwelling and so suitable control measures will be required to prevent avoidable harm to the tree, see Tree roots and the RPA in Appendix 1.
- 5.5 Tree protection measures, as described in Exclusion, will be required, the suggested alignment of the protective barrier fencing is indicated below. In addition, ground protection measures as described in Prevention will be required in the area as shown below.



- 5.6 To allow for the permanent boundary fence to be erected the apple tree's crown may well require selective lifting, see The stem and crown: the protective barrier fencing may as well be erected along the boundary for the duration of the development and then replaced by the permanent fence.
- 5.7 Consideration will need to be given to the siting of secure storage areas and welfare facilities; depending upon their location further control measures may be required to prevent avoidable harm to retained trees, either by exclusion or prevention.

6 Specific tree protection measures

- 6.1 At this site the specific ground and tree protection measures that are required, and their exact alignment, will be agreed once the development proposal has been finalised and so are outside the scope of this initial report.

7 Recommendations

- 7.1 We recommend that:
- 7.1.1 the four exotic conifers are not considered to be a constraint,
 - 7.1.2 the mountain ash is not considered to be a constraint,
 - 7.1.3 the five trees be removed to facilitate the development,
 - 7.1.4 new trees be planted in the season after the completion of the development to mitigate for the loss of the five trees, the species to be suitable for a small garden,
 - 7.1.5 specific control measures to prevent avoidable harm to be agreed once the development proposal has been finalised.

Appendix 1 – tree protection measures in general

Introduction

- A.1 Before any work activity commences the precise alignment and specification of any protective barrier fencing, and the positioning and specification of any ground protection measures, should be agreed on site at a formal, minuted, meeting between the project manager, the project arboriculturist and the local authority's Tree Officer.

Tree roots and the RPA

- A.2 The RPA is an artificial construct that assumes that tree roots will radiate from the tree's base in all directions in a more or less uniform distribution: in reality the actual distribution will be dependent on, amongst other things, the availability of soil water and nutrients and the bulk density of the soil. Roots will grow where the environment is suitable, and it is almost impossible to predict where the structural roots or the active rooting volume of a particular tree might be found.

- A.3 Any retained tree's roots that are at risk of damage from work activity will require protection throughout the term of the development because roots serve two distinct purposes, and need to be alive to do so:

- they securely anchor the tree in the ground, and
- they take-up the moisture and the range of nutrients from the soil (generally dissolved or in suspension) that will allow the tree to grow.

- A.4 Roots will respond to positive stimuli and grow where the soil environment is suitable, they are found at relatively shallow depths where they can access the oxygen and water held in the voids between the soil particles and take up the moisture and nutrients the tree requires. In consequence, soil compaction that closes the voids between the soil particles will have a negative impact as it will deny the roots the access to the oxygen and water that they need to survive and to allow the tree to thrive.

- A.5 Damage to the retained trees' roots and the soil volumes they occupy during the development may arise from a variety of causes, including:

- crushing or fracturing
- soil compaction
- the spillage of toxic substances
- the installation of hard surfacing.

- A.6 BS 5837 has a presumption in favour of preventing avoidable harm to retained trees, and states, at clause 5.3.1:

The default position should be that structures are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s). If operations within the RPA are proposed, the project arboriculturist should:

- a) demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA;
- b) propose a series of mitigation measures to improve the soil environment that is used by the tree for growth.

- A.7 Where avoidable harm can be prevented BS 5837 states, at clause 6.2.1.1:

Where all activity can be excluded from the root protection area (RPA), vertical barriers should be erected to create a construction exclusion zone (CEZ). Where, due to site constraints, construction activity cannot be fully or permanently excluded in this manner from all or part of a tree's RPA, appropriate ground protection should be installed

A.8 The two generic control measures in common use to reduce the risk of harm to the soil structure within the RPA are:

exclusion

- the installation of a temporary barrier to create the CEZ to deny access to those places where trees' roots may be found to prevent damage to the retained trees' roots and the soil volumes they occupy, or

prevention

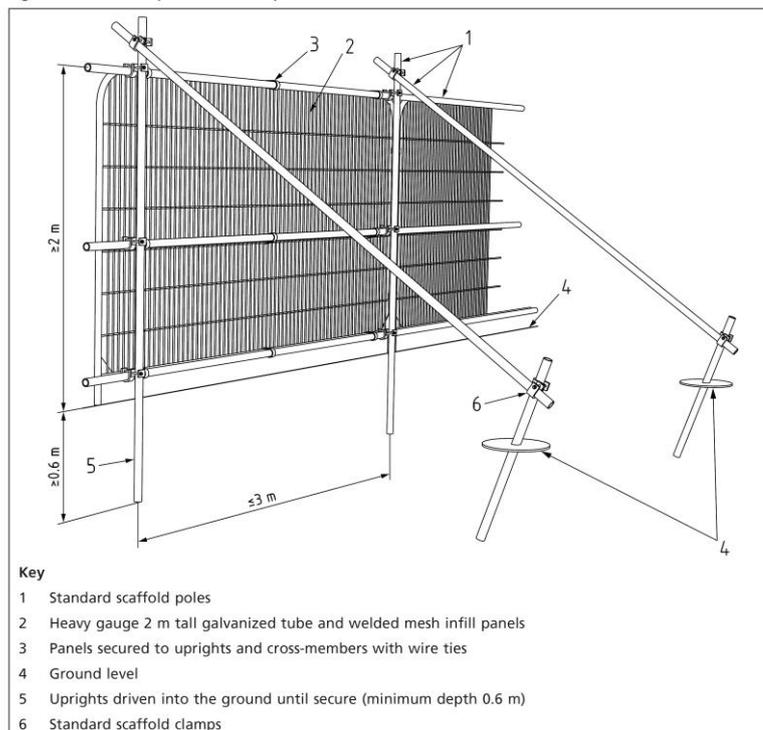
- either the use of temporary ground protection measures to prevent compaction by spreading the load from any site traffic that may pass over the ground, and contain accidental spillages of toxic substances of those places where trees' roots may be found,
- or the adoption of no-dig construction techniques if an area of hard-surfacing is required to encroach over the RPA of a retained tree.

Exclusion

A.9 The default specification for a protective barrier fencing is given in clause 6.2.2.2 of BS 5837:

... a vertical and horizontal scaffold framework, well braced to resist impacts, as illustrated in Figure 2. The vertical tubes should be spaced at a maximum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels should be securely fixed. ... If the presence of underground services precludes the use of driven poles, an alternative specification should be prepared in conjunction with the project arboriculturist that provides an equal level of protection.

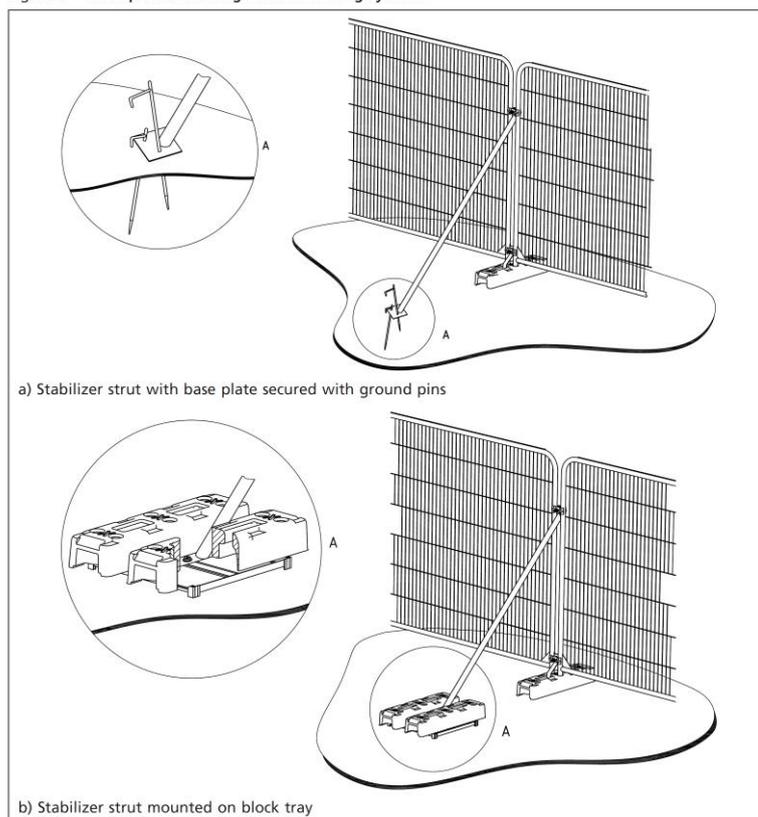
Figure 2 Default specification for protective barrier



A.10 An alternative specification, for use where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, is given in clause 6.2.2.3:

... 2 m tall welded mesh panels on rubber or concrete feet joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence.... The panels should be supported on the inner side by stabilizer struts, which should normally be attached to a base plate secured with ground pins (Figure 3a below)

Figure 3 Examples of above-ground stabilizing systems



A.11 Information signs, like those shown below, should be displayed on the CEZ at suitable intervals, usually on every other panel and at no more than 10 m centres: each individual sign should be A4 in size, laminated, hole punched and secured to the panel with cable ties:



Prevention

A.12 If temporary ground protection measures are required, for example to provide temporary access for site traffic, then several proprietary solutions are available that offer a specification that is sufficiently robust to withstand damage from vehicle movements, including (but not limited to):

- bogmats.co.uk/hire/
- gallagherstaging.com/hexagon-ground-protection-rentals/

- ground-guards.co.uk/products/bog-mats/

A.13 For small areas lay heavy-duty polythene sheeting on the ground (any hollows can be filled with wood chip for example to create a level surface) and then scaffold boards, close butted, can be laid upon the polythene. The polythene will prevent contamination from work activity seeping into the soil and possibly causing harm to the retained trees, the scaffold boards will spread any loads.

A.14 If the proposed development were to include a permanent hard surface that encroached over the RPA of the retained trees then then “no-dig” principles should be followed, if roots are found to be present. In other words:

- installation of the surface treatment must take place above existing ground level, and
- any covering of the ground must be permeable to allow for the continued aqueous and gaseous exchange by the trees’ roots in the soil profile.

A.15 As with temporary ground protection measures (see above) there are several proprietary solutions available upon which a permanent surface may be overlaid, and adopting any one of these will allow access to be achieved whilst causing no harm to the retained tree’s roots and the soil volumes in which those roots might be expected to be found, including (but not limited to):

- <http://www.geosyn.co.uk/product/cellweb-tree-root-protection>
- <http://www.greenblue.com/gb/type/urban-tree-planting-systems/>
- <http://www.terram.com/products/geocells/tree-root-protection-geocell.html>

A.16 If the access were to become permanent then a surface-mounted load-bearing reinforced concrete raft that will be retained, rather than removed, could be poured and used as part of the construction of the access into the completed site. I re-iterate that I have no technical engineering competence, but I have been advised that a raft that was at least 150 mm deep would be adequate spread the load of the typical fully-laden wagon that would be expected to make deliveries to, or to take a load from, a development site.

- a suitable membrane should be laid over the ground for the complete width and length of the proposed access
- shuttering should be erected that will allow the concrete to be poured to form the access, the minimum depth of the raft should be determined by a competent engineer
- reinforcing bar should be laid within the shuttering to the engineer’s specification
- within the footprint of the access a series of cardboard tubes, perhaps up to 100 mm in diameter, should be held upright on pins or canes
- after the network of cardboard tubes has been set out the concrete may be poured, the specification to be determined by a competent engineer.
- once the concrete has set the cardboard tubes can be removed, they will have created a series of holes in the raft, to be filled with 10 mm gravel that will allow for the passage of air and water through the raft to the soil below

A.17 If the proposed development were to include a permanent structure within the RPA then BS 5837 states at 5.3.1:

.... where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s).

and then at 7.2:

To avoid damage to tree roots, existing ground levels should be retained within the RPA. Intrusion into soil (other than for piling) within the RPA is generally not acceptable, and topsoil within it should be retained in situ. However, limited manual excavation within the RPA might be acceptable, subject to justification. Such excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.

Breaking the ground

A.18 If the ground must be broken within the RPA of a retained tree to construct foundations, to ascertain the presence / absence of tree roots to the idealised foundation depth at key points for example, then the topsoil must be excavated with care and precision in accordance with the guidance in BS 5837:

7.2.1 To avoid damage to tree roots, existing ground levels should be retained within the RPA. Intrusion into soil (other than for piling) within the RPA is generally not acceptable, and topsoil within it should be retained in situ. However, limited manual excavation within the RPA might be acceptable, subject to justification. Such excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.

A.19 The excavations should be initially carried out using hand tools to ascertain the presence/absence of retained tree roots: if no roots are found then machinery can be deployed on load-spreading mats to complete the excavation.

A.20 Any tree roots that are exposed during the excavation should be treated in accordance with the following details from BS 5837:

7.2.2 Roots, whilst exposed, should immediately be wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

7.2.3 Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist, as such roots might be essential to the tree's health and stability.

7.2.4 Prior to backfilling, retained roots should be surrounded with topsoil or uncompacted sharp sand (builders' sand should not be used because of its high salt content, which is toxic to tree roots), or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

The stem and crown

A.21 Damage to the retained trees' stems and canopies may arise from accidental collisions with site traffic. Once the site has been fully set out (including the location of temporary site buildings, welfare facilities, storage areas, parking areas etc.), and the temporary tree protection measures installed, it would be prudent to consider the need for any tree pruning to lift the canopies or reduce the crown spreads to prevent any accidental damage during the work activity.

A.22 The retained trees' crowns may encroach into the working space required to demolish an existing building or to carry out the proposed development and this conflict is another potential cause of harm that may be mitigated by pruning to lift the trees canopies or reduce their radial spread to prevent any accidental damage during the work activity.

A.23 Because trees on a development site are likely to be retained or protected because they contribute toward the local amenity then their pruning should be to a good technical and aesthetic standard. Branch reduction or removal should not leave any stubs that may attract decay organisms. If branch length is being reduced the pruning wound should be at a suitable growth point, and the pruning should seek to result in a canopy of attractive and natural appearance with branches pruned where there is a lateral branch of appropriate diameter to maintain a flowing canopy.

A.24 Because tree work is inherently dangerous then it would be appropriate to engage a competent arboricultural contractor to safely undertake the work against a specification prepared by a competent arboricultural consultant. Evidence of training for the tasks being performed by the named members of staff should be requested from the contractor prior to awarding the work, and the evidence presented should be compared with, for example, the schedule of Level 3 competences available under the NPTC scheme (see <https://goo.gl/KaCXWD>).

- A.25 Once the development has been completed it may be necessary to initiate a programme of remediation pruning, i.e. to remove those limbs that may have been accidentally damaged during the work activity. As noted above it would be appropriate to engage a competent arboricultural contractor to undertake this pruning against a specification prepared by a competent arboricultural consultant.

Arboricultural site monitoring

- A.26 As noted in the introduction to this Appendix the control measures should be agreed on site at a formal meeting between the project manager, the project arboriculturist and the local authority's Tree Officer before any work activity commences.
- A.27 The final alignment of the ground and tree protection measures should be documented and recorded on the first Arboricultural Site Monitoring Sheet.
- A.28 The control measures should remain in place for the duration of the development without being breached, lifted, moved or opened unless the express permission of the Tree Officer has been obtained, and the opening and re-closing of the breach must be overseen by the project arboriculturist. Any amendment that is permitted should be documented and recorded on the Arboricultural Site Monitoring Sheet.
- A.29 The integrity of the control measures should be monitored by a competent arboriculturist throughout the development, and the reports submitted to the project manager and the Tree Officer, a template for an is included below.
- A.30 Throughout the duration of the development the integrity of the control measures can be assessed during unannounced site visits, the same Arboricultural Site Monitoring Sheet can be used to record the outcome of those visits.
- A.31 Once the development has been completed the Tree Officer should be invited to a formal, minuted, meeting to confirm the completion of the build and then to witness and sign off the controlled removal of the tree protection measures.

Arboricultural Site Monitoring Sheet

Client	
Project	
Inspector	
Others present	
Date	
Weather	
Sheet detail	
Sheet number	

Aspect to be monitored	Yes	No	Comments	Signature
1. Has the protective fencing been installed?				
2. Are the information signs on the protective fencing in place?				
3. Has the protective fencing been moved?				
4. Have the trees sustained visible damage since the previous inspection?				
5. Has the condition of the trees altered since the previous inspection?				
6. Are there any scheduled works within the protective fencing?				
7. Have those works been agreed in writing with the local planning authority?				
8. Is the ground protection sufficient?				
9. Are any additional measures required to protect the trees?				
10. Can the protective fencing be removed?				

Notes

Appendix 2 – a selection of site photos



The exotic conifers and mountain ash that are proposed for removal



The apple tree that is to be retained