



PLANNING APPLICATION

ARBORICULTURAL IMPACT ASSESSMENT

FOR

MR DREWE & MRS TAYLOR

AT

No. 1

THE DERRY

ASHTON KEYNES

SWINDON

SN6 6PW

1297 -BDR-V1-XX-ST-A- 6107

[illegible]

There are no works that are anticipated to effect any trees or hedges within or bounding the site with a stem diameter greater than 75mm (235mm circumference), when measured at 1.5m above ground level.



- Abbreviations:
 - RPA : Root protection area
- Botanical tree names:
 - Acacia : Robinia pseudoacacia
 - Birch : Betula pendula
 - Blue Atlantic cedar : Cedrus libani atlantica
 - Glauca Group
 - Corsican pine : Pinus nigra var. calabrica
 - Deodar cedar : Cedrus deodara
 - Hazel : Corylus avellana Holm oak : Quercus ilex
 - Larch sp : Larix sp
 - Leyland Cypress : Cupressus x leylandii
 - Lawson cypress : Chamaecyparis lawsoniana
 - Maritime pine : Pinus pinaster
 - Mountain redwood : Sequoiadendron giganteum
 - Oak : Quercus robur
 - Scots pine : Pinus sylvestris
 - Sweet chestnut : Castanea sativa
 - Western red cedar : Thuja plicata
- Botanical hedge names:
 - Blackberry : Rubus sp
 - Blackthorn : Prunus spinosa
 - Common dog violet : Viola riviniana
 - Crab apple : Malus sylvestris
 - Cuckoo pint : Arum maculatum
 - Dog's mercury : Mercurialis perennis
 - Dog-rose : Rosa canina
 - Dogwood : Cornus sanguinea
 - Elder : Sambuca nigra
 - Field Maple : Acer campestre
 - Hawthorn : Crataegus
 - Hazel : Corylus
 - Leylandii hedge plants : Cupressocyparis x leylandii
 - Primrose : Primula vulgaris
 - Sweet violet : Viola odorata
- BS 5837 (2005) compliance: All data has been collected based on the recommendations set out in subsection 4.2 of BS 5837.
- Category: Our assessment automatically considered tree physiological condition (BS 5837 4.2.6h) and structural condition (BS 5837 4.2.6i), so these are not listed separately in the schedule. Additionally, the category accounts for the remaining contribution (BS 5837 4.2.6k) as greater than 10 years for A and B trees and less than 10 years for C and R trees, so this is also not listed separately in the schedule.
- 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 '*'.
- Height: Height is estimated to provide a broad indication of the size of the tree.
- Low branches: Only large, low branches that would not be feasible for removal during normal management and should be considered as a design constraint are noted.
- 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 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.
- Minimum barrier distance: The minimum barrier distance has been assessed according to the recommendations set out in 5.2.3 of BS 5837. This advises that the basic RPA can be interpreted as a square surrounding the trunk. Based on this recommendation, the closest point to the perimeter of that square creates a minimum barrier distance.
 - Explanation of any minimum barrier distance adjustment: In clause 5.2.4 of BS 5837, it is recommended that the RPA may be changed in shape, taking into account local site factors as assessed by an arboriculturist. Where such an adjustment is appropriate and results in a reduced minimum barrier distance, it should be noted with a short explanation.
- NHBC limitations: All data has been collected for the sole use of identifying the development constraints in the planning process. It is not intended for use in conjunction with the NHBC guidance or Building Control for calculating foundation depths and should not be used for that purpose without authorisation from BDR Design Limited.
- Root protection area: The RPA has been assessed according to the recommendations set out in

Table 2 and section 5 of BS 5837. It is calculated by multiplying the radius squared by 3.142, derived from the area of a circle being πr^2 .

- Root protection area radius: The RPA radius has been calculated by multiplying the trunk diameter by 12 if it is measured at 1.5m above the ground or by 10 if it is measured at ground level.
- Site limitations: 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 a walkover tree survey and, if heavy ivy is present, tree condition is assessed from what can be seen from the
- 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.
- Trunk diameter: Trunk diameter is estimated or measured and recorded in centimetres. 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. Where diameter is estimated, it is recorded in 5cm increments. For trees with a single trunk, it is taken at 1.5m above ground level. Where trees have multiple stems, it is taken immediately above the root flare.

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 is that no relevant features were observed.

- Tree works: The inspection of all trees was of a preliminary nature and only defects visible from the ground have been identified. Each individual tree may not have been inspected closely because of access difficulties and only defects visible from the inspection point have been noted. In addition to tree removals for development and management reasons, further works are listed to establish acceptable levels of risk. All trees should be crown cleaned and lifted to 4m above the site and hedges pruned back to reform the original hedge form where appropriate. Only works in excess of this have been listed for individual trees. The following points should also be noted before carrying out any works:
 - 1 Reporting during work operations: In the context of the preliminary nature of the tree inspection, any defects that may affect tree safety discovered by the contractor when carrying out the work recommendations should be reported to the supervising officer. Modification to the schedule of works may be required because of these reports. The contractor should be specifically instructed on this point.
 - 2 Recommendations for Tree Work as modified by more recent research. It is advisable to select a contractor from the local authority list and preferably one approved by the Arboricultural Association. Their Register of Contractors is available free from Ampfield House, Romsey, Hants, SO51 9PA - Telephone 01794 368717; website www.trees.org.uk/contractors.htm .
 - 3 Statutory wildlife obligations: The Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000 provides 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 must be obtained before undertaking any works that might constitute an offence.
 - 4 Stumps: Stumps to be removed within the RPAs of retained trees should be ground out with a stump grinder to minimise any disturbance unless otherwise authorised by the supervising officer.

Illustrative specification for barriers near trees according to BS 5837 (2005) recommendations.
Note: The final design must be site specific and detailed by an appropriately qualified expert.



Heras fencing wired to scaffold braced posts

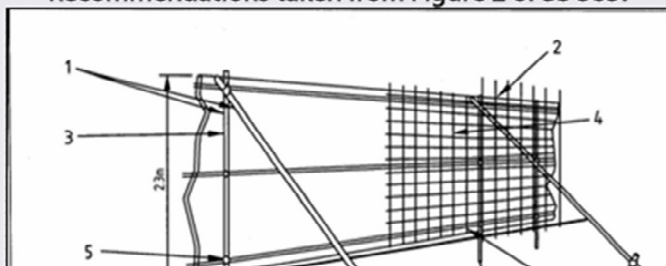


Board specification on secure wooden posts

Explanatory notes

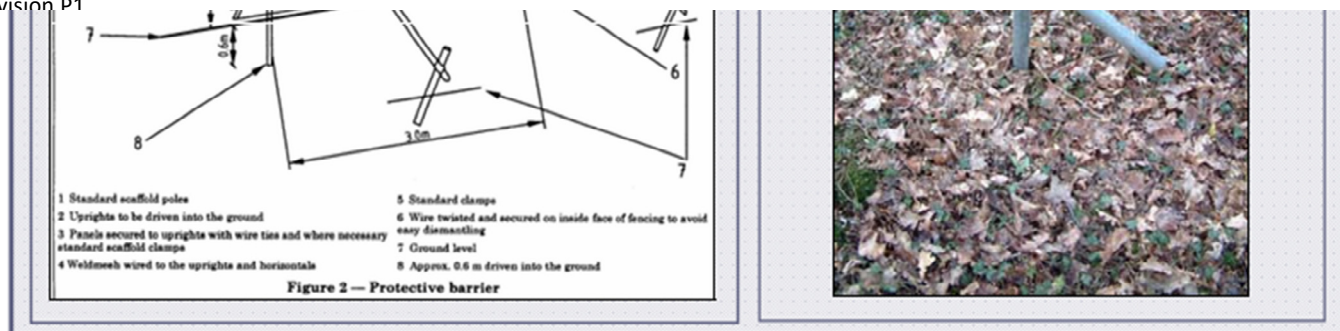
- 1 Barriers should be installed at the location illustrated
- 2 All uprights should be fixed in position for the duration of the development activity as either scaffold tubes or wooden posts banded or dug into the ground and braced sufficiently to withstand the pressures of everyday site work.
- 3 The framework supported by the uprights must be suitable for firmly attaching either heras panels or heavy duty ply in a way that will not allow the facing to be easily moved.
- 4 Minimum barrier height is 2.3m unless otherwise agreed with council.
- 5 Inside the protective barrier, the following rules must be strictly observed:
 - No vehicular access
 - No fires
 - No storage of excavated debris, building materials or fuels
 - No mixing of cement
 - No service installation or excavation without written consent of council
 - No excessive cultivation for landscape planting
- 6 No barriers should be moved or temporarily dismantled without the written permission of the council.
- 7 Barrier condition to be regularly monitored to ensure it remains effective.

Recommendations taken from Figure 2 of BS 5837



Close up of bracing detail

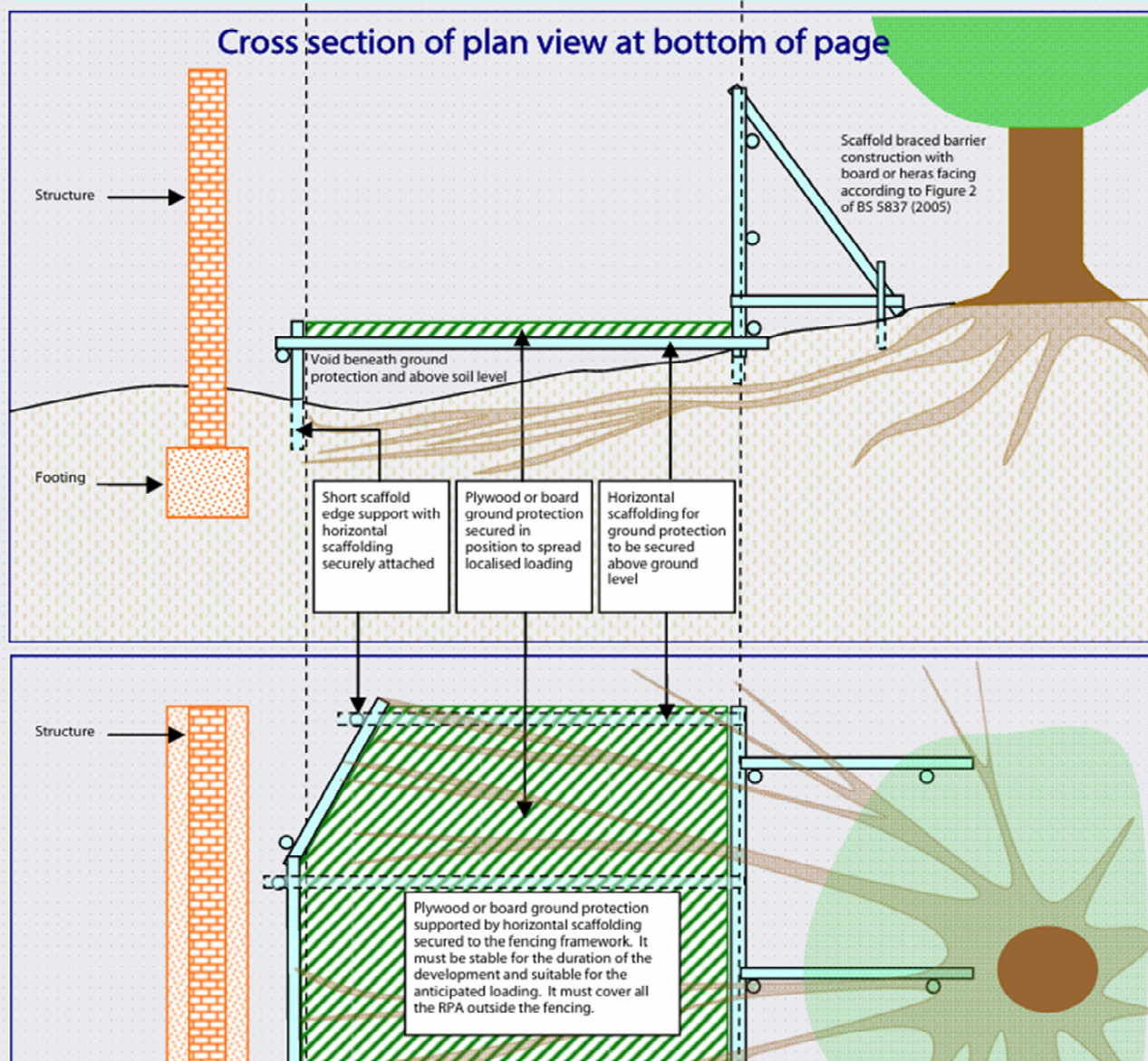


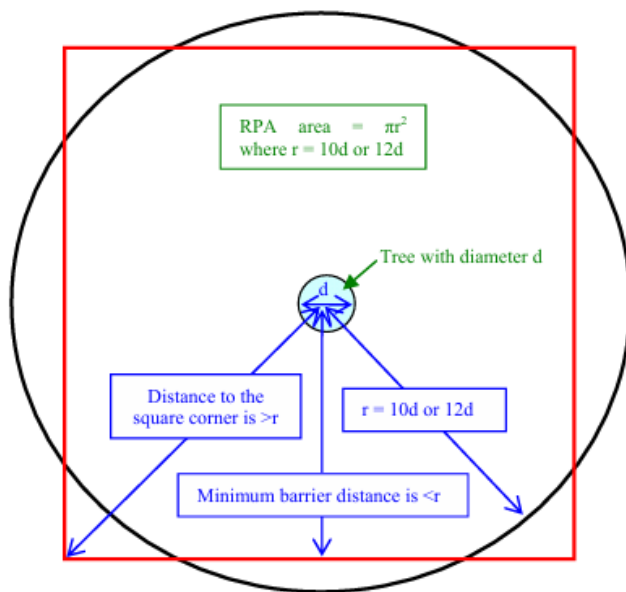


Illustrative specification for ground protection in root protection areas using scaffolding to support the ground protection surface. **Note:** The final design must be site specific and detailed by an engineer.



Cross section of plan view at bottom of page





A tree with diameter d is in the centre. Its root protection area radius is established by measuring the trees diameter (d) at 1.5m or at ground level (See Clause 5.2.2 of BS 5837) and multiplying that by 12 (if measured at 1.5m) or 10 (if measured at ground level). The root protection area is calculated by multiplying the square of the radius by π (3.142), i.e. the RPA = πr^2 , which is shown by the black circle. Clause 5.2.3 of BS 5837, sets out that the RPA can also be represented by a square centred on the trunk of the tree (red square). This square has the same area as the circle but, unlike the circle, where the distance to the centre remains the same for any point on the circumference, the distance of the sides from the centre vary from a minimum that is less than r to a centre-to-corner

distance that is greater than r . This is why the minimum barrier distance can be less than r if there is a distance greater than r that allows the RPA to remain the same. The minimum barrier distance is calculated by finding the square root of the RPA, which gives the length of one side of the square, and dividing that by two to give the distance from the side to the centre.

GENERAL GUIDANCE FOR WORKING IN ROOT PROTECTION AREAS

- Anyone entering a RPA must follow this guidance if important trees are to remain unharmed. Anyone working in a RPA must take care to minimise excavation into existing soil levels and limit any fill or covering that may adversely affect soil permeability. There are two main scenarios where this guidance must be followed when entering and working within a RPA:
 - 1 Removal of existing surfacing/structures and replacement with new surfacing, structures and/or landscaping.
 - 2 Preparation and installation of new surfacing, structures and/or landscaping.
- This guidance should always be read in conjunction with the site plans illustrating the areas where specific precautions are necessary. Each area where precautions are required is annotated on the plans as identified on their keys. All plans are illustrative and intended to be interpreted in the context of the site conditions when the work is started. All protective measures should be installed according to the prevailing site conditions and agreed as satisfactory by the appropriate supervising officer before any demolition or construction work starts.
- This guidance is based on the assumption that the minimum general standards for development issues

are those set out in British Standards Institution (2005) BS 5837: Trees in relation to construction – Recommendations and the National Joint Utilities Group (2007) Volume 4, Issue 1: Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. It is interpreted in the context of our experience of managing trees on development sites.

- Any part of the RPA beyond the agreed work area must be isolated from the work operations by protective barriers or ground protection to at least the minimum standard described in BS 5837 for the duration of the work.
- All excavation must be carried out carefully using spades, forks and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air may be an appropriate alternative to hand digging, if available. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help locate any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark. Exposed roots to be removed should be cut cleanly with a sharp saw or secateurs 10–20cm behind the final face of the excavation. Roots temporarily exposed must be protected from direct sunlight, drying out and extremes of temperature by appropriate covering. Roots greater than 2.5cm in diameter should be retained where possible. Roots 2.5–10cm in diameter should only be cut in exceptional circumstances. Roots greater than 10cm in diameter should only be cut after consultation with the appropriate
- Any work within RPAs requires a high level of care. Qualified arboricultural supervision is essential to minimise the risk of misunderstanding and misinterpretation. Site personnel must be properly briefed before any work starts. Ongoing work must be inspected regularly and, on completion, the work must be signed off by the arboriculturist to confirm compliance by the contractor. In the context of this guidance, an appropriate supervising officer would normally be an arboriculturist.

REMOVING SURFACING/STRUCTURES IN ROOT PROTECTION AREAS

For the purposes of this statement, the following broad definitions apply:

Surfacing: Any hard surfacing used as a vehicular road, parking or pedestrian path including tarmac, solid stone, crushed stone, compacted aggregate, concrete and timber decking. This does not include compacted soil with no hard covering.

Structures: Any man-made structure above or below ground including service pipes, walls, gate piers, buildings and foundations. Typically, this would include drainage structures, car-ports, bin stores and concrete slabs that support buildings.

- Roots frequently grow adjacent to and beneath existing surfacing/structures so great care is needed during access and demolition. Damage can occur through physical disturbance of roots and/or the compaction of soil around them from the weight of machinery or repeated pedestrian passage. This is not generally a problem whilst surfacing/structures are in place because they spread the load on the soil beneath and further protective measures are not normally necessary. However, once they are removed and the soil below is newly exposed, damage to roots becomes an issue and the following guidance must be observed:
 - No vehicular or repeated pedestrian access into RPAs unless on existing hard surfacing or custom designed ground protection.
 - Regular vehicular and pedestrian access routes must be protected from compaction with temporary ground protection as set out in BS 5837
 - RPAs exposed by the work must be protected as set out in BS 5837 until there is no risk of damage from the development activity.
- Removing existing surfacing/structures is a high-risk activity for any adjacent roots and the following guidance must be observed:
 - Appropriate tools for manually removing debris may include a pneumatic breaker,

crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow.

Secateurs and a handsaw must also be available to deal with any exposed roots that have to be cut.

- Machines with a long reach may be used if they can work from outside RPAs or from protected areas within RPAs. They must not encroach onto unprotected soil in RPAs.
 - Debris to be removed from RPAs manually must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction of soil. Alternatively, it can be lifted out by machines provided this does not disturb RPAs.
- Great care must be taken throughout these operations not to damage roots as set out in above.
- If appropriate, leaving below ground structures in place should be considered if their removal may cause excessive root disturbance.

INSTALLATION OF NEW SURFACING IN ROOT PROTECTION AREAS

- New surfacing is potentially damaging to trees because it may require changes to existing ground levels, result in localised soil structure degradation and/or disrupt the efficient exchange of water and gases in and out of the soil. Mature and over mature trees are much more prone to suffer because of these 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 surfacing 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 beyond the scope of this guidance and must be provided separately by the appropriate specialist.
- The precise location and depth of roots within the soil is unpredictable and will 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 a turf layer up to 5cm is unlikely to be damaging to trees. 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 beyond 5cm is anticipated. On undulating surfaces, finished gradients/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 officer before a final decision is made.
- 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. 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. In some situations, limited width floating concrete rafts constructed directly on to the soil surface may be acceptable but the design must not include any strip-dug supports.
- Conventional kerb edge retention set in concrete filled excavated trenches is likely to result in damage to roots and should be avoided. Effective edge retention in RPAs must be custom designed to avoid any significant excavation into existing soil levels. For most surfaces, the use of pre-formed edging

secured by metal pins or wooden pegs is normally an effective way of minimising any adverse impact on trees from the retention structure.

In some instances, existing surfacing can be retained and used as a base for new surfacing. Normally, this will not result in significant excavation that could expose roots so special precautions are not necessary. However, if large roots already protrude above the proposed sub-base level, then the precautions and procedures set out above must be observed.

INSTALLATION OF NEW STRUCTURES IN ROOT PROTECTION AREAS

- New structures in RPAs are potentially damaging to trees because they may disturb the soil and disrupt the existing exchange of water and gases in and out of it. Mature and over-mature trees are much more prone to suffer because of these changes than young and maturing trees. Adverse impact on trees can be reduced by minimising the extent of these changes in RPAs. This can be done by constructing the main structures above ground level on piled supports and redirecting water to where it is needed. The detailed design and specification of such structures is an engineering issue that should be informed and guided by tree expertise.
- Light structures such as small sheds and bin stores, do not normally require substantial foundations and can have permeable bases. Ideally, their bases should be of a no-dig, load-spreading construction set directly on to the soil surface. They require a flat base and so an undulating site will need levelling to provide a suitable surface. Excavation of any high points by up to 5cm and filling depressions with permeable fill to provide a flat base will normally be acceptable provided no roots greater than 2.5cm in diameter need to be cut. If large roots are found, the preferred course of action would be to raise the base level of the structure by filling rather than cutting roots. However, if this is not practical and large roots have to be cut, the situation should be discussed with the supervising officer before a final decision is made. Above the base, there will often be a protective covering fixed onto a frame that can rise directly from the base or be fixed to supports either banged into the ground or set in carefully dug holes. Provided the supports are well spaced, i.e. greater than 1.5m apart, and of a relatively narrow diameter, i.e. not in excess of 15cm, it is unlikely they will cause any significant disturbance to RPAs.
- Conventional strip foundations in RPAs for any significant structure may cause excessive root loss and are unlikely to be acceptable. However, disturbance can be significantly reduced by supporting the above ground part of the structures on small diameter piles and beams or cast floor slabs set above ground level. The design should be sufficiently flexible to allow the piles to be moved if significant roots are encountered in the preferred locations. Before the actual installation of the new structure starts, all RPAs that may be affected should be covered with temporary ground protection as set out in BS 5837. Gaps in the ground protection should be left where it is expected to install the piles or dig the holes for gate piers. Pile locations should be initially hand dug to a depth of 75cm to establish if there are any significant roots over 2.5cm in diameter that could be damaged. If significant roots are found, then the pile location must be moved slightly and a new exploratory hole dug. Once the piles have been installed, the lowest points of the supporting beams for the structure must be above the ground level between the piles and there should not be any further excavation. The beams between the piles can be pre-cast and imported to the site ready to fix or can be cast in position using shuttering for the sides and a biodegradable void-former for the base. Gate piers generally require larger holes and have less flexibility for relocation if large roots are found. Localised loss of roots may be unavoidable so each situation should be assessed on its own merits by an appropriate supervising officer once the careful excavations have been completed. Any roots found should be dealt with as set out in above. When installing any of these structures, the ground protection must remain in place until the construction is completed and there is no risk of damage to RPAs.
- A free-standing wall on an existing foundation is unlikely to require any additional excavation and so its construction should have no adverse impact on RPAs if the appropriate protection is in place. However, replacing walls that retain the soil of RPAs normally requires some limited excavation back into the exposed soil face to provide a working space of at least 10–20cm behind the inside wall face. This should be done carefully and limited to no more than required to construct the new wall. Any roots found should be dealt with as set out in above. Once the wall is completed, any voids behind it should

- be filled with good quality top soil and firmed into place but not over compacted. Specific difficulties with large roots that emerge during the course of the construction should be referred to the supervising
- Excavation to upgrade existing services or install new services in RPAs may damage retained trees and should only be chosen as a last resort. In the event that excavation emerges as the preferred option, the decision should be reviewed by the supervising officer before any work is carried out. If excavation is agreed, all digging should be done carefully and follow the guidance set out above.

SOFT LANDSCAPING IN ROOT PROTECTION AREAS

- For the avoidance of doubt, soft landscaping includes the reprofiling of existing soil levels and covering the soil surface with new plants or an organic covering (mulch). It does not include the installation of solid structures or compacted surfacing. 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 close to 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.