ARBORICULTURAL IMPACT ASSESSMENT

AT

14 Frognal, London, NW3 6AG

By

AH ARCHITECTURE

SUMMARY

I have inspected all the trees in the vicinity of the site that could be affected by the development and list their details in Appendix A. The indicative layout is for the construction of a single storey detached outbuilding to the rear of the garden. The design proposal requires works within the root protection areas (RPAs) of a number of mature trees. The main construction work generally has minor encroachment into the RPAs of the retained trees although extensive landscaping works are proposed. Provided the guidelines are followed in the method statement we do not consider the long-term potential of the trees is at risk from the proposed developments.

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1.1. Drawings and Documents

1.1.1. We can confirm sight of the following documents and drawings:

- Existing/Proposed Topographic Survey drawing number AH730/01

2. Report on site visit

2.1. General

2.1.1. The site was inspected on 15th April 2025. All arboricultural data contained in this report was recorded at that time. Weather conditions were clear and sunny with light winds and good visibility.

3. Tree inspection and methodology

3.1. Inspection

3.1.1. Trees likely to be affected by any developments were identified and inspected from ground level only and were not climbed. No invasive examination technique (such as increment boring, or internal decay detection) was carried out. As the inspection was visual only, no guarantee, either expressed or implied, of the internal condition of the wood of these trees can be given.

3.2. Marking

3.2.1. Trees surveyed were referenced with a number corresponding to the particular tree on the site plan. Where appropriate, close growing trees were entered as a group and given a generic entry within the tree schedule. Trees not included in the original topographic survey were plotted using linear measurements along the length of the site and there may be some adjustment required on receipt of a full site survey.

3.2.2. Each reference number refers to a survey sheet entry completed on site to show the following data:

- Sequential tree reference number (recorded on tree survey plan)
- Species - Common name followed by the Latin name for the first entry of each different species
- Height in metres
- Trunk diameter in millimetres, measured in accordance with Annex C of BS 5837:2012
- Crown radius measured at the four cardinal points – where only one measurement is given, the crown is symmetrical
- First significant branch height and direction of growth
- Crown clearance above ground level
- Life stage (young, semi-mature, early mature, mature, over-mature, veteran)
- General observations, particularly of structural and/or physiological condition, and/or preliminary management recommendations
- Estimated remaining contribution in years (less than 10, 10+, 20+, more than 40)
- Category U or A to C grading, to be recorded on the tree survey plan

3.2.3. Survey sheet entries are shown at Appendix A of this report.

3.3. Tree categorisation

3.3.1. Trees vary in, size, age, and landscape importance. All trees were categorized in accordance with the British Standard Trees in relation to design, demolition and construction - recommendations BS 5837: 2012. BS Categories have been entered in the tree schedule and are as follows:

U – **Trees unsuitable for retention**. Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

A - **High Category.** Trees of high quality with an estimated remaining life expectancy of at least 40 years.

B - **Moderate Category.** Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

C - **Low Category.** Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

4. Brief Site Description

4.1. General

The application site is located at Garden Flat, 38, Frognal, London, NW3 6AG. The building itself is a four storey Detached property divided in flats and is situated within the Redington Frognal Conservation Area. The Conservation Area is a designated heritage asset as described by the NPPF and great weight should be accorded to the protection of the heritage asset, and its character and context has therefore strongly informed the development of the proposals. This part of the Conservation Area is characterized by large-scale, of around four storeys (some properties subdivided) and includes variations on Queen Anne or freestyle. Many properties are red brick with terracotta heraldic reliefs (royalty, facial, basal) and have prominent gables and some tile hanging. There are white timber frame windows, some with round or cambered heads or ocular windows, and some with small panes.
There is a line of Lime trees adjacent to the site boundary in the rear garden

4.2. Tree Preservation Orders

The Town and Country Planning (Tree Preservation) (England) Regulations 2012 allows for trees either as groups, or individuals, or as woodlands, to be protected by Tree Preservation Orders (TPO). These have the effect of preventing the cutting down, topping, lopping, uprooting, wilful damage or wilful destruction of trees except in certain circumstances, other than with the consent of the local planning authority.

4.2.1. A Conservation Area is an area designated by the Local Planning Authority as one of “special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance”. Special controls exist with regard to demolition and alteration of buildings; Listed Building Consent must also be obtained for any demolition, even if the building is not itself listed. Similarly, trees are given some protection with the requirement for the local authority to be given six weeks written notice before carrying out any work on trees; this gives the authority time to decide if a TPO is necessary.

4.2.2. There are no TPO trees present on site.

4.3. Development Proposal

4.3 The development proposal is to construct a single storey detached garden room/Gym for applicants enjoyment.

5. Tree Population

5.1. Tree schedule

5.1.1. Refer to appendix A for detailed records of individual trees and drawings.

5.2. Root Damage

5.2.1. Trees that are growing satisfactorily have achieved equilibrium with their surroundings. Any construction work that affects this equilibrium could be detrimental to health, future growth and the safety of the tree.

5.2.2. The part of the tree most susceptible to damage is the root system, which, because it is not immediately visible, is frequently ignored. Damage or death of the root system will affect the health, growth, life expectancy and safety of the rest of the tree. The effects of such damage may only become evident several years later.

5.2.3. The majority of a tree's root system is generally considered to be in the top 600mm of the soil, extending radially in any direction for distances frequently in excess of the tree's height. However, roots are adventitious and if conditions suitable for root development exist to a greater depth, the roots may extend to depths of three metres or more. Works within the root spread may damage the root system.

5.2.4. Close to the trunk are the main structural roots that develop in response to the tree's need for structural stability. Beyond these major roots, the root system rapidly subdivides into smaller diameter roots; off this main system a mass of fine roots develop.

5.2.5. Tree root systems can be damaged in a number of ways during construction works. Root severance. Severing of a root will destroy all parts of the root beyond that point. Even roots less than 10mm diameter may be serving a mass of fine roots over a large area. The larger the root severed, the greater the impact on the tree.

- Damage to root bark. The bark protects the root and is essential for further root growth; it is loosely attached and easily damaged. If damage extends around the whole circumference, the root beyond that point will be killed.

- Compaction of the soil. Compaction of the ground reduces the space between soil particles, particularly in clay soils. A single passage of heavy equipment or the storage of materials can cause significant damage. Compaction can restrict or even prevent gaseous diffusion through the soil and thereby asphyxiate the roots. The roots must have oxygen for survival, growth and effective functioning.

- Alterations in ground levels. Lowering the level will strip out the mass of roots near to the surface. Raising the ground levels will have the same effect as compaction.

- Covering the rooting area with impervious surfaces. This prevents natural diffusion of gases between the soil and the atmosphere and can lead to oxygen depletion in the soil.

- Direct toxicity of some materials. For instance, petrol or diesel spillage or lime in cement can kill underlying roots.

- Wounding. Minor wounds to root bark can allow pathogens into the tree root system that can lead to a further impairment of water absorption. The general debilitation of trees due to root severance can make them more susceptible to invasion by some decay fungi such as Armillaria spp.

- Damage to the fine roots by severance of a main root, or by compaction, or by alteration of levels, will prevent the fine roots absorbing the water and nutrients essential for tree growth. The effects of damage from different causes will be cumulative.

5.2.6. The effects of tree root damage may not be immediately apparent. If the root system is capable of rapid regeneration, the tree may recover without noticeable ill effects, though usually symptoms take several years to develop. The range of symptoms varies from minor branch dieback, to deterioration and ultimate tree death depending on the severity of the damage and the ability of the roots to regenerate.

6. Arboricultural Method Statement

6.1. Tree protection with barriers and ground protection.

6.1.1. All retained trees will be protected by barriers and ground protection where applicable. Where possible the protective fence will be placed at the positions indicated on the Tree protection Plan, as defined in Trees in relation to design, demolition and construction – AH730/01 and is included in Appendix B of this report. Where it is necessary to move fencing for access and construction, the existing hard surface should remain as ground protection. If it becomes necessary to remove existing hard surfacing within the RPAs, temporary ground protection **must** be installed. Refer to Appendix C section 1.2.7 for examples of ground protection.

6.1.2. All materials storage and mixing will be confined to areas outside the RPAs of the trees. Where mixing of materials is undertaken close to the RPAs, this should be on an impervious surface with no run-off to prevent chemical contamination of the RPA.

6.1.3. All tree protection measures **must** be erected before any works commence or materials or machinery is brought onto site. Once erected, barriers and ground protection are sacrosanct, and **must** not be moved or altered without prior consultation with the arboriculturist or Local Authority Tree Officer. Fencing will remain in place throughout the following processes:

- Contractor occupancy
- Plant and materials delivery
- Demolition/construction works
- Installation of utilities
- Completion of development

6.2. Installation and/or upgrading of existing services

6.2.1. Where possible, existing services into the site should be utilised keeping all new services outside RPA's. Where existing services within RPAs require upgrading or new services installed, care must be exercised to minimise any disturbance. As far as possible, trenchless installation should be the preferred option but if that is not possible, excavation must be by hand. Refer to Appendix C 1.7 for further information.

6.3. Excavations in RPAs

6.3.1. Any work in RPAs **must** be carried out with care as set out in Appendix C section 1.6. On this site special precautions **must** be taken near retained trees, particularly trees T1 and AH730/01 for locations of no-dig construction/surfacing).

6.4. Changes of Surface

6.4.1. Removal of existing surfacing (any hard surface used as a vehicular road, parking or pedestrian path including tarmac, solid stone, crushed stone, compacted aggregate, concrete and timber decking; this does not apply to compacted soil with no hard covering) is a high risk to any adjacent tree roots and guidance in Appendix C section 1.7 **must** be followed.

6.5. Installation of new Surfaces

6.5.1. Changes of surfacing within RPAs is potentially very damaging as it usually involves changes in gradient/levels that may lead to root damage. The guidance in Appendix C section 1.8 **must** be followed to minimise any impacts on retained trees. As cement is toxic to roots, any excavations close to the RPAs must be lined with an impermeable membrane to

prevent concrete leachates being exposed to roots. Whenever practicable, the old hard surface should be removed by working away from the tree so that any plant/equipment operates from the existing hard surface to prevent compaction damage.

6.6. Lightly founded structures

6.6.1. Where new fencing, gates or boundary walls are planned within the RPAs of retained trees, the excavations for supporting posts/foundations should be excavated by hand to ensure no roots are present. If significant roots >than 25mm diameter are found it may be possible to cut them under advice from a suitably qualified arboricultural professional. If the roots have to remain, the design should be suitably flexible to allow repositioning of any foundation structure. Any design involving concrete must utilise an impermeable membrane in the excavation to prevent concrete leachates contacting roots. Boundary walls can be constructed on surface beams set on micro-piles to avoid large roots and reduce excavations within the RPAs.

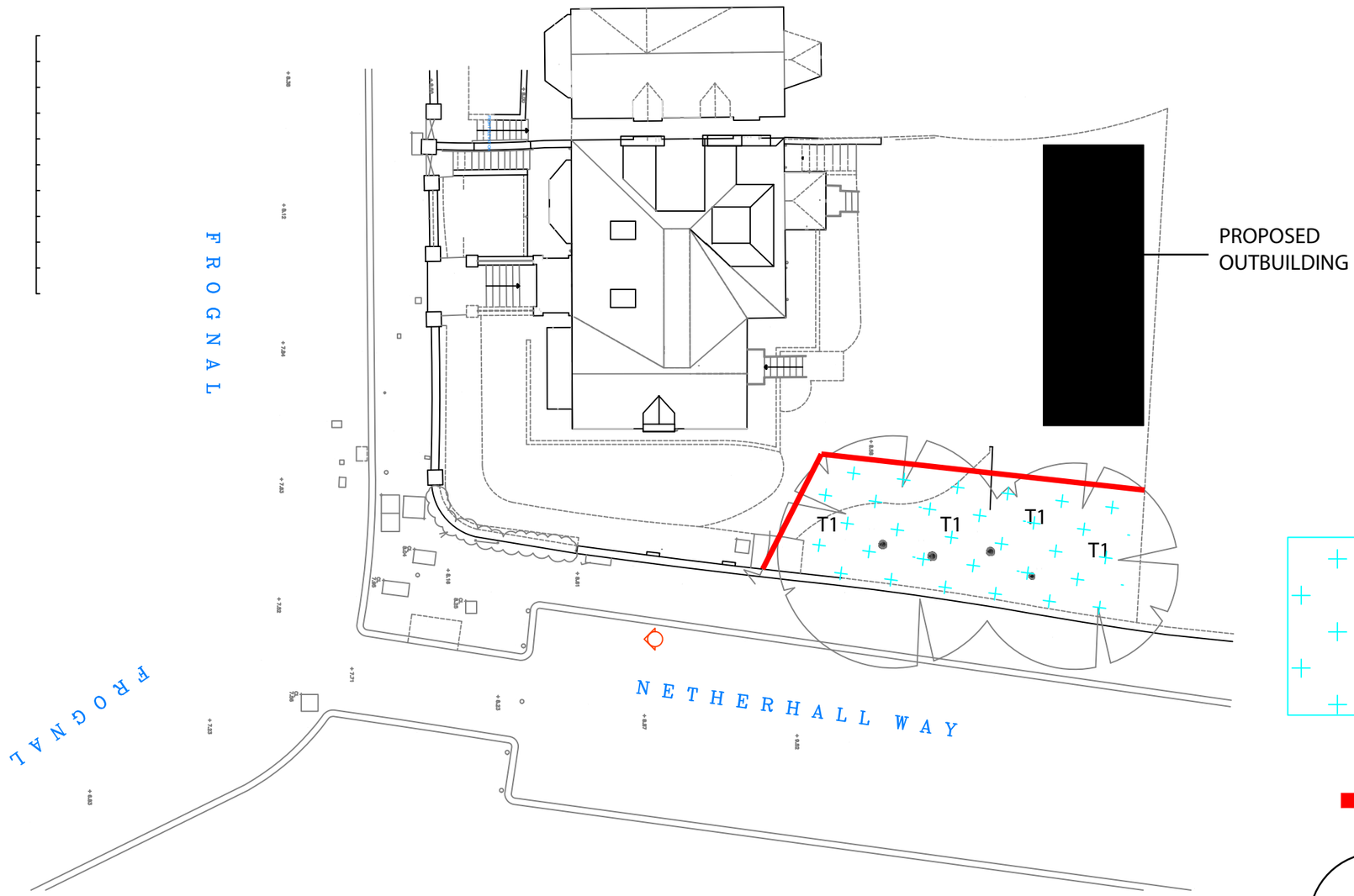
6.7. Other tree-related site works

6.7.1. **Pre-commencement site visit:** A site meeting should be held by the interested parties prior to any works. All details of the tree protection measures should be discussed to ensure adherence by all parties during the works. Any modifications to the tree protection measures must be recorded and agreed in writing.

6.7.2. **Site supervision:** Site visits by the project arboriculturist may be required by the local planning authority, particularly if works are proposed within the RPAs of retained trees. Once the site is active, the project arboriculturist will ensure compliance with arboricultural conditions and advise on tree problems or any modifications that may arise. The developer must ensure that all conditions of the arboricultural method statement and any amendments are known and fully understood by all site personnel. All personnel engaged in works near trees must have access to written copies of the method statement and understand the content before working near trees.

Notes:
Contractors must verify all dimensions on site before commencing any work or shop drawings. This drawing must not be scaled. Use figured dimensions only. Subject to statutory approvals and survey.

ALL DRAWINGS 730/01-04,
AND ENGINEER'S DETAILS TO BE READ TOGETHER



GROUND PROTECTION &

NO-DIG CONSTRUCTION

T1= EXISTING LIME TREES

PROTECTIVE FENCE

ROOT PROTECTION AREA

Existing/Proposed Site Plan (1:200)

0 4 8 12 16 20m

SCALE: 1/ 200 @ A3

This is a '**Scheme Level Drawing**' and is intended to illustrate the general arrangement of the project proposals. As it stands this drawing does not include all of the detail necessary for a full plans building regulations application.

While this drawing can be used as a base drawing for construction purposes, your building contractor may require more information. It is therefore important to discuss, with your architect & builder together, where more detail would be appropriate.

1. This drawing has been based upon a measured survey drawing by others. As a result, the precision of the dimensions indicated is dependent upon the information supplied.
2. While this drawing can be used as a base drawing for construction purposes, it is VERY IMPORTANT that all dimensions are checked carefully before any work commences or any materials are ordered.
3. This drawing can be used as part of a planning application, although your planning officer may ask for more specific information about some aspects of the design. Ask your architect for more information on planning applications.
4. Where applicable, a suitable Structural Engineer and/or a Party Wall Surveyor should be consulted. Although as far as possible these instances have been indicated, this is not necessarily exhaustive and the whole scope of proposed works should be reviewed.
5. Unless other arrangements have been specifically made, your building contractor should serve a Building Notice, as and where applicable, to your local authority to satisfy the requirements of the Building Regulations. Your building contractor should also liaise with the Building Control Officer regarding routine inspections of the work.

Further detailed design / dwgs may be needed for this section.

This symbol indicates that it may be beneficial to have more detailed design drawings prepared to illustrate elements of the proposal in more detail so that your building contractor can more fully understand the intention of the design.

You may need a Structural Engineer for this section.

This symbol indicates that structural calculations / structural design may be required, both of which should be undertaken by a suitable structural engineer. Your architect can help point you in the right direction.

You may need to consult a Party Wall Surveyor for this section.

This symbol indicates that you may need to take action in order to comply with the Party Wall Act and it may ne wise to consult a suitable Party Wall surveyor. Your architect can help point you in the right direction.

Revisions:
a. date.

All dimensions are in millimetres
All dimensions to be checked on site

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Drawing name: **Existing & Proposed Site Plan**		
Job no: **AH 730**	Drawing no: **01**	Revision: **-**
Scale: **1/200 @ A3**	Date: **24/02/2025**	Drawn by: **AH**

Project name:
14 Frognal, London, NW3 6AG

APPENDIX C TREE PROTECTION

1.1. Pre-commencement site meeting.

1.1.1. A pre-commencement site meeting is advised prior to any works commencing on site, to agree all the approved processes with the relevant concerned parties.

1.2. Protective fencing and ground protection.

1.2.1. All trees to be retained on site should be protected by barriers and ground protection where applicable. Barriers should be in place before any materials or machinery is brought onto site. Once in place, barriers and ground protection should be considered sacrosanct and should not be altered or removed without prior recommendation by an arboriculturist and approval of the local planning authority. Barriers should be fit for excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). Barriers should be maintained to ensure that they remain rigid and complete.

1.2.2. The protective fencing is to be erected prior to any site works or demolition works.

1.2.3. The barrier is to comprise of a vertical and horizontal framework (Figure 1 below), well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Weldmesh panels, such as Heras, should be securely fixed with wire or scaffold clamps to this framework. Weldmesh panels on rubber or concrete feet are not resistant to impact and should not be used. Care should be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. 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. Such alternatives could include the attachment of the panels to a freestanding scaffold support framework.

1.2.4. Where retained trees are in close proximity to the existing buildings, a higher specification hoarding will be required to prevent damage from falling rubble. In place of the weldmesh, panels solid hoarding should be used, for example, scaffold boards.

1.2.5. Where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority. For example, 2 m tall welded mesh panels on rubber or concrete feet might provide an adequate level of protection from cars, vans, pedestrians and manually operated plant. In such cases, the fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout 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 2 below). Where the fencing is to

be erected on retained hard surfacing or it is otherwise unfeasible to use ground pins, e.g. due to the presence of underground services, the stabilizer struts should be mounted on a block tray

1.2.6. It is advised that a plan be pinned up on site in highly visible areas such as in the site huts, so that all ground staff involved in the demolition and construction works have a point of reference for tree protection issues. All demolition and construction workers should be briefed on the importance of tree protection prior to works commencing. Special attention must be paid to ensure that protective fencing remains rigid and complete during the course of all works.

1.2.7. Where it is agreed that vehicular or pedestrian access for construction purposes is necessary within the RPA, ground protection measure will be required to prevent damage to the soil structure within the RPA.

1.2.8. For pedestrian access within the RPA, the installation of ground protection in the form of a single thickness of scaffold boards over a compressible layer laid onto a geotextile, or supported by scaffold, is likely to be acceptable.

1.2.9. For wheeled or tracked vehicle, access within the RPA the ground protection should be designed by an engineer to accommodate the likely loading and may involve the use of proprietary systems or reinforced concrete slabs. The structure must use a no dig design (see methodology described in 1.7 below) to prevent root severance and must prevent localised soil compaction by distributing the load across the track width. Such a system may include the use of three dimensional cellular confinement systems (CCS) as a component of the sub-base, to act as a load suspension layer.

1.2.10. New permanent hard surfacing should not cover in excess of 20% of the RPA or be wider than 3m within it; it should be constructed to be permeable to moisture and gas.

1.3. Construction exclusion zone

1.3.1. Once the construction exclusion zone (CEZ) has been protected by barriers and/or ground protection, demolition/construction can take place.

Inside the Construction Exclusion Zone (CEZ) of the protective fencing, the following prohibitions shall apply:

- No mechanical digging or scraping
- No hand digging
- No storage of plant, equipment or materials
- No vehicular or plant access
- No fire lighting
- No washing down of vehicles or machinery
- No handling, discharge or spillage of any chemical substance, including cement washings
- No action likely to cause localised waterlogging
- No change in ground levels

- No construction of a hard surface
- No earthworks

1.3.3. In order to inform site personnel of the purpose of the fencing, information notices shall be fixed to the fencing at 5m intervals. These notices shall be of all-weather construction and shall be in the form of the example provided at Figure 4 below, and replaced as and when necessary.

1.3.4. In addition to the above, further precautions are necessary adjacent to trees outside the CEZ:

- Materials that will contaminate the soil, e.g. concrete mixing, diesel soil and vehicle washings, should not be discharged within 10 metres of the tree stem. This should take into consideration the topography of the site and slopes to avoid materials such as concrete washings running towards trees.

- Fires should not be lit in a position where their flames can extend to within 5m of foliage, branches or trunk. This will depend on the size of the fire and the wind direction.

- Notice boards, telephone cables or other services should not be attached to any part of the tree.

1.4. Avoiding damage to stems and branches

1.4.1. Site operations should be planned to ensure that wide or tall loads or plant with booms, jibs and counterweights, could operate without coming into contact with retained trees. Mechanical damage from large plant can be significant and make their safe retention impossible. Any transit or traverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure adequate clearance from trees is maintained at all times.

1.4.2. If the use of a tower crane is necessary, its location will be predetermined and agreed in writing by the Local Planning Authority, and its operation and movements supported by a detailed Method Statement.

1.5. Reporting damage to trees and protective fencing

1.5.1. In the event of any damage to trees scheduled for retention, the damage should be reported to the site agent immediately. The site agent shall report up the chain of responsibility to the project arboriculturist or in the absence of such an appointment to an appropriately qualified arboriculturist, to enable remedial measures to be carried out immediately and if possible.

1.5.2. Should protective fencing be damaged to impair its function, all work shall cease near the damage until the fence has been returned to standard.

1.6. Excavating in RPAs

1.6.1. All excavations must be carried out using hand tools (spades, forks and trowels) and taking care not to damage bark and wood of the roots. It is acceptable to use a pneumatic hammer carefully to break up any existing hard surface for removal. Specialist tools (air spade) may be suitable in certain situations to remove soil from around the roots. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of the excavation. Where a mass of flexible roots is encountered, it may be possible either to displace the roots to another location temporarily or permanently to avoid areas of excavation. Exposed roots to be removed should be cut cleanly with a sharp saw or secateurs approximately 20cm back from the face of the final excavation. Roots that are exposed temporarily should be protected from drying out, direct sunlight and extremes of temperature by suitable covering. Roots greater than 2.5cm diameter should be retained where possible; roots up to 10cm diameter should only be cut in exceptional circumstances and roots greater than 10cm should only be cut after consultation with the appropriate supervising officer.

1.6.2. Working within RPAs requires a high level of care to ensure the long-term potential of the trees. Qualified supervision is vital to minimise the risk of misinterpretation. Site personnel must be properly briefed before work commences and ongoing work should be regularly inspected by an arboriculturist to confirm compliance by the contractor.

1.7. Removing Surfacing in RPAs

1.7.1. Roots are frequently found beneath or adjacent to existing surfacing or built structures and care is needed. Damage to the roots may be by direct physical damage or compaction of the soil from the weight of plant and machinery or repeated pedestrian movement. This is generally not a problem whilst surfacing is in place as the load is spread and additional protection is not required. However, once the existing surface is removed and the soil below exposed significant damage can occur to the soil structure and directly to the roots in a very short time. The following rules must be followed:

1. No vehicular activity or repeated pedestrian access into the RPAs unless on existing hard surfacing or custom designed ground protection, this must be designed for anticipated loads.
2. Regular vehicle and pedestrian access routes must be protected from compaction by temporary ground protection.
3. RPAs exposed by the works must be protected as set out in BS 5837:2012 until there is no risk of damage from construction activity

Appropriate tools for manually removing debris may include a pneumatic breaker/drill, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow. Secateurs and a bow saw must 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 areas protected by ground protection designed for the loading within the RPA. Debris to be removed from RPAs

manually must be moved across existing hard surfacing or temporary ground protection to prevent compaction damage. If possible, leaving below ground structures in place should be considered if their removal may cause excess root disturbance.

1.8. Installation of new Surfacing in RPAs

1.8.1. New surfacing is potentially damaging to trees as it may require changes to existing levels, result in localised soil structure damage and disrupt the exchange of water and gases in and out of the soil. Mature or older trees are more sensitive to this type of damage than younger trees. Potential adverse impacts on the trees can be minimised by limiting the extent of these changes. The most suitable surface will be porous to allow the relatively free movement of gas and water and load spreading to limit compaction damage. The actual specification is an engineering issue that has to be considered in the context of the load-bearing capacity of the soil; this element requires specialised input from the appropriate professional.

1.8.2. The actual location and depth of roots is unpredictable and will only become clear once excavation starts and following the guidance in section 1.7 above. Ideally, all new surfacing in the RPAs will be no dig, but this is rarely possible on undulating surfaces. New surfacing generally requires an evenly graded sub-base 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 in a normal installation. Some limited excavation is usually necessary to achieve this and need not be damaging to the tree if carried out with care and avoiding cutting large roots. Tree roots generally do not occupy the top 5cm of soil so the removal of a turf layer need not cause root damage. It may be possible to dig to a greater depth with care and dependant on local conditions. On undulating surfaces, finished levels must be carefully planned and flexible enough to allow on-site adjustment if excavations reveal large roots. Roots of 2.5cm diameter and less can normally be cut without a significant impact on the tree and the minimal 5cm depth can be used. If roots larger than 2.5cm diameter are encountered and it is considered inappropriate to cut them by a suitably qualified professional, the surrounding levels must be adjusted to take into account the high points by infilling with a suitable material.

1.8.3. Generally, the construction of hard surface access within the root protection area is to be that of a ‘no-dig’ design to avoid root loss due to excavation. In addition, the structure of the hard surface should be designed to avoid localised compaction, evenly distributing the carried weight over the track width and wheelbase of any vehicles that will use the access. The design will be based on a cellular confinement system as an integral component of the sub-base, to act as a load suspension layer.

1.8.4. The finished surface will be either a granular material, permeable and gas-porous finished surface (wearing course) to allow moisture infiltration and gaseous diffusion. It is essential to maintain adequate supplies of water and oxygen for trees through the soil. Porosity

is important particularly where the new hard surface covers an area of previously unmade ground, under which tree roots may have developed preferentially.

1.8.5. No-fines granular materials should be used wherever fill or a sub-base is required to help to ensure adequate gaseous diffusion. Excess water in the root protection area should be avoided, particularly on clay soils where water logging can occur. In these cases, the hard surface should slope away from the tree to avoid ponding. Provided surface water is not liable to be contaminated by salt or toxic run-off from oil or petrol, a permeable surface should be employed.

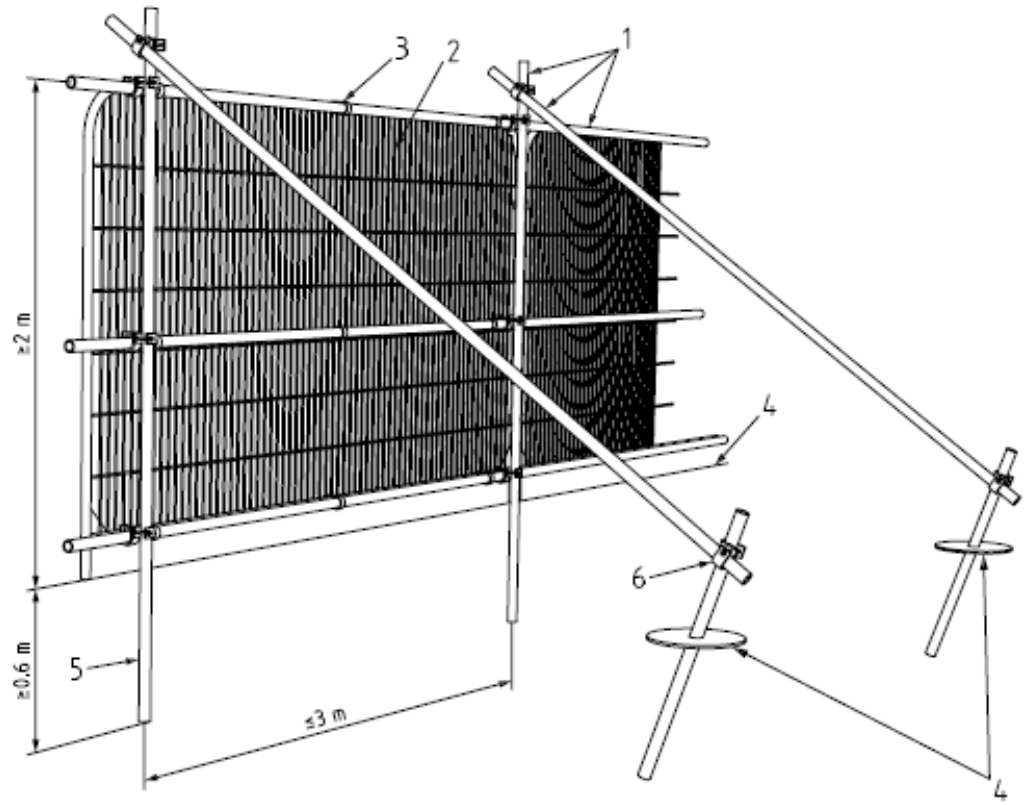
1.8.6. Washed gravel. Washed gravel retains its porosity unless excessively consolidated, and is particularly useful where changes of level occur, or an irregular shape is needed around the stem of a tree. Gravel is easily renewed or topped up. Although weeds may become established, they can be controlled by chemical or mechanical means. However, gravel is rarely suitable for use where there is vehicle or pedestrian traffic for example, in residential areas. Materials with high fines content, such as binding gravels or hogging, should not be used due to their almost impermeable texture when consolidated.

1.8.7. Paving slabs and block pavers. Paving slabs and block pavers are available with built in infiltration spaces between the slabs or blocks. These are ideal, though they should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

1.8.8. Graded Soil. Sufficient spoil shall be placed along the edge of the area to receive Geoweb, suitably graded away from the works in order that it may be pulled in later. This eliminates the need to transport soil over the finished surface. The spoil (E.g. Heicom sand) shall be graded into the finished structure at the end of the scheme.

1.8.9. Construction. Refer to Fig 4 for a general overview of a typical installation with porous tarmac (illustration courtesy of Geosynthetics Ltd). The depth of CellWeb will be dependent on the expected loads and should be based on the manufacturer’s recommendation.

Figure 1: Tree Protective fencing



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Figure 2: Tree Protective fencing (alternative)

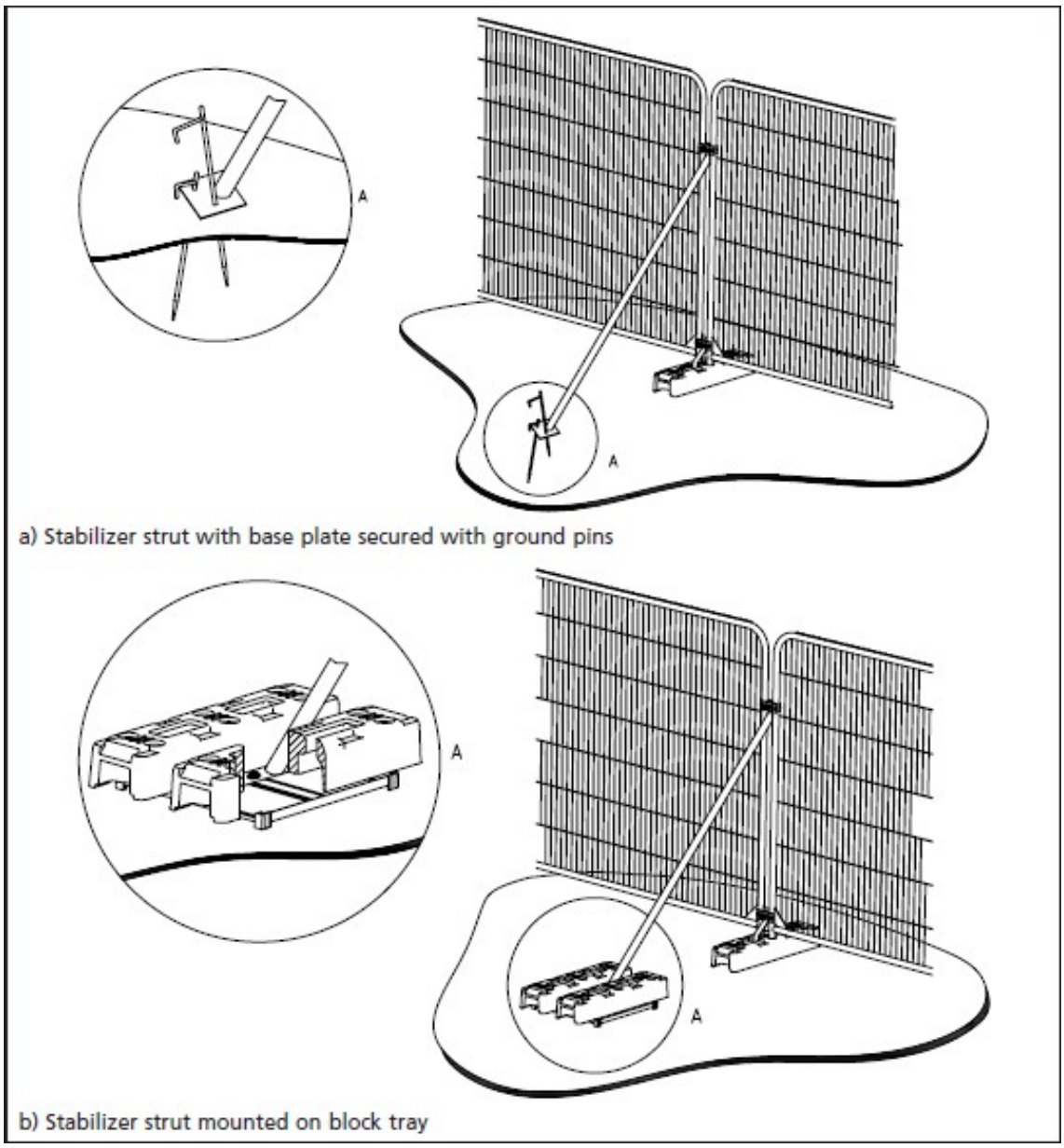


Figure 3: Example of warning notice

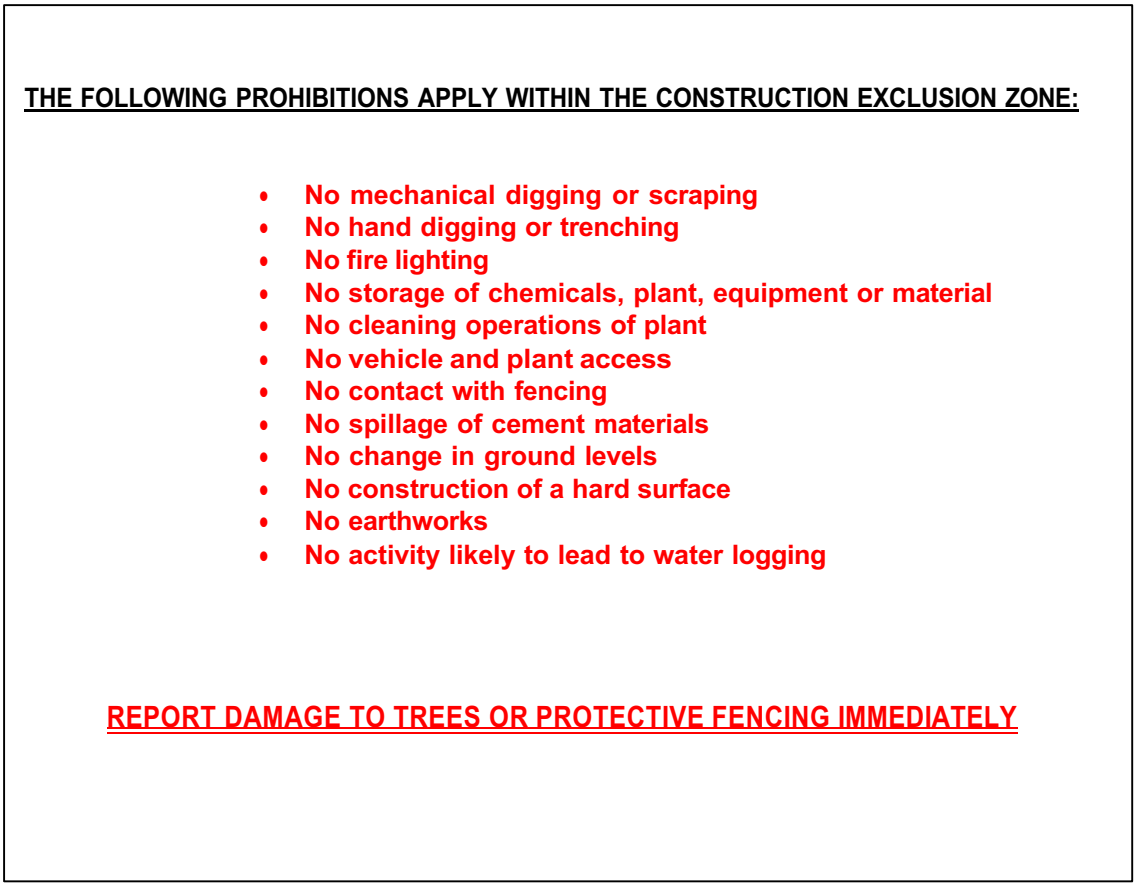


Figure 4: Cellular Confinement System