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PROPOSED BUILDING DEVELOPMENT

TREE CONDITION SURVEY
TO BS5837 (2012)

Report by:

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Chartered Arboriculturist

Client	**Retrospect Energy (NW) Ltd**
Planning Authority	**Wrexham County Borough Council**
Grid Reference	**SJ30855 52961**
Dates of Surveys	**3 March 2025**
Reference	**052025/TCS/TM**

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Report purpose, validation statement and tree protection plan

Purpose of this report

This is a BS5837 (2012) 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. The report includes an analysis of how trees will be affected and a heads of terms arboricultural method statement briefly describing how retained trees will be protected and managed during the development activity.

Validation Statement

For LPA validation purposes, this report includes:

- A **BS5837 compliant tree survey**, including a tree protection plan showing the location of existing trees, their categorisation, the location of the new structures and hard surfacing, the trees to be removed and the tree protection measures;
- An **arboricultural assessment** in Section 1 which describes how the proposed development will affect local character from a tree perspective;
- An **arboricultural method statement** [heads of terms only], as recommended in BS5837(2012)] in Section 2, which details tree protection measures;
- Several **appendices** in Section 3 setting out the background administrative information and a schedule of tree information.

Tree Protection Plan

The Tree Protection Plan is based on the provided information and should only be used for dealing with the tree issues. The plan shows:

- Existing trees sequentially numbered, with high/moderate category trees indicated by green/light blue crown outline and low/unsuitable categories indicated by grey/red crown outlines respectively.
- The circular interpretation of the Root Protection Areas (RPA) of category A, B and C trees, indicated by magenta circles. For veteran trees, a larger area is indicated by purple circles.
- The trees to be removed, shown with a dotted crown outline.
- The location of the Construction Exclusion Zone (CEZ) which is the area of restricted access, to be protected by temporary barriers (fences and/or ground protection), indicated by an orange line.
- The location of No Dig Construction Areas where no excavation is permitted, except by hand, indicated by a hatched dark blue area.
- The location of Ground Protection Areas where ground protection must be installed to protect tree roots, indicated by a hatched cyan area.
- The location of Hand Dig Areas where all excavation up to a depth of 0.9m must be undertaken by hand, indicated by a hatched green area.

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Summary

1. The development proposal

The proposal is to demolish the existing building and erect 3 No. new dwellings on the site, construct a new driveway entrance and 7 No. car parking spaces and carry out landscaping works.

2. Background administrative information

The instructions, how the report was prepared and other relevant background information is explained in Appendix 1. All the trees that may be affected by the proposed development were inspected and the information is provided 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 BS5837 Category			
	A (high quality)	B (moderate quality)	C (low quality)
Remove	-	-	-
Protect using special precautions	-	2, 4, G3, G4	1, 3, 5, G1, G2

Note: Category U trees are in such a poor condition (or are causing damage/excessive nuisance) they would be removed, irrespective of development and therefore are not included in this summary.

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

	Impact on local character	Mitigation
Category A (-)	• No Category A trees will be removed. • **No impact.**	-
Category B (-)	• No Category B trees will be removed. • **No impact.**	-
Category C (-)	• No Category C trees will be removed to facilitate the proposed development. • **No impact.**	-

5. Protection of retained trees

As recommended in BS5837 (Table B1) a heads of terms arboricultural method statement is included in Section 2 of this report. The approximate locations of the protective measures are shown on the tree protection plan.

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Summary

6. Enhancement through new planting

In order to increase the contribution of trees to local character, a new landscaping strategy is feasible to provide sustainable planting across the site. The new trees would help ensure continued tree cover on site into the long-term future.

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

No trees will be lost to facilitate the proposed development. The significant boundary tree cover will remain intact. One Category U tree (unsuitable for retention) will be removed for management, due to significant structural defects observed. There is sufficient space for tree and hedge planting to enhance the site and a comprehensive new tree planting scheme is feasible. The construction activity and proposed changes have the potential to affect the trees to be retained, **unless** appropriate protective measures are taken to protect them. However, if the appropriate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the overall impact of the proposal on local character will be limited to the short term only, but no significant visual impact in the wider setting.

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Section 1

Arboricultural Impact Assessment

This arboricultural assessment has taken account of all the recommendations set out in BS5837 Section 5.4 (Reproduced courtesy of BSI below).

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.

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8. Relevant strategic and policy considerations

The Climate Change Act (2008) sets out a 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 adaption benefits to the built environment where people live and work. Included in these benefits are carbon sequestration and storage of carbon, the buffering of temperature extremes and buffering of rainwater runoff, which can significantly reduce the adverse impacts of climate change.

Further, a significant body of research provides reliable evidence that trees impart numerous health-related benefits to people that live and work near them. In addition to extracting particulate pollution from the air and filtering noise pollution, trees potentially improve psychological wellbeing by reducing anxiety and stress through the relaxing nature of their presence. Access to greenspace and trees helps a person feel happier and encourages them to exercise more, which has a direct positive benefit on physical health and wellbeing. More subtlety, appropriate tree management enhances ecological sustainability.

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'* looks at these concepts in a built-environment context. Specific advice on new tree planting is provided in British Standard 8545 (2014) *'Trees: from nursery to independence in the landscape – Recommendations.* The guidance provided in these publications has been reflected in the analyses in this report.

The general principle is that more and bigger trees will provide more benefits. Naturally, this must be applied in a balanced and intelligent manner, but it provides an important guiding principle in the planning process and it has been an influential consideration in the analyses on this site.

9. Table 3: The impact of tree removal on local character

	Impact on local character	Mitigation
Category A -	• No Category A trees on site.	-
Category B (-)	• No Category B trees will be removed. • **No impact.**	-
Category C (-)	• No Category C trees will be removed to facilitate the proposed development. • **No impact.**	-
Category U (T5)	Category U trees are in such a 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 and their loss will not be caused by this proposal and it should not be considered as a direct impact.	New landscape planting to encompass all mitigation

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Section 1: Arboricultural Impact Assessment

9. The impact of tree removal on local character

No trees will need to be removed to implement the proposed development scheme. New planting will enhance the site and ensure continued tree cover in the future.

10. Table 4: Trees that need special precautions to be successfully retained

Special precautions	
Category A (-)	• No Category A trees within proposed development site.
Category B (2, 4, G3, G4)	• Protective barriers will be installed before any work commences. • No excavation to be undertaken by machinery within RPAs. Where excavation is required within RPA, use Airspade or hand dig to avoid damaging tree roots. • No changes in levels of soil within RPAs, unless ground made up with a low organic granular fill that allows for free water percolation and gaseous exchange. Top soil must only to be used for depths of up to 150mm. No subsoil to be used for fill. • Special measures prescribed in the form of Hand Dig solution within the RPA of T2, to protect tree roots. • Special measures prescribed in the form of Ground Protection within the RPAs of T1 and G4, to protect tree roots whilst providing working space to facilitate the proposed development.
Category C (1, 3, 5, G1, G2)	Category C trees are not sufficiently important to warrant any special precautions to ensure their retention. However, where appropriate, they can be retained within the wider tree protection provisions for the site and are shown for possible retention.

RPA = Root Protection Area

The proposed development could have a significant impact on some of the trees to be retained through root loss, soil compaction or impact damage to trunks/branches, **unless** precautions are implemented. Protection measures have been specified to protect all retained trees. These are discussed below and in Section 2 Arboricultural Method Statement, including arboricultural supervision.

Designations

There are no Designations on the site and the site is not adjacent to any Designated Sites. When I visited the Wrexham County Borough Council on-line interactive map [www.wrexham.gov.uk/service/conservation-areas], the site is not within a Conservation Area. I am not aware of any Tree Preservation Order in force on the site.

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Section 1: Arboricultural Impact Assessment

10. Trees that need special precautions to be successfully retained

General measures

A copy of the Tree Protection Plan must be kept on site and should be fully understood by the Site Agent.

Qualified arboricultural supervision is essential to minimise the risk of misunderstanding and misinterpretation. Site personnel must be properly briefed about protecting retained trees before any work starts. Ongoing work near trees must be inspected regularly by an arboriculturist and on completion, the work must be signed off to confirm compliance by the contractor. This supervision arrangement will normally include a pre-commencement meeting, regular inspection visits and sufficient flexibility to allow for visits as necessary to deal with emerging tree protection issues (*see Appendix 3 para.24*).

Protection general measures have been specified to protect the Root Protection Areas of all retained trees, as detailed below.

Protective barriers to be installed around trees to be retained, prior to works commencing (*see Appendix 3 para.26*).

Ground protection to be installed within Precautionary Areas around trees to be retained, prior to works commencing (*see Appendix 3 para.28*).

No construction activity whatsoever must be allowed within Root Protection Areas, **unless using specifically described special measures**. On no account must these areas be used for routing of underground services, storage of materials or on-site parking.

No mixing of cement, or concrete, or storage of fuel/chemicals must take place within 10m of retained trees, nor in any position where the slope of the ground could lead to contamination of the Root Protection Area (*see Appendix 3 para.45-46*).

Fires must not be lit in a position where their flames could extend to within 10m of foliage, branches or trunk.

Landscape works carried out within Root Protection Areas must be undertaken with great care so as not to damage shallow roots. Tractor mounted rotovators or other heavy mechanical cultivation should not be used within the Root Protection Areas.

Special care must be taken to avoid disturbing protected species (bats, nesting birds) during tree work operations, by carrying out any required surveys/inspections and implementing mitigation and using Reasonable Avoidance Methods (e.g. time of year).

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10. Trees that need special precautions to be successfully retained
Special measures

Protection general measures have been specified to protect the Root Protection Areas of all retained trees, apart from the following where some intrusion into Root Protection Areas will take place. These operations require special measures which have been specified:

Hand dig/Airspade excavation

- T2 – If any excavations are required within RPAs (e.g. installing wooden fence posts), hand digging/Airspade excavation to 0.9m depth has been specified to minimise root damage (*see Appendix 3, para. 29*). Exposed roots must be covered immediately with hessian sacking material and dampened with water, to prevent the roots desiccating and drying. Airspade or hand dig excavation has been specified within the RPA of T2 to protect tree roots. All roots over 25mm diameter must be retained, until inspected by either the Arboricultural Consultant or the Tree Officer, to ensure all possible care is taken to ensure any damage is minimised. Any roots less than 25mm diameter that are authorised to be removed, should be cleanly cut with sharp secateurs/hand saw to avoid tearing the bark.

Ground Protection

- T1, G4 – where working space is required within the RPAs to facilitate the proposed construction activities, ground protection has been specified (*see Appendix 3, para. 28*). For pedestrian and light vehicle access, such as vans and small dumpers/excavators, Trakmats (supplied by the Marwood Group, www.marwoodgroup.co.uk), Ground-Guards, (supplied by Greentek www.greentek.org.uk) or a similar approved product, must be used. These must be interlinked and laid on top of a compressible layer of sand or woodchips, laid onto a permeable geotextile. For heavy vehicles, such as lorries and piling rigs, and for major access points, either Tufftrak, (supplied by Eve Trakway www.evetrakway.co.uk), IsoTrack (supplied by Groundtrax www.groundtrax.com) or a similar approved product, must be used. These must be inter-linked and laid on top of a compressible layer of sand or woodchips, laid onto a permeable geotextile. For areas where only pedestrian movement will take place, it will be acceptable for ground to be protected by either 25mm plywood or scaffold boards, on top of a compressible layer of sand or woodchips, laid onto a permeable geotextile.

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11. New tree planting to mitigate tree removals

New tree planting will be carried out as mitigation. To enhance the site, a tree planting scheme is feasible as part of the wider landscaping strategy for the site, which could include new trees to be planted around the site in sustainable positions. The final selection of species, size and location are flexible and open to amendment if necessary. The new trees would help ensure continued tree cover on site into the long-term future.

The tree planting work should be carried out by a suitably qualified and experienced arborist, and the work should conform to B.S.8545 'Trees: from nursery to independence in the landscape – Recommendations' (2014).

12. Summary of the impact on local character

No trees will be lost to facilitate the proposed development. The significant boundary tree cover will remain intact. One Category U tree (unsuitable for retention) will be removed for management, due to significant structural defects observed. There is sufficient space for tree and hedge planting to enhance the site and a comprehensive new tree planting scheme is feasible. The construction activity and proposed changes have the potential to affect the trees to be retained, **unless** appropriate protective measures are taken to protect them. However, if the appropriate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the overall impact of the proposal on local character will be limited to the short term only, but no significant visual impact in the wider setting.

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Section 2

Arboricultural method statement (heads of terms)

As recommended in Table B1 of BS5837 (reproduced courtesy of BSI below), this arboricultural method statement is confined to a summary of the heads of terms, with the detail to be provided at the reserved matters stage in response to a planning condition.

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

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Section 2: Arboricultural Method Statement (heads of terms)

13. Table 5: Heads of terms arboricultural method statement

Heads of terms	Overview of appropriate protective measures (to be detailed in a response to a planning condition once consent has been given)
Identification of areas to be protected	The tree protection plan shows all the areas where protective measures are necessary. The construction exclusion zone (CEZ) boundary is shown on the plan as the orange line. If necessary, further Precautionary Areas outside the CEZ are shown on the plan as dark blue [No Dig], green [Hand Dig] or cyan [Ground Protection] hatched areas where a high level of care is needed. This work will be subject to arboricultural supervision.
Tree works	Tree works, based on my assessment of the proposal and the original site inspection are detailed 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 shown by a dotted crown outline. All tree works must be reassessed before any site activity starts as part of the standard risk management process.
Fencing	Protective fencing must be installed at the locations shown on the tree protection plan by the orange line. If agreed with the LPA, fencing can be set back to improve access, provided the exposed ground is protected with ground protection. This work will be subject to arboricultural supervision.
Ground protection	Ground protection must be installed wherever RPAs are exposed and not enclosed by fencing. This will be where fencing has been agreed to be set back, and in all Precautionary areas. This work will be subject to arboricultural supervision.
Existing surfacing to be retained	The existing hard surfacing will be retained and utilised where possible. Any surfacing disrupted during the course of the construction activity will be reconditioned or upgraded as necessary. This work will be subject to arboricultural supervision.
Installation of new surfacing	New surfacing within RPAs is proposed as shown on the tree protection plan. These will be installed in accordance with the appropriate guidance. This work will be subject to arboricultural supervision.
New and existing services	All excavation for the installation of new services or the upgrading of existing services must be carried out in accordance with the appropriate guidance. This work will be subject to arboricultural supervision.
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. This work will be subject to arboricultural supervision.
Tree planting	Space has been allowed for a comprehensive new tree planting scheme. It would be appropriate for the precise detail to be agreed with the LPA through a planning condition.
Landscaping	All landscaping activity must be carefully controlled once the protective measures have been removed. This work will be subject to arboricultural supervision.
Other risks to trees	Any significant risk to trees from activities outside RPAs, but close enough to have a knock-on impact, must be assessed and appropriate precautions put in place to reduce that risk. Such activities include, *inter alia*, chemical pollution, cranes and high loads.

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Section 2: Arboricultural Method Statement (heads of terms)

14. Heads of terms construction method statement

A construction method statement is a description of how operations that may affect the 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 will require further explanation 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 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 sited and when they will be installed.
11. Crane location and zones of movement.
12. 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.
13. Wheel washing facilities near trees.
14. Measures to control the emission of dust and dirt during construction near trees.
15. Recycling and storage of waste near trees.
16. Details of earthworks, grading and mounding and removal of spoil, including any planned lowering or raising of ground levels.
17. Details of upgrading/removing/replacing existing surfacing and areas where this will happen, including any detailed and precise cross-sections where no-dig surfacing is to be installed.
18. How and when any temporary surfacing will be laid and removed.
19. Details of any piling operations.
20. Precise service locations, including the method of excavation when near trees.
21. Precise locations of any site facilities/crane location/material storage/loading bays etc.
22. Finished excavation lines for basement works.
23. How post-construction damage through compaction to soil near existing trees and new trees will be ameliorated.

Note: it is not my role as an arboricultural consultant to detail the timing and implementation of these measures, although I can input into the process and will need to confirm that the final proposals will not adversely affect retained trees.

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Section 2: Arboricultural Method Statement (heads of terms)

15. Arboricultural supervision

15.1 General principles
An arboricultural consultant must be appointed by the developer to advise on the tree management for the site and to attend:

1. the pre-commencement meeting before any work starts;

2. regular supervision visits as agreed at the pre-commencement meeting; and

3. as needed to oversee any specific works that could affect trees.

Additionally, the consultant will have a supervisory input into operations that could adversely affect protected trees (see 16. below).

15.2 Detailed proposals
More specifically, the form and purpose of the supervision will be as follows:

• **Pre-commencement meeting:** A pre-commencement meeting will 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 LPA representative. If a LPA representative is not present, the arboricultural consultant will inform the LPA in writing of the details of the meeting. All tree protection measures detailed in this document will be fully discussed so that all aspects of their implementation and sequencing are understood by all the parties. This will 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 will be agreed and finalised, which will 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 will be available on site and the site manager will brief all personnel who could have an impact on trees on the specific tree protection requirements. This will 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 will 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 will 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 will switch to monitoring compliance with arboricultural planning conditions and advising on any tree problems that arise or modifications that become necessary.

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Section 2: Arboricultural method statement

• Proof of compliance to help refute liability and facilitate the discharge of planning conditions: All supervisory visits will be formally confirmed in writing and circulated to all relevant parties, including the LPA. The purpose of these written records is firstly to provide proof of compliance that will allow the developer to robustly demonstrate adherence to best practice in the event of any disputes, and secondly to help the LPA efficiently discharge the relevant planning conditions.

16. Programme and phasing of tree management

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. Installation of special surfacing
5. Installation of new services or upgrading of existing services
6. Removal of protective measures
7. Tree planting and general landscaping

More specifically, a preliminary programme for the arboricultural input is set out below:

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 tree protection, if already installed • Agree any changes to CEZ barrier combinations of fencing and ground protection
Site Operations before demolition/construction 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	• Review the site requirements with the tree work contractor • 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 within precautionary areas that could affect trees during construction	
Action	**Arboricultural input**
Installation of new special surfacing	• Meeting with contractor for briefing before installation, with further supervision visits as necessary at the discretion of the arboricultural consultant
Installation of new services	• Meeting with contractor for briefing before work starts, with further supervision visits as necessary at the discretion of the arboricultural consultant

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Section 2: Arboricultural method statement

Operations that could affect trees after construction is completed	
Action	Arboricultural input
Removal of barriers and ground protection	• Meeting with contractor for briefing before work starts, with further supervision 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
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 supervision 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 can affect trees will remain under arboricultural supervision.

17. General tree management and protection

17.1 General site operation

The day-to-day running of the site will take full account of the tree protection measures set out in this document, a copy of which will be kept on site at all times. All site personnel will be briefed on the tree protection requirements as part of the site induction procedures.

17.2 Tree works

The proposed tree works are set out in the work recommendations column of the tree schedule in Appendix 2. These are made on the basis that all trees will be re inspected within a year of the original inspection and the management advice only remains valid for up to a year after that inspection date. Trees to be removed are highlighted with red text in the schedule. The location of each tree by number is shown on the plan and those to be removed are indicated with a dashed crown outline.

17.3 Protection of the CEZ by the use of fencing and ground protection

BS 5837 (3.6) describes the CEZ as the *"area based on the RPA from which access is prohibited for the duration of a project'*. In practice, this can be done by any combination of fencing and ground protection, to be finalised and agreed at the pre-commencement meeting.

• **Protective fencing:** On the tree protection plan, the approximate boundary of the CEZ is shown by the orange line. The minimum specification is that the Tree Protection Fencing must be from weldmesh panels, at least 2m high, securely fixed, with wire or scaffold clamps, to a rigid framework. This framework must be constructed from scaffold tubes with vertical tubes, at a maximum interval of 3m and driven into the ground at least 0.6m. The structure must be well braced to resist impacts, constructed as per Figure 2 of BS5837:2012, which is reproduced in Appendix 3 Protecting retained trees (paragraph 26).

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Section 2: Arboricultural method statement

• Protective fencing:
Weatherproof notices must be fixed to the Tree Protection Fencing, and maintained, stating:-

TREE PROTECTION AREA
KEEP OUT
THE FOLLOWING MUST BE OBSERVED BY ALL PERSONS:
• The Protection Fence must not be moved
• No person, machine or plant shall enter the area
• No materials or spoil shall be deposited
• No excavation shall occur
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

• Ground protection: Where it is not practical to protect the CEZ by the use of fencing alone, BS 5837 (6.2.3.1) allows for the fencing to be set back and the soil protected by ground protection. The Ground Protection Areas shown hatched in cyan on the plan, can be used for general site use, provided ground protection is installed to protect tree roots. 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.

- For pedestrian and light vehicle access, such as vans and small dumpers/excavators, Trakmats (supplied by the Marwood Group, www.marwoodgroup.co.uk), Ground-Guards, (supplied by Greentek www.greentek.org.uk) or a similar approved product, must be used. These must be interlinked and laid on top of a compressible layer of sand or woodchips, laid onto a permeable geotextile.

- For heavy vehicles, such as lorries and piling rigs, and for major access points, either Tufftrak, (supplied by Eve Trakway www.evetrakway.co.uk), IsoTrack (supplied by Groundtrax www.groundtrax.com) or a similar approved product, must be used. These must be inter-linked and laid on top of a compressible layer of sand or woodchips, laid onto a permeable geotextile.

- For areas where only pedestrian movement will take place, it will be acceptable for ground to be protected by either 25mm plywood or scaffold boards, on top of a compressible layer of sand or woodchips, laid onto a permeable geotextile.

- alternatively, a cellular confinement system laid over a permeable geotextile, and filled with clean angular stone, type 4/20 (to BS EN 13242 or BS EN 12620), can be used. The depth of the system must follow suppliers recommendations for the maximum axle weight and soil bearing capacity.

- In all cases ground protection products must be laid as per manufacturers best practice guidelines.

Any soil within Root Protection Areas that is damaged must be ameliorated by manual forking once the soil has dried, incorporating a mixture of organic compost and zeolite (5-10%) into the surface soil horizon, taking care not to damage roots.

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• **Ground protection:** Further detail on ground protection options is included in Appendix 3 (paragraph 28). 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.

Throughout this report, there is a presumption that all RPAs identified for protection on the plan outside the CEZ will be protected from soil degradation at all times during any demolition and construction. This applies to all the shaded precautionary areas shown on the plan at all times during the development while there is a risk of damage to the RPAs of retained trees. All work operations in RPAs will be strictly controlled to comply with BS 5837, as explained in Appendix 3. All barriers, whether fencing or ground protection, must remain intact and fit for purpose for the duration of any development activity that could cause damage. The barriers are intended to prevent any unsupervised activities within the protected CEZ. All construction activities with the potential to disturb RPAs must be subject to arboricultural supervision. Additionally, once the barriers are removed, any landscaping activity must be carefully controlled in RPAs.

17.4 Control of activities within precautionary areas

All activities
within precautionary areas must be carried out in accordance with the guidance principles set out in Appendix 3 and be supervised by an arboricultural consultant. In particular, this guidance applies to removing surfacing and structures, installation/upgrading of new surfacing, structures and services, and soft landscaping.

• **No Dig Areas:** The No-Dig areas, shown hatched dark blue on the Tree Protection Plan, must be constructed without excavation apart from the removal of turf/organic matter, which should be carried out by hand. Excavators, dumpers and other site traffic must not be allowed to track on the No-Dig areas until roots are protected by the No-Dig surfacing. In areas where levels are to rise, where the drainage swales are to be constructed within Root Protection Areas, levels must be made up with a low organic matter granular fill that allows for free water percolation and gaseous exchange. Topsoil must only be used for depths of up to 150mm. It is essential that the movement of rainwater and gases to underlying roots is not impeded. Subsoil should not, therefore, be used.

Where proposed road and car park spaces encroach within the Root Protection Area of retained trees, engineering details for sections of No-Dig construction must avoid localised compaction, using both a two dimensional geogrid, and a three dimensional cellular confinement system as integral components of the sub-base. A typical section is shown on the drawings included in Appendix 3 (paragraph 34 Figure 23). As well as being fit for purpose, the design and methodology must protect tree roots, by ensuring the following:-

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- topsoil/turf must be removed carefully by hand to a maximum of 75mm, or less if roots are found nearer the surface, or by spraying off with a suitable herbicide such as Glyphosphate.

- following levelling with soil or sand, a permeable, non-woven geotextile membrane, must be laid.

- pressure treated timber edging boards, supported by driven stakes must be used.

- a suitable cellular confinement system must then be constructed to manufacturers instructions on top of the geogrid. Products that might be considered include Geoweb, supplied by Cooper Clarke Group Ltd (01204 862 222) or Cellweb, supplied by Geosynthetics Ltd (01455 617 139).

- the cellular confinement system must be filled with clean (no fines), washed angular, 4/20mm, stone to provide load support, while allowing air and moisture to permeate to the root zone.

- a further permeable, non-woven geotextile membrane, such as TreetexT300, or an alternative approved product which has similar oil trapping qualities, must be laid over the cellular confinement system.

- A further permeable, non-woven geotextile membrane, such as TreetexT300, or an alternative approved product which has similar oil trapping qualities, must be laid over the cellular confinement system. A porous, surfacing material, free from contaminants, must then be laid.

- Landscaping should not include the 'making-up' of soil levels to incorporate or disguise the edge of the completed access road/car park space. Instead permeable fill should be used for battering up to the top of the edge retention. If the edges need 'softening' in appearance it is recommended that low shrubs or ground cover plants are planted. The installation should be overseen by an appointed arboricultural consultant with suitable technical knowledge and experience of 'no-dig' systems.

- NB: The ground within No-Dig Construction areas must be protected until such time as the new hard surfacing provides protection. In the majority of cases the Tree Protection Fencing specified will provide this protection. However, there may be instances where construction access is required to other areas, prior to No-Dig Surfacing being laid. In these cases, ground protection must be provided as detailed previously.

• Hand Dig Areas:

Hand dig areas are shown on the Tree Protection Plan as hatched green areas. All excavation up to a depth of 0.9m within the Hand Dig Areas, shown shaded/hatched green on the Tree Protection Plan, must be undertaken by hand. All roots over 25mm diameter must be retained, until approval from the arboricultural consultant has been received. This will either be following a site visit or after receipt of photos. Roots must then be neatly severed using secateurs or a pruning saw. Roots must be wrapped in damp hessian while exposed to avoid desiccation.

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17.5 Control of activities near RPAs

Any risk to trees from activities outside RPAs, but close enough to have a knock-on impact, will be assessed during the day-to-day running of the site and appropriate precautions put in place to reduce that risk. More specifically, all cement mixing and washing points for equipment and vehicles will be outside RPAs. Where the contours of the site create a risk of polluted water or toxic liquids running into RPAs, a precautionary measure of using heavy-duty plastic sheeting and sandbags with the ability to contain accidental spillages will be put in place to prevent contamination.

17.6 New tree planting

Sufficient space has been allowed for a comprehensive new landscaping scheme that could include heavy standard and semi-mature trees. It would be appropriate for the precise detail to be agreed with the LPA through a planning condition.

18. Specific tree protection requirements

The specific tree protection operations, in roughly the order that they will be carried out, are explained in detail in the following subsections. Where appropriate, more detailed guidance is referenced in Appendix 3 to supplement the following explanations.

18.1 Installation of CEZ barriers (fencing and/or ground protection)

The CEZ boundary is shown on the tree protection plan as the orange line. Its location is approximate because its precise position will need to be finalised on site, depending on the local site conditions. If necessary, BS 5837 allows the fencing location to be moved provided the exposed CEZ is protected by ground protection, but this would need to be formally agreed by all parties at the pre-commencement meeting. Once the tree works have been carried out, the appropriate fencing and ground protection will be installed before any construction work starts, following the guidance in Appendix 3 (paragraphs 26-28).

18.2 Installation of new special surfacing

All the areas annotated on the plan will have special surfacing installed before any construction works start on site. This surfacing will be a low-impact, no-dig construction using CellWeb or a similar product. The area to be covered will need to be levelled before the CellWeb is installed as described in Appendix 3 (paragraphs 33-37). New surfacing is proposed within the RPA of tree 1, which has the potential to cause harm if not specified and implemented with care. I have carefully reviewed the levels in these areas and it would be feasible to install custom designed no-dig specification surfacing without causing any significant disturbance to the RPAs. From my previous experience at installing such surfacing, I am confident that this can be implemented without significant harm to the trees, with the detail to be agreed as part of a planning condition. This surfacing solution is within the advice set out in BS 5837 (8.6) and would be appropriate in this situation. Any impact should be minimised by following the guidance and illustrative specifications included in Appendix 3 (paragraphs 33-39).

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18.3 Installation of new services or upgrading of existing services

It is often difficult to clearly establish the detail of services until the construction is in progress. Where possible, it is proposed to use the existing services into the site and keep all new services outside RPAs. However, where existing services within RPAs require upgrading or new services have to be installed in RPAs, great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible, any excavation must be carried out by hand according to the guidelines in Appendix 3 (paragraph 44). If unexpected services do need to be installed within RPAs, written approval must be obtained from the LPA before any works are carried out.

18.4 Removal of protective measures

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.

18.5 Landscaping and reinstatement

The final tidying up and reinstatement can only be carried out when all the protective barriers have been removed, which means great care is needed by all the contractors to observe the tree protection requirements. No machines can be used within RPAs, which specifically includes rotovators, and all new planting and soil level variations must be agreed and supervised by the arboriculturist. All these works will be carried out strictly in accordance with the guidance in Appendix 3 (paragraph 47).

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Section 3

Appendices

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

19. Table 6: Background administrative information

Background administrative information	
Report date & reference	Report dated 20/05/2025 – Ref: 052025/TCS/MR
Tree Protection Plan reference	38-40 Westminster Road, Moss TPP with layout May 2025
Instructing client	Matischok & Ross on behalf of Retrospect Energy (NW) Ltd
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	1066-SP1 existing site survey [topograph survey] – (emailed as pdf on 10/02/2025). Proposed Site Plan layout – (emailed as pdf and dwg on 20/05/2025).
Report author and credentials	Stephen Cutmore BSc (Hons), MICFor, MArbor.A, VETcert Consulting Level is fully qualified to undertake the assessments in this report.
Report limitations	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 any ecological or archaeological issues, or any 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/uppga/1990/8/contents • National Planning Policy Framework (NPPF), published by the DCLG www.gov.uk/government/publications/national-plannng-policy-framework--2 • BS5837 (2012) *Trees in relation to design, demolition and construction – Recommendations,* BSI www.shop.bsigroup.com/en/ProductDetail/?pid=000000000030213642 • BS8545 (2014) *Trees: from nursery to independence in the landscape – Recommendations,* BSI www.shop.bsigroup.com/ProductDetail/?pid=000000000030219672 • BS3998 (2010) *Tree work – Recommendations,* BSI http://shop.bsigroup.com/ProductDetail/?pid000000000030089960 • *Trees in the Townscape: A Guide for Decision Makers*, published by the Trees & Design Action Group www.tdag.org.uk/downloads.html • *Trees in Hard Landscapes: A Guide for Delivery*, published by the Trees & Design Action Group www.tdag.org.uk/downloads.html • National Joint Utilities Group (2007) Volume 4, Issue 2: *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees* www.njug.org.uk/publications/

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

20. Table 7: Data collection

Data collection	
Dates of site visits	Initial survey on 03/03/2025.
People present during site visit	Stephen Cutmore
Weather & visibility	Dry and sunny. Good visibility.
Limitations to observations	• My inspection of the trees for the purpose 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 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. • Observation 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 BS5837	The data collection is fully compliant with the advice in subsection 4.4.2 of BS5837. 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 given in Table D1 of BS5837, 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.

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

21. Specific observations of individual trees

During the data collection, the Goat Willow (T5) was observed to be in a poor structural condition. A large stem had failed in a recent storm, resulting in a large rip-out wound to the trunk, with the heartwood exposed. Fungal decay is likely to develop in the exposed wood. Another stem had longitudinal cracks/splits. The multi-stemmed trunk has weak branch unions with included bark. There is a high likelihood that further stem failures will occur in future high winds.



Rip-out wound to trunk.



Longitudinal cracks/splits in stem.

22. The use of the tree information in layout design

Following the inspection of the trees, the information listed in Appendix 2 was used to provide constraints guidance to the architect based on the locations of all the category A and B trees. All the category C and U trees were discounted because they were not considered worthy of being a material constraint. This guidance identified the estimated developable footprint of the site and was considered by the architect to arrive at the submitted design. For conciseness, and because it is not a BS recommendation, this detailed constraints advice has not been included in this report.

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Appendix 2: Tree schedule and explanatory notes

Explanatory notes

- **Abbreviations:**

  T : Tree
  G : Group
  H : Hedge
  WL : Woodland
  RPA : Root Protection Area

- **Botanical tree names**

Ash	: *Fraxinus excelsior*
Beech	: *Fagus sylvatica*
Common Oak	: *Quercus robur*
Common Privet	: *Ligustrum vulgare*
Elder	: *Sambucus nigra*
Goat Willow	: *Salix caprea*
Hawthorn	: *Crataegus monogyna*
Holly	: *Ilex aquifolium*
Plum/Damson	: *Prunus domestica*
Sycamore	: *Acer pseudoplatanus*
Wych Elm	: *Ulmus glabra*

- **BS5837 (2012) compliance:** All data has been collected based on the recommendations set out in subsection 4.4 of BS5837.

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Appendix 2: Tree schedule and explanatory notes

- **Tree inspections and site limitations:** Each tree was subject 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 spreads are recorded at cardinal points to show the true shape of the crown on the tree protection plan.

- **Dimensions:** All dimensions are estimated unless annotated with a '*'.

- **Species:** Species identification is based on visual observations. Where there is 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 BS5837 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 BS5837.

- **Maturity:** In planning context, maturity provides a simplistic indication of a tree's ability to cope with change and its potential for future 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.

- **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:** My assessment automatically considered tree physiological/structural condition (BS5837 4.4.2.5h), and so these are not listed separately in the schedule. Additionally the category accounts for the remaining contribution (BS5837 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. Sub-category 1 is for mainly arboricultural qualities; sub-category 2 for mainly landscape qualities; sub-category 3 for mainly cultural values, including conservation. Category A, B and C trees are automatically listed as sub-category 1 unless otherwise stated.

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Appendix 2: Tree schedule and explanatory notes

- **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 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 reduce the threats from retained trees. All trees on the site should be checked by the contractor at the time of carrying out the main tree works to deal with any emerging safety issues in the context of the consented development. Additionally, where appropriate to facilitate access, all crowns should be lifted to 3-4m above the site. 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. **Implementation of works:** All tree works should be carried out to BS 3998 'Recommendations for Tree Work', 2010. It is advisable to select a contractor from the local authority Approved List of Contractors.

  3. **Statutory wildlife obligations:** The Wildlife and Countryside Act, 1981 [as amended by the Countryside and Rights of Way Act, 2000] and The Conservation of Habitats and Species Regulations, 2017, 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.

  5. **Future tree 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.

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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)	Stem Diameter at 1.5m (mm)	Branch Spread (m)	Maturity	Low branches	Category	Notes	Tree works	RPA radius (m)	RPA area (m^2)
All retained trees									Carry out safety check and crown lift over site to 3-4m as necessary.		
T1	Hawthorn	9	200/180/ 250	N-4 E-4 S-1 W-2	Mature	1.8m ground clearance	C1/2	Multi-stemmed at base. Ivy up trunks into crown. Overhead low voltage power line close to South of crown.	Sever Ivy at base.	4.4	62
T2	Goat Willow	15	360/410/ 790	N-9 E-7 S-11 W-6	Mature	3m ground clearance	B1/2	Multi-stemmed at base. Ivy up trunks into crown. Deadwood in crown.	Sever Ivy at base. Crown clean.	11.5	417
T3	Goat Willow	6	220	N-4 E-7 S-6 W-1	Early Mature	4m ground clearance	C2	Ivy up trunk into crown. Very small cavities in trunk where dead branches previously failed. Deadwood in crown. Soil/woodchip piled around base.	Sever Ivy at base. Crown clean. Spread out soil/woodchip so not 'volcanoing' around trunk.	2.6	22
T4	Goat Willow	16	770	N-8 E-7 S-8 W-6	Mature	4m ground clearance	B1/2	Multi-stemmed at 2m height. Ivy up trunks into crown. Deadwood in crown.	Sever Ivy at base. Crown clean.	9.2	222
T5	Goat Willow	16	170/340/ 270/350/ 360	N-6 E-4 S-6 W-10	Mature	3m ground clearance	U	Multi-stemmed at base with included bark in branch unions. Large stem previously failed, with exposed heartwood in rip-out wound. Another stem has longitudinal cracks/splits. Ivy up trunks into crown.	Remove tree for management.	-	-
G1	Elder, Privet	3	Average 70	N-S 1	Early Mature	0m ground clearance	C2	Scrubby hedge on boundary. Previously managed, but not recently.	Trim to tidy and reduce overhang into road.	0.8	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)	Stem Diameter at 1.5m (mm)	Branch Spread (m)	Maturity	Low branches	Category	Notes	Tree works	RPA radius (m)	RPA area (m^2)
All retained trees									Carry out safety check and crown lift over site to 3-4m as necessary.		
G2	Holly, Plum/Damson, Hawthorn, Ash	4	Average 80	Average 3m crown spread	Young – Semi-mature	1m ground clearance	C2	Small scrubby self-set trees near boundary. Ivy up some stems.	Sever Ivy at base.	1.0	3
G3	Goat Willow, Ash, Sycamore, Hawthorn	16	<1264	Average 5m crown spread	Young - Mature	1m ground clearance	B2	Mixed species scrubby woodland area. Some trees recently windblown. Ivy up trunks into crown. Deadwood in crowns. Small young self-set Sycamore at rear (West) of woodland.	Sever Ivy at base of trees near road and boundaries.	15.0*	707
G4	Sycamore, Hawthorn, Ash	10	Estimated 250	Average 5m crown spread	Early Mature	2m ground clearance	B2	Trees located in garden of neighbouring property.	No work required, as not located on site.	3.0	28

*Maximum RPA value in Table D1, Annex D, BS5837 (2012)

Appendix 3: Protecting retained trees

Introduction

23. Purpose and use of this guidance

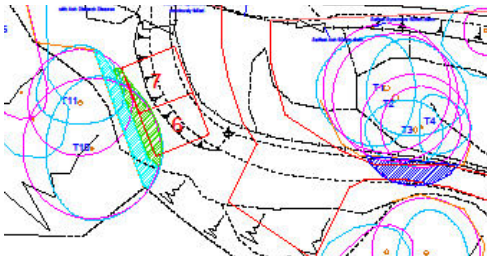
This general guidance is for construction site management to help protect trees that have been agreed for retention. It must be read in conjunction with the site-specific proposals shown on the tree protection plan and explained in the body text of this report. It supplements and expands upon the principles set out in the British Standards Institution (2012) BS 5837: Trees in relation to design, demolition and construction - Recommendations (www.bsigroup.com) and the National Joint Utilities Group (NJUG) (2007) Volume 4, Issue 2: Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees (www.njug.org.uk). More specifically, it describes useful practical precautions that can be taken when working close to retained trees and provides sources of further information. Important terms include:

- **Root protection areas (RPAs):** RPAs are the areas surrounding retained trees where disturbance must be minimised.

- **Construction exclusion zone (CEZ):** This is the RPA where no construction activity should occur and damage is prevented by either installing fencing to restrict access or installing ground protection that allows limited access above the ground, while protecting the rooting environment below.

- **Precautionary area:** This is the RPA outside the CEZ where limited works are proposed, but must be carried out with care to minimise any impact on the tree rooting environment.

These areas are illustrated on our plans and annotated as follows:



The green hatching is Hand Dig Areas; dark blue hatching is No Dig Construction; cyan hatching is Ground Protection Areas. The orange line is the Protective Barriers.

This guidance describes practical methods and examples of how trees can be protected. This guidance, in conjunction with the report and tree protection plan, will act as a written record for reference during the construction process. Once work starts on site, this guidance is designed to help the site personnel implement effective tree protection. All personnel working in RPAs must be familiar with this document and be properly briefed about their responsibilities to protect important trees.

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24. Arboricultural supervision

All 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 about protecting retained trees before any work starts. Ongoing work near trees must be inspected regularly by an arboriculturist and on completion, the work must be signed off to confirm compliance by the contractor. This supervision arrangement will normally include a pre-commencement meeting, regular inspection visits and sufficient flexibility to allow for visits as necessary to deal with emerging tree protection issues.

Primary tree protection

25. Primary tree protection

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 must 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.

26. Protective fencing

Various fencing options are illustrated in figure 1 and photos 2-4 below. The minimum specification for the fencing must be as described in figure 2 of BS 5837 (figure 1 below) or an equivalent design that effectively restricts access to the RPA it protects.

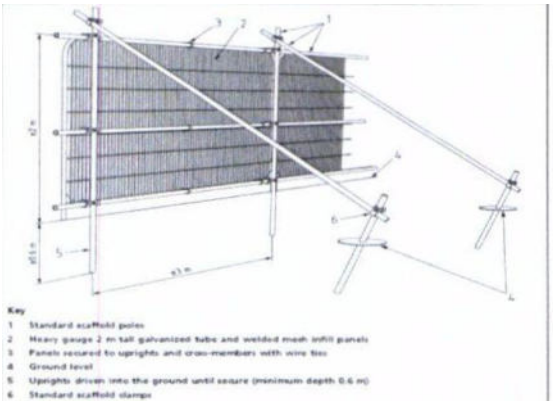


Figure 1: Recommendations taken from figure 2 of BS 5837.



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

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



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

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 must 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 must be agreed by the supervising arboriculturist.

27. Trunk protection

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



Photo 5: A scaffold braced framework surrounding the trunk reduces the risk of accidental impact.



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

28. 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.

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Photos 7-14 illustrate a range of practical solutions that can effectively protect CEZs of retained trees.



Photo 7: Heavy-duty plywood set onto a compressible woodchip layer and pinned into position is suitable to spread the loading from pedestrian access.



Photo 8: Spreading soil excavated from footings is an effective way of buffering the plywood surface from the wear of light vehicles.



Photo 9: Plywood fixed to a wood frame is another effective method of protecting soil from pedestrian compaction.



Photo 10: 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.



Photo 11: 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.



Photo 12: Custom designed sectional tracks can be joined to support very heavy traffic use through sensitive areas.

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Photo 13: A combination of retaining existing surfacing and using temporary construction cabin accommodation can be a very effective means of preventing damage to sensitive areas.



Photo 14: Steel plates can be an effective way of temporarily reinforcing weak surfacing over a construction access during the development activity.

Guidance for working in precautionary areas

29. Excavation and dealing with roots

Precautionary areas are RPAs outside the CEZ, i.e. they are areas where construction activity can take place, but it must be carried out with care to avoid damaging the sensitive rooting environment. BS 5837 (7.2) makes provision for excavating in RPAs, explaining that all excavation must be carried out carefully using hand-held tools and preferably by compressed air soil displacement, (e.g. Air spade), taking care not to damage the bark and wood of any roots (photo 15,16 and 17). All soil removal must be done with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of smaller 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 handsaw 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 such as dampened hessian sacking (photo 18). If necessary, roots less than 2.5cm in diameter can be cut cleanly without consultation with the supervising arboriculturist. Roots greater than 2.5cm in diameter should be retained where possible and only cut after consultation with the supervising arboriculturist.

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Photo 15: Careful hand-digging using conventional tools is acceptable for exposing roots in RPAs.



Photo 16: Air spades are very effective at exposing roots and services with minimal damage.



Photo 17: Air spades are particularly useful where roots are very dense.



Photo 18: Exposed roots must be protected from light, drying out and extremes of temperature by covering with hessian sacking and boards until they can be covered back with soil.

30. Removing hard surfacing and structures in precautionary areas

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

• **Hard 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, carports, bin stores and concrete slabs that support buildings.

31. Access

Roots frequently grow adjacent to and beneath existing surfacing and 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 and structures remain in place because they spread the load on the soil beneath and further protective measures are not normally necessary. However, once that protection is removed and the soil below is newly-exposed, the potential for damage to roots becomes an issue.

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In summary, there should be no vehicular or repeated pedestrian access unless existing ground protection is retained or new protective measures are installed (photo 19). All exposed RPAs must be protected until there is no risk of damage from the development activity.



Photo 19: Ground protection must be used where repeated foot or vehicle traffic could cause compaction in sensitive RPAs. It can be as simple as plywood for pedestrians, but must be more robust for vehicles.



Photo 20: Machines with a long reach can be used to lift out heavy surfacing and structures as long as the machine sits outside the RPA and the exposed surface is protected before there is any further access.

32. Removal of material

Removing existing surfacing and structures is a high-risk activity for any adjacent roots and the following guidance must be observed:

1. Appropriate tools for manually removing debris may include a pneumatic breaker, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow (photos 21 and 22). Secateurs and a handsaw must also be available to deal with any exposed roots that have to be cut.

2. Machines with a long reach may be used if they can work from outside RPAs or from protected areas within RPAs (photo 20), but they must not encroach onto unprotected soil in RPAs.

3. 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 (photo 20).

4. Great care must be taken throughout these operations not to damage roots as set out in paragraph 29 above.

5. If appropriate, leaving below ground structures in place should be considered if their removal may cause excessive root disturbance.

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Photo 21: Careful lifting of cemented-in sets round this tree allowed them to be re-laid on a permeable sand base, improving the water input into the soil around the trunk.



Photo 22: These trees had impermeable surfacing right up to their trunks, which had to be removed by hand before installing new structures.

33. Installation of new surfacing in precautionary areas

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.

34. 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 my experience 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 my 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 my preferred choice of product. The product is 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 figure 23. Photos 24 and 25 show the product spread over the ground and then filled with stone to produce the base layer.

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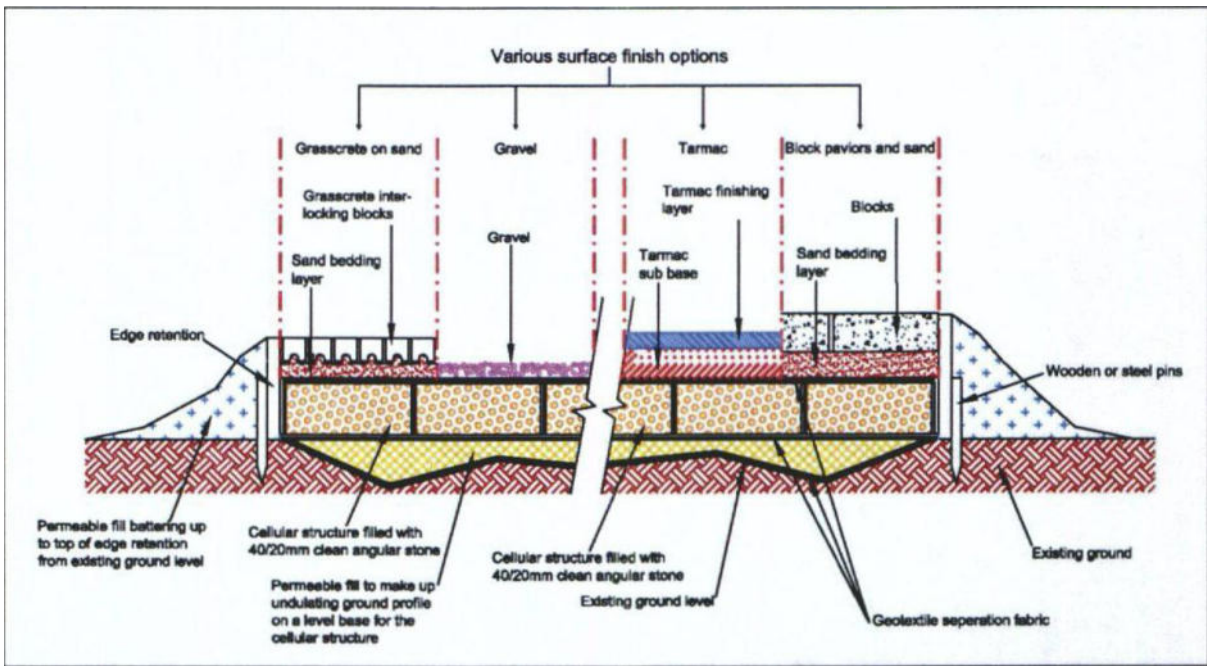


Figure 23: This conceptual cross-section illustrates the structural elements of the system and the multiple surfacing options that can be used with it.



Photo 24: The three-dimensional cells are opened up, spread across the area to be surfaced and pinned in place ready for the stone filling.



Photo 25: The stone-filled cells spreads the load of traffic and the geotextile membrane on the ground prevents migration of the stone into the soil profile.

35. 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 to trees. However, this may not be possible where there is no grass because tree roots may grow right up to the soil surface.

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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.

36. 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 paviours set on a sand base (figure 23). However, for lightly loaded surfacing of limited widths (<3m) such as pedestrian paths, preformed concrete slabs may be appropriate if the sub-base preparation is as set out above.

37. 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 paviours, 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 (photo 26). Railway sleepers (photo 27) pinned in place or wooden boards (photo 28) 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.



Photo 26: A conventional concrete haunching can be used to retain new surfacing as long as it is not dug into a trench – here is it placed on top of the CellWeb layer.



Photo 27: 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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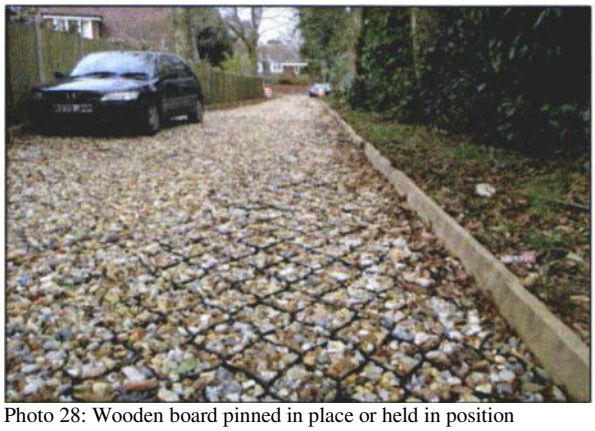


Photo 28: Wooden board pinned in place or held in position with backfilled topsoil can provide more informal and rustic surface edging.



Photo 29: 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.

38. 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 (photo 29) and vehicular access (photo 30), 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 (photos 31 and 32). 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 (photo 33).



Photo 30: 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.

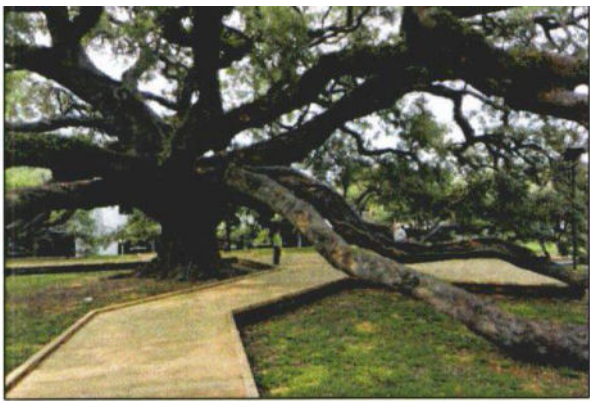


Photo 31: Board walks supported on posts or a light frame are another way of providing pedestrian access across sensitive RPAs.

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Photo 32: New surfacing can be supported above the ground on posts leaving the soil surface beneath undisturbed.



Photo 33: 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.

39. Installing new surfacing on top of existing surfacing

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 and so special precautions are not necessary. However, if large roots already protrude above the proposed subbase level, then the precautions and procedures set out above must be observed. If the retained surfacing is impermeable, it may improve conditions for tree roots if it is punctured before the new surfacing is laid, but this is detail that should be agreed with the supervising arboriculturist.

40. Installation of new structures in precautionary 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. Where possible, it is recommended that spiral piles are used.

41. Small sheds, carports and bin stores

Light structures 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 arboriculturist before a final decision is made. Light covering structures can be 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 (photo 34).

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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 (photo 35).

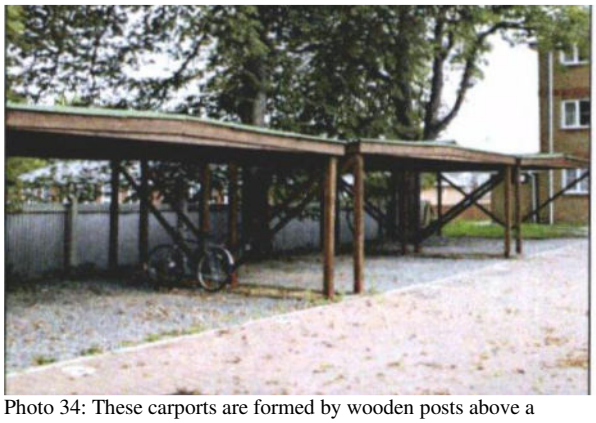


Photo 34: These carports are formed by wooden posts above a three dimensional cellular no-dig and load-spreading surface of permeable crushed stone.



Photo 35: This deck supported above the ground on small posts provides a low-impact alternative to conventional stone patio surfacing in RPAs.

42. New foundations for free-standing walls, gate piers, buildings and bridges

Conventional strip foundations in RPAs for any significant structure may cause excessive root loss and are unlikely to be acceptable. However, BS 5837 (7.5) confirms special engineered foundations can be used in RPAs. Damaging 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 (photos 36 and 37). It is recommended that screw piles are used, which are a far less invasive foundation system than micro piles. A screw pile consists of a slender, hollow steel shaft with a small number of steel helices (or screw threads) welded to it. As an indication, the largest screw pile with a pile shaft outer diameter of 89mm, a maximum helix diameter of 350mm, a maximum helix thickness of 20mm can support 25 tonnes as standard.

Before the actual installation of the new structure starts, any vulnerable RPA should be protected by temporary ground protection as set out in paragraph 6 above (one option shown in photo 39). At expected pile or gate pier locations, gaps in the ground protection should be left to allow access to the soil beneath. The preferred pile locations should be carefully excavated to a depth of 60cm to establish if there are any significant roots over 2.5cm in diameter that could be damaged. If significant roots are found, they should be dealt with as set out in paragraph 29 above or the pile location may have to be moved slightly (photo 38).

No heavy plant is needed to install a screw pile. A typical handheld anchor driver weighs less than 100kg and is capable of installing a pile with a safe working load capacity of 73kN (factored). An excavator mounted torque head (capable of installing piles with a SWL of 250kN (factored)) can be operated from a long reach excavator, which ensures that the root ball experiences no loading as a result of pile installation. Installing screw piles is a smooth and steady process whereby screw piles are rotated into the ground using a handheld or excavator mounted torque head. Installation occurs at a constant speed, inducing no vibration and requiring no pre-auguring.

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A screw pile displaces a comparatively small amount of soil & tree roots compared to a traditional micro pile. The helices attached to the screw pile shaft are deliberately made from thin steel plate, with a blunt protruding edge to ensure that where possible, roots are moved out of the way during installation rather than severing them. The pile shaft is considerable smaller than that of a micro pile so again, displacement of soil and tree roots is minimised. Clearly there is no way that a pile can be installed through an existing root system without causing some damage, however it is key to the health of the tree to minimise this effect as much as possible. Micro piling requires the removal of all material in the position of the pile, including any tree roots encountered, whereas screw piling has been found to leave a good proportion of the tree roots intact following installation.

It has been argued that screw pile installation acts to aerate the soil in which it penetrates, which has the added benefit of increasing oxygen supply to the root system. Compression of soil containing tree roots by traditional foundations has been shown to have a detrimental effect on the continued health of the tree. Compaction of soil reduces the passage of oxygen to roots during wet weather, and can cause the soil to become so dense that roots are no longer able to penetrate through it. Screw piles overcome this by supporting load directly on their constituent helices. These are placed well below the tree roots to ensure the root ball does not experience any loading influence or disturbance as a result of development. Screw Piles are installed to a predetermined torque during the installation process. A well-established relationship exists between installation torque achieved and the final load capacity of the pile, so the final capacity of the pile can be calculated quickly on site. As no further pile testing is required once the pile is in the ground, there is no need to place the tree at further risk of damage through the use of testing equipment.

Typically screw piles are used in combination with a cast concrete ground beam system. This system is generally flexible enough to allow pile to be relocated if significant roots are encountered in the preferred locations (photos 38 and 39).

Once the piles have been installed, the ground protection is usually removed ready for the installation of the slab supporting the structure (photos 40 and 41). It is important to note that the lowest points of the new structure, i.e. the underside of the main slab and any pile-capping beam must be above the ground level between the piles and there should not be any further excavation. The supported structure base 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 (photo 42). The building base is then constructed above the existing ground level, so that air and water can get to the soil surface and the roots below, allowing the roots to keep growing and the tree to be retained. BS 5837 (7.5.4) recommends that where impermeable structures cover significant proportions of RPAs, it may be necessary to provide water input through redirecting roof drainage beneath the supporting slab (photo 43).

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Photo 36: Small diameter piles (less than 150mm) are an effective means of supporting structures in RPAs with minimal disturbance and allow air and water to reach the soil and roots below.

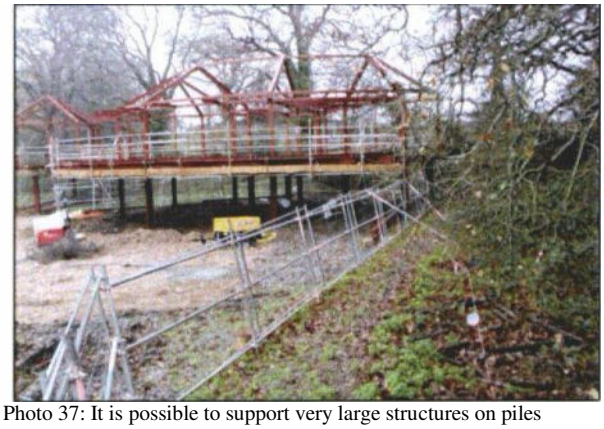


Photo 37: It is possible to support very large structures on piles within sensitive RPAs without any significant adverse impact on tree roots.



Photo 38: Where piles are proposed close to trunks, it is essential to excavate 50-75cm deep to see if there are any significant roots in the way, with provision to move the pile location if roots are found (note the pile was finally installed to avoid this root).

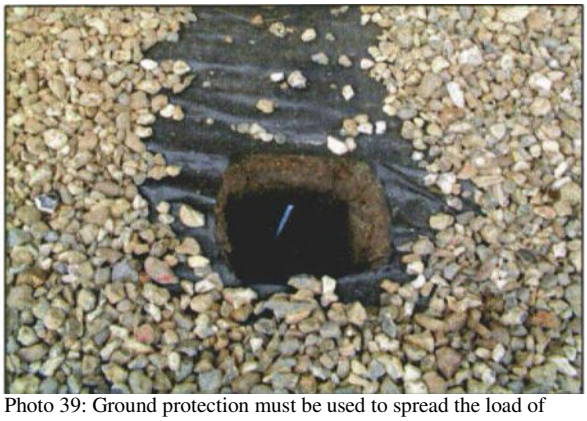


Photo 39: Ground protection must be used to spread the load of the piling rig once excavation has confirmed that no substantial roots are in the preferred pile location.



Photo40: Once the piles have been installed (yellow tops), the ground protection to support the piling rig is removed ready to fix the void-former onto the bare soil, in advance of pouring the building slab.



Photo 41: Piles can also be used to support bridges across sensitive RPAs, but the temporary ground protection has to be removed before the main structure is either imported in or cast on site.

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Photo 42: Where a slab is cast on site, a biodegradable void former (red arrow) temporarily supports the weight of the liquid concrete until it sets. The void-former can then be wetted and washed away to leave a void or left to degrade naturally, both of which allow movement of air beneath the slab.



Photo 43: This reinforced base slab for a double garage has drainage provision (red arrow) beneath the structure to redirect roof runoff to supply roots with water.

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 the supervising arboriculturist once the careful excavations have been completed. 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.

43. Walls on existing foundations and retaining walls

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 ground protection is in place while the new wall is being built. However, replacing existing walls or constructing new 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 paragraph 29 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 are found during the course of the construction should be referred to the supervising arboriculturist.

44. Services

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 (photo 44).

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Where a hand-digging option is agreed (photo 45), any roots discovered during the excavations should be dealt with as set out in paragraph 29 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.



Photo 44: 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.



Photo 45: 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).

45. Fuel and chemical storage

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 (photo 46).



Photo 46: Where fuel or other chemical are stored on site, it is now standard practice to have emergency spillage kits available to restrict the environmental impact of accidents.



Photo 47: 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.

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46. Cement mixing and vehicle washing points

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 (photo 47), must be used to contain accidental spillages.

Soft landscaping and new tree planting

47. Upgrading existing soft landscaping or replacing existing surfacing or structures with new soft landscaping

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 1 m 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 (photos 48 and 49).



Photo 48: 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.



Photo 49: 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.

48. New tree planting

Where new trees are proposed, the species, location and size will be explained within the text of the report and illustrated on the accompanying plan. Essential considerations on a tree-by-tree basis for the successful establishment and sustainability of new trees include:

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1 Planting locations: Illustrative locations are shown on the appropriate plans. The final location for each tree must be agreed with the supervising officer after consideration of the prevailing site conditions in the immediate vicinity.

2 Site preparation: All competing weed vegetation within 1m of the stem must be mechanically removed or chemically killed to leave a weed-free planting area.

3 Tree quality: New trees must be specifically checked before planting to confirm that they are healthy and free of structural defects.

4 Planting pits: All planting must be into good topsoil and the pits excavated to a size of at least 10cm beyond the maximum dimensions of the loose roots or root-ball. The bottoms and sides of pits should be forked and broken up for a distance of at least 10cm beyond the pit boundaries before planting. The larger the tree, the greater this broken-up area needs to be, which can be up to 50cm and more for the larger semi-mature trees.

5 Drainage: Planting pits must be free-draining to avoid prolonged waterlogging. This specifically applies to poorly draining soils such as clay, where breaking up the pit bottom and sides is essential for the new tree to survive.

6 Planting depth: Planting the roots too deeply can seriously damage and kill trees. They should be planted no deeper than the depth that they were growing in the nursery, i.e. the base of the stem where it meets the roots at the root collar, should be no deeper than the final ground level around the planting pit.

7 Stabilising by staking and guying: Most trees taller than 1.5m at planting are likely to need stabilising until new supporting roots have grown. For all trees up to semi-mature size, this should be in the form of short staking so that the tree is held 0.5-0.75m above ground level and no higher. For the larger semi-mature trees, either above ground guying of the stem with cables or securing the root-ball below ground is essential to allow new anchoring roots to develop.

8 Protection: Where there is a risk of browsing damage from animals, stems must be protected with individual guards or more substantial fenced protection, if appropriate.

9 Mulching: The area surrounding each new tree up to at least 1m from the stem must be covered with a 50mm depth of composted woodchip mulch. Cut grass must not be allowed to grow right up to the stem as it competes for water and nutrients, and predisposes the stem to mowing damage during maintenance.

10 Watering: All new trees must be watered in periods of dry and hot weather until they are established to be independent in the landscape. This must be for at least one year for smaller trees and could extend for up to four years for larger trees. All standard and larger trees must have a suitable means of ensuring that water reaches the deeper roots, usually in the form of a perforated pipe installed around the rootball at the time of planting.

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11 Annual maintenance: All newly planted trees must be inspected on an annual basis until they are successfully established. All failures must be replaced. Annual maintenance must include keeping the planting area weed-free and topping up the woodchip mulch.

12 Tree size: Nurseries can supply most species of tree at a variety of sizes, ranging from small whips less than a metre in height up to large semi-mature specimens up to 12m height and more from some specialist growers. Figure 50 provides a simple guide on the commonest forms and sizes, and photos 51 and 52 indicate the variety of trees available.

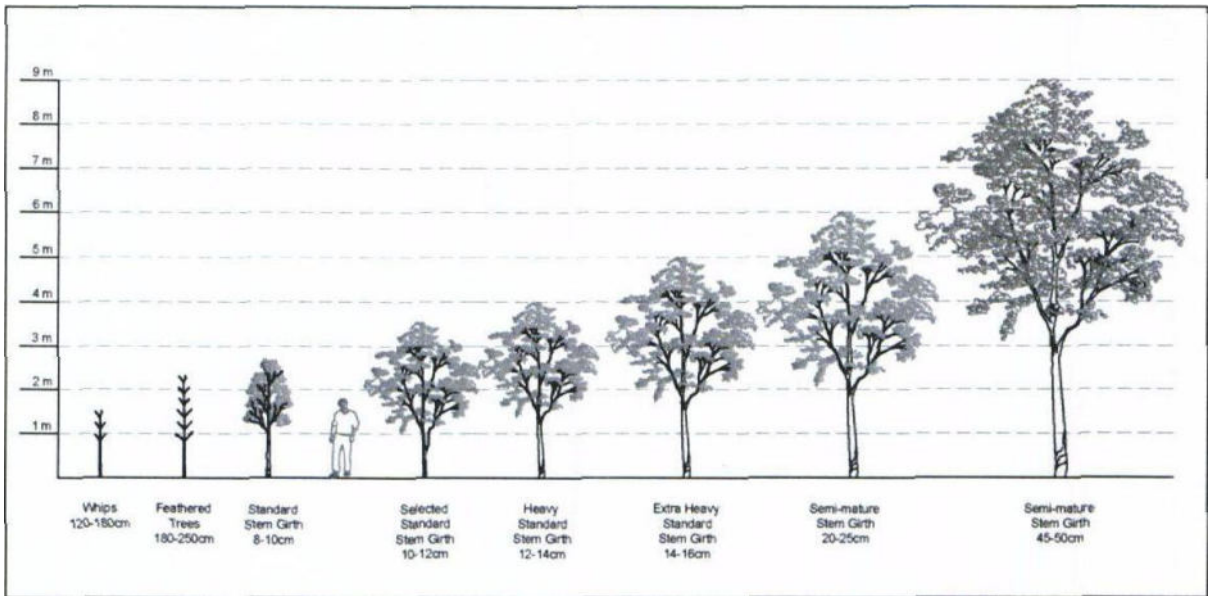


Figure 50: Summary of common conventions used by nurseries to describe tree types and sizes.

13 Tree form: Selecting the most appropriate tree for the location so that it does not out-grow the space available is important to avoid future inconvenience to occupiers. Specialist nurseries are able to supply a wide range of different forms (shape, size and proportion) and varieties with different aesthetic characteristics such as leaf shape, branching habit and foliage colour.


Photo 51: Hillier nurseries in Hampshire have a wide range of tree forms and species to provide instant effect in formal landscapes.



Photo 52: Barcham nurseries in Cambridgeshire specialise in supplying large trees for urban planting.

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The larger semi-mature trees over 4-5m in height and the more unusual forms and varieties can be supplied by specialist nurseries (try www.barcham.co.uk, www.hilliertrees.co.uk and www.civictrees.co.uk). Such trees must be planted by experienced landscape contractors for the best results.

49. Structural tree soil

Structural tree soil is a man-made growing medium for trees with a high proportion of angular stone, which provides support for surfacing above while still maintaining voids that roots can grow in. It allows surfacing to be installed close to trees and for roots to establish beneath, making it suitable for growing trees in parking areas (photos 53 and 54). It is generally installed to a depth of about 1 m, and filled in layers of about 300mm that can be progressively compacted to provide sufficient bearing for the new surfacing, without compromising future root growth. It is sometimes call tree sand or Amsterdam tree soil, and an internet search on either of these names will identify local suppliers. Three commercial suppliers can be found at www.landtechsoils.co.uk. www.treesand.co.uk and www.woodlandhp.co.uk.

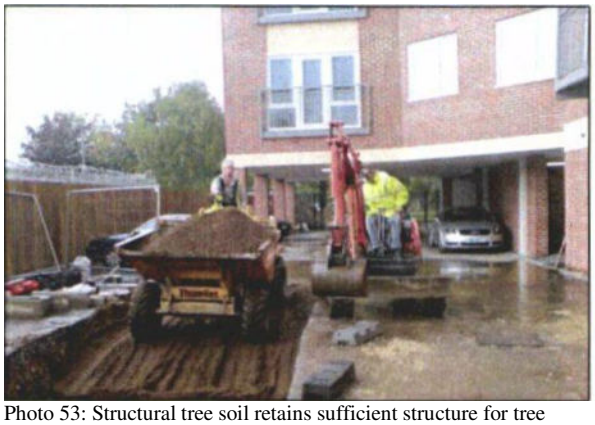


Photo 53: Structural tree soil retains sufficient structure for tree roots to grow, even when compacted.

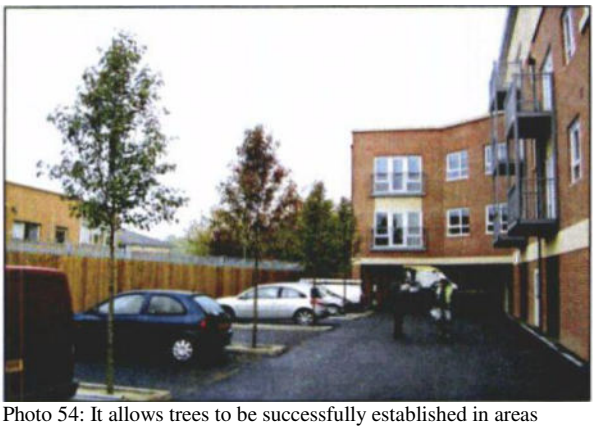


Photo 54: It allows trees to be successfully established in areas of extensive hard surfacing, with very little, if any, loss of parking space.

50. Silva Cells and root deflectors

It is possible to establish trees in fully paved areas using structural supports that protect the soil beneath the surface from being compacted. These are effectively large containers made of concrete or combinations of metal and plastic, which support the surface above and any loads it has to carry. They are filled with soil to provide a viable rooting environment for trees, allowing large trees to provide sustainable amenity in highly urbanised settings. Such systems also have the added advantage that they allow storage of rainwater, significantly reducing the rate of flow of water from paved areas during peak periods. One of the most widely used systems is the DeepRoot Silva Cell (www.deeproot.com) (photos 55-57), but other products are available.

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Photo 55: The individual Silva Cells can be assembled in layers and service ducting threaded through before filling with soil and fitting the reinforced tops.



Photo 56: Drainage from adjacent buildings can be directed into Silva Cells, significantly buffering rainwater runoff from urbanised areas.

New trees planted near surfacing can cause distortion damage from root growth if the appropriate precautions are not taken. Problems of this nature can be significantly reduced by installing root deflectors around the rootballs of new trees at the time of planting (photo 58). New roots growing out from the rootball meet the plastic profiled surface, deflecting them downwards, where they grow outwards at a lower level. Although they do eventually grow back near the surface, the onset of any damage is significantly delayed and it is usually far enough away from the trunk for remedial works to be carried out without seriously affecting the stability of the tree. However, these products are not suitable for all situations, especially on shallow soils, and so their use should always be considered very carefully in the context of individual site conditions. Try www.deeproot.com and www.greenleaftrees.co.uk. or internet search on 'root deflectors' for more information on products.



Photo 57: The finished surfacing is profiled to leave the tree pit open, ready to be filled with good quality topsoil and the new tree.

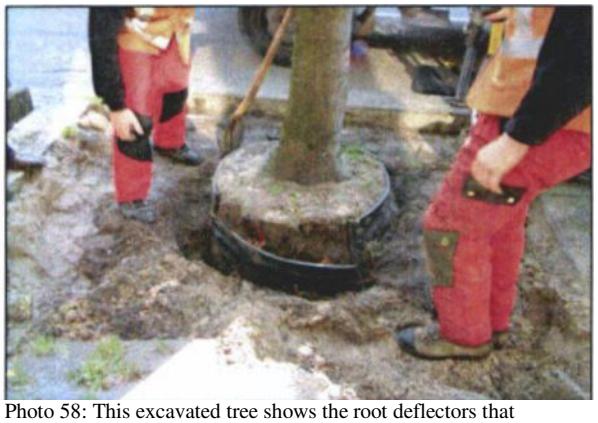


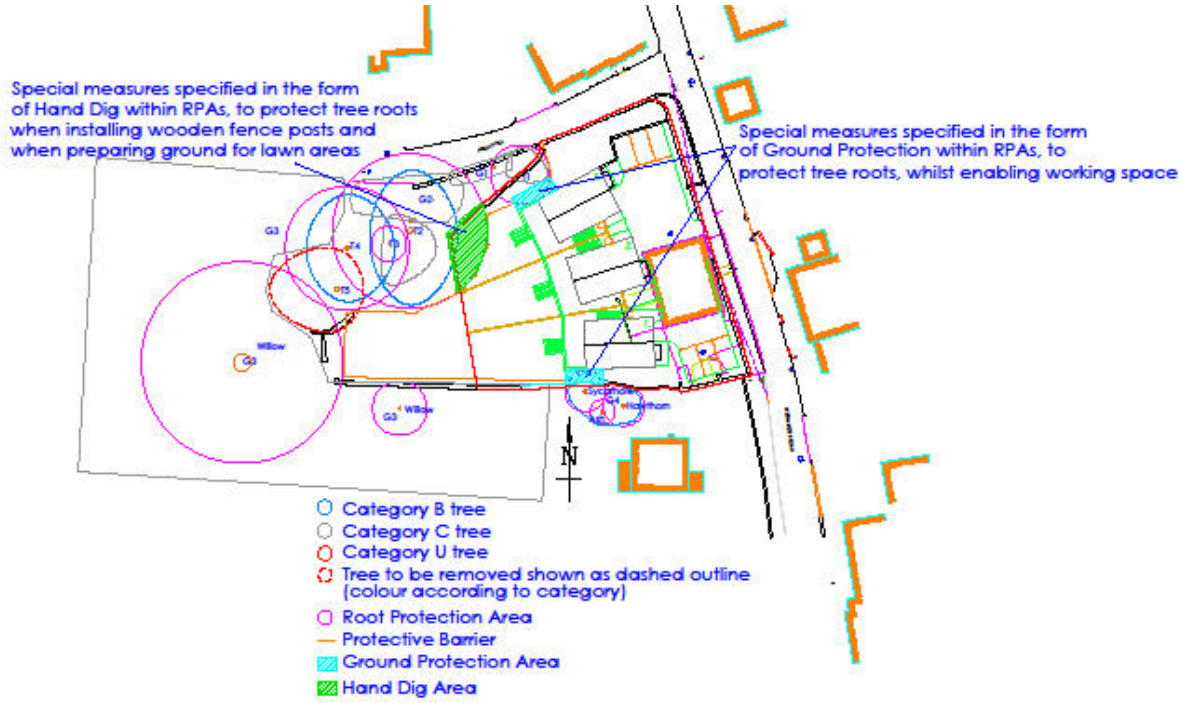
Photo 58: This excavated tree shows the root deflectors that were installed when it was planted seven years previously. The product has deflected roots downwards and prevented damage to the adjacent surfacing. Note that this is a permeable sandy soil and the roots were able to grow beneath the bottom of the deflectors.

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Tree Protection Plan

Please see accompanying pdf file of 38-40 Westminster Road TPP with layout drawing May 2025', in order to zoom in to view details more clearly.



TREE PROTECTION PLAN WITH LAYOUT

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APPENDIX 4 – Photographs



Photo 1: Hawthorn (T1), Elder/Privet (G1).



Photo 2: R-L Goat Willow (T2, T3, T4, T5), mixed species (G2).



Photo 3: R-L Goat Willow (T4, T5), mixed species (G3).

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APPENDIX 4 – Photographs



Photo 4: Rip-out wound with exposed heartwood on Goat Willow (T5).



Photo 5: Longitudinal cracks/splits on stem on Goat Willow (T5).



Photo 6: Sycamore, Hawthorn, Ash (G4) on neighbouring land near boundary.

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