



BS5837:2012

**Trees in relation to design, demolition and construction –
Recommendations**

Arboricultural Method Statement

Collins Construction PLC

1 Radlett Place,
London,
NW8 6BT.

Revised 2/06/2016 to include Addendum
Report and Technical Details

15 April 2016

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If this report has been released electronically the appendices referred to herein can be found in the annexed zip folder/s as .pdf files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans are annexed separately as A0, A1, A2 or A3 as appropriate.

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Introduction

Arbtech Consulting Limited (Arbtech) received written instruction on 27th January 2016 from Collins Construction PLC to attend 1 Radlett Place, London, NW8 6BT; grid reference, TQ 27209 83784 (site) to undertake an arboricultural survey a to BS5837:2012 guidance to assess trees, hedges and major shrub groups growing on and within influencing distance of the site and to produce a Schedule of trees, Tree Constraints Plan, Arboricultural Site Investigations , Arboricultural Method Statement and Tree Protection Plan.

Executive Summary

This report describes the extent and effect of the proposed development at 1 Radlett Place, London, NW8 6BT (“site”) on individual trees and groups of trees within and adjacent to the site.

Trees within the site were surveyed; using a methodology guided by British Standard 5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’ (“BS5837”).

Subsequently, this report has been produced, balancing the layout of the proposed development against the competing needs of trees. This report comprises all of the requisite elements of an arboricultural implications assessment, method statement and supporting plans.

Figure 1: Site Location (OS Plan)



Figure 2: Aerial image of site



Checklist for Submission to Local Planning Authority

Tree survey	<input checked="" type="checkbox"/>
Arboricultural method statement	<input checked="" type="checkbox"/>
Tree protection plan	<input checked="" type="checkbox"/>

This report and its appendices follow precisely the strategy for arboricultural appraisal intended to provide local planning authorities with evidence that trees have been properly considered throughout the development process.

It is the conclusion of this report that the overall quality and longevity of the amenity contribution provided for by the trees and groups of trees within and adjacent to the site will not be adversely affected as a result of the local planning authority consenting to the proposed development. It is considered that any issues raised in this report, or beyond the scope of it can be dealt with by planning conditions.

General Information

Client: Collins Construction PLC.

Site: 1 Radlett Place, London, NW8 6BT.

Brief proposal description: Installation of metal gates, fence and hard surfacing adjacent to Radlett Place.

Table 1: Documents referred to.

Document	Reference No.
Topographical survey drawing	Radlett place - a
Proposed layout drawing	(700) 559.1 P06
Landscape master plan drawing	N/A
LPA pre-app comments	N/A
British Standard 5837:2012	"BS5837"
Tree Protection Plan	Arbtech TPP 02

Tree Survey

Survey: An arboricultural survey to BS5837 of all trees within impacting distance of the site was undertaken by Matthew Middle on 5th February 2016

A total of one (1) individual tree was surveyed. Details for each of the trees surveyed are provided in the Schedule of Trees (see Appendix 1)

Table 2: Documents upon which this tree survey has been based.

Document	Originator	Reference Number	Title
Topo	Sterling Surveys	Radlett place - a	Site Survey

Limitations: The survey was made at ground level using visual observation only. Detailed examinations, such as climbing inspections and decay detection equipment were not employed, though may form part of the survey’s management recommendations. Measurements were taken using specialist tapes, laser and GPS devices. Where this was not possible, measurements are estimated.

Scope: Pre-development tree surveys make arboricultural management recommendations based exclusively upon the individual tree or group of trees condition relative to their present context (*i.e. not in relation to the proposed development*).

Legal Status: No statutory protection check has been performed. BS5837 does not draw any distinction between trees subject to statutory protection, such as a Tree Preservation Order (“TPO”), and those trees without. This is principally because a detailed planning consent overrides any TPO protection. Consequently, we do not seek to offer any comparison between or infer any difference in the quality or importance of TPO trees and other trees.

* For more information on the surveyed trees please see Arbtech Consulting Ltd, Tree Survey Schedule (Appendix 1), Tree Survey Report and Tree Constraints Plan.

Arboricultural Method Statement

The purpose of this method statement is to demonstrate how any aspect of the development that has potential to result in loss or damage to a tree may be implemented and provide an adequate level of protection for those trees that are to be retained during the proposed works.

Details of key site personnel, including site / project manager will be submitted to the Council’s Tree Officer prior to the commencement of site works.

This method statement is to be approved and agreed to in writing by all key personnel prior to the commencement of site works.

No site personnel are to be present and no demolition, site clearance, building work or delivery of materials is to occur until the protective measures are in accordance with this method statement and the Tree Protection Plan drawing number Arbtech TPP 02.

Protective measures should be in accordance with this method statement and the Tree Protection Plan; drawing number Arbtech TPP 02 will remain unaltered and in situ, unless otherwise specified, for the entire duration of the construction.

Table 3: Documents upon which this assessment has been based.

Document	Originator	Reference Number	Title
Topo	Sterling Surveys	Radlett place - a	Site Survey
Site Plan	Osel architects	(700) 559.1 P06	Vehicle Gates



Site Management

The site manager will be responsible for briefing and inducting all personnel who will be working on any stage of this development and especially those who will be working within or adjacent to the canopies or RPAs of retained trees; and will make them aware of, and provide a copy of this this method statement and tree protection plan drawing number Arbtech TPP 02; this is to include but not exclusively of the movement and or operation of plant, excavations, unloading deliveries, mixing and or pouring of cement and concrete.

The site manager will be responsible for the day to day running and protection of all retained trees and for leasing with the project arborist about any tree related matters and prior to any works that may or will affect the RPAs or canopies of retained trees; this is to include but not exclusively of the movement and or operation of plant, excavations, unloading deliveries, mixing, pouring and storage of all caustic materials that may cause harm to retained trees.

Any incidents of damage to retained trees or of tree protection measures will be documented by the site manager who will then report these incidents to the project arboriculturist immediately and make sure that works within this area cease until the project arborist has had an opportunity to inspect the damage and where appropriate, agree a mitigation plan with the local planning authority tree officer.

The site manager may designate another person to take charge of briefing and inducting process of new site personnel or visitors in his absence.

If the site manager is replaced or is absent from site for more than three consecutive working days the project arborist will be informed and a pre start meeting will be held with the new or acting site manager.

It is the responsibility of the site manager to ensure that the planning conditions attached to the planning consent are adhered to at all times and that a monitoring regime and supervision of any works within or adjacent to the RPAs are adopted.

If at any time pruning works are required other than those previously approved, permission must be sought from the LPA tree officer and once permission is granted they are to be carried out by a suitably qualified person in accordance with BS3998:2010 Tree work – Recommendations.

Prohibition

- Mechanical digging or scraping is not permitted within a defined root protection area or within areas cordoned off by protective barrier fencing.
- No access will be permitted within the protected areas;
- No materials, equipment or debris will be stored within any of the fenced areas, or against the fencing;
- Fires are not permitted within 10m of any vegetation.
- Leaning objects against or attaching of objects to a tree is not permitted.
- Machinery, plant and vehicles are not permitted to be washed down within 10.0m of vegetation.
- Chemicals and materials are not to be transported, stored, used or mixed within a root protection area or within areas cordoned off by protective barrier fencing.
- Cement silos, mixing site to be situated within a bunded area to prevent spillage/leaking of chemicals harmful to trees. These areas are to be sited well clear of protected trees.
- Refuelling of plant or machinery is prohibited within 10m of the construction exclusion zones.
- It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees.
- Where machinery is to be used within 5m of retained tree canopies a banks man will be required at all times whilst setting up, moving or operating within this distance of retained trees canopies.
- Storage of all caustic material and chemicals are to be situated well clear of protected areas and preferably on lower ground if slopes are present, or to be situated within a bonded area to prevent any spills or leaks entering the ground.

Sequencing of works

A logical sequence of events is to be observed and shall be phased as follows.

Table 4: Sequence of Events

Stage	Event
Stage 1	Pre-commencement site meeting
Stage 2	Installation of protective measures in accordance with the approved tree protection plan
Stage 3	Undertake and complete construction works
Stage 4	Undertake external landscaping works outside of the construction exclusion zones
Stage 5	Removal of all machinery and materials form site
Stage6	Dismantle and removal of protective measures
Stage 7	Undertake external landscaping works within the construction exclusion zones
Stage 8	Sign off from project arboriculturist

Protective Measures

Protective measures are to be installed immediately following the completion of the tree works, and are to be sited and aligned in accordance with the tree protection plan (Arbtech TPP02) prior to the commencement of any works or the introduction of any machinery or material to site.

Upon installation of the protective measures around the retained trees the project arboriculturist will visit the site to inspect and document the position and specifications of the protective measures.

In the event that the protective measures and their positions do not comply with this arboricultural method statement document number Arbtech AMS 04 (15th April 2016) and tree protection plan drawing number Arbtech TPP 02, the project arboriculturist shall inform the client and fencing contractor so adjustments can be made.

When the protective measures comply with document number Arbtech AMS 04 (15th April 2016) and tree protection plan drawing number Arbtech TPP 02, the project arboriculturist will sign off the protective measures in writing to the client and will send a copy to the fencing contractor, site agent and local authority tree officer.

If the protective measures become damaged or there is any accident or emergencies involving trees, these areas are to be cordoned off with immediately with high visibility plastic mesh fencing. The site agent is to photograph and document the damage and inform the project arboriculturist immediately after the incident and all work within in this area is to cease until the project arboriculturist has made a visit to the site. Any and all damaged sections of protective measures shall be replaced within 48 hours of the initial incident.

The protected area is sacrosanct and will not be invaded by the storage of materials, mixing of concrete or other products, accessed by machinery, equipment or pedestrians or in any other way disturbed by construction activity.

The protective measures will remain in place until the completion of stage 5(see Sequencing of Works), there after they will be carefully dismantled only with the agreement of the project arboriculturist and or the local authority tree officer.

The existing site boundary measures are to be retained for the duration of the development. If for any reason the existing boundary measures are not to be used protective barrier fencing is to be installed along the line of the boundaries and is only to be removed upon the written permission of the project arboriculturist or LPA tree officer upon the completion of the development or immediately prior to the installation of the permanent boundary measures.

Proposed hard surfacing is to be installed immediately to act as ground protection, where it is decided that this is not a viable option these areas are to be covered by ground boarding as designed by the project engineer to cope with any likely loading.

No equipment, vehicles or plant shall operate beyond the tree protection fencing. Booms, hoists and rigs should be kept as far away from the canopies of retained trees at all times. Where it is necessary to operate within 5m of a tree canopy, it will be done with the utmost caution and under the control of a banks man. Damage to trees will be considered a breach of this tree protection plan, which in turn could be a breach of planning permission.

Trunk Protection

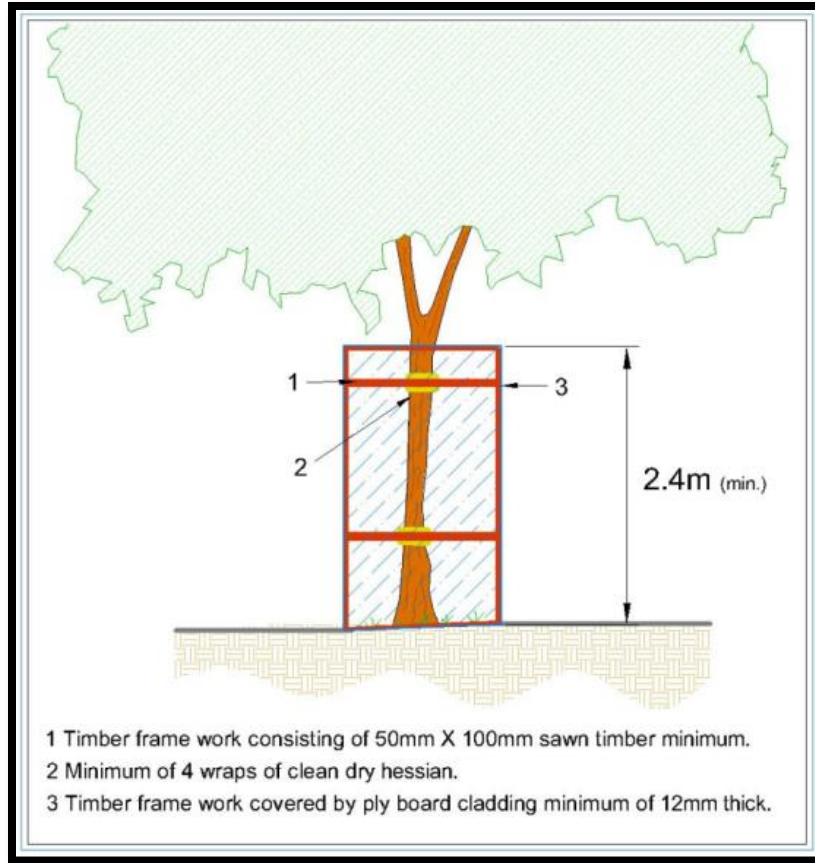
Protective trunk wrapping:

Protective trunk wrapping is to comprise of a minimum of three wrappings of clean dry hessian around the trunk from ground level up to 2.4m high and held in place with sisal. Onto the hessian there is to be a minimum of three wraps of chestnut paling around the trunk; the chestnut paling is to be held in place by 2.50mm galvanized mild steel wire at the top, middle and bottom of each wrap of chestnut paling. The wire is to be secured to the chestnut paling by fencing staples; Or

Protective barrier hoarding:

Protective barrier hoarding should be appropriate for the intensity and proximity of the development to protect trees where development activity is in close proximity. To comprise of 2.4m high wooden site hoarding constructed upon a timber frame work situated around the outside of the planting pit. Where the timber frame is constructed around the tree trunk a minimum of four layers of clean dry hessian is to be wrapped around the trunk to protect the bark.

Trunk protection is to be removed ONLY with the written permission of the arboricultural consultant and approval of the local planning authority (LPA).



Trunk protection Signage denoting the words “*tree protection area*” at 5.0m intervals should be fixed to the protective barrier fencing (See Appendix 2).

Trunk protection is to be removed ONLY with the written permission of the arboricultural consultant and approval of the local planning authority (LPA).

Ground boarding

New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

Where is determined by the project engineer that the any hard surfacing is not adequate protection from any expected loading, ground boarding is to be installed to the engineers specification on top of the hard surfacing within the root protection areas of retained trees.

Where machinery will be stored or used from the ground boarding within the RPAs of the retained trees an impervious barrier and or bunding to prevent oils, fuel or chemicals is to be installed to prevent leaching into the soil within or adjacent to the RPAs.

Note The ground protection might comprise of one of the following:

- a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100mm depth of woodchip), laid onto a geotextile membrane;
- b) for pedestrian-operated plant up to a gross weight of 2t, proprietary inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150mm depth of woodchip), laid onto a geotextile membrane;
- c) for wheeled or tracked construction traffic exceeding 2t gross weight, an alternative system (e.g. proprietary system or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

For any situations other than those described in a) or b) (as above), the ground boarding is to be designed by a suitably qualified person to an engineering specification in conjunction with arboricultural advice, to be suitable of supporting the expected loading to be placed upon it.

In all cases, the objective of the ground boarding is to avoid compaction of the soil beneath, so that tree root functions remain unimpaired.

Demolition

Prior to the demolition of the existing site features, all tree works are to have been completed, tree protection measures are to be in place as per Arbtech Consulting Ltd. tree protection plan document number Arbtech TPP 02 and have been signed off and a copy of the demolition method statement has been submitted and approved by the project arboriculturist and LPA tree officer, to ensure that there is no conflict with this method statement.

All demolition work within or immediately adjacent to RPAs or canopies of retained trees is to be undertaken under the direct on-site supervision of an arboriculturist.

Hard Surfacing

Where it is required for hard surfacing is to be removed and or re-surfaced within the RPAs of retained trees it is to be undertaken under direct on-site arboricultural supervision, during the landscaping phase of the development.

The wearing course will be broken up using a hand held pneumatic breaker, hand tools and wheel barrows to break up and remove the surfacing. Where is necessary to remove the sub base this is to be undertaken using a fork to loosen the material and moved using shovels and wheel barrows.

In some situations and at the discretion of the arborist it may be possibly to use an excavator using a hydraulic breaker and a suitably sized toothless grading bucket. If an excavator is to be used it must be situated outside of the RPAs, on top of the hard surfacing working away from the RPAs or from ground boarding.

Whichever system is used there is to be **NO** disturbance of the soil beneath. If roots are found they are to be covered over with damp hessian and a layer of either sharp sand, wood chip or top soil will be applied as soon as practicably possible to prevent desiccation.

Existing Underground Services

Existing services within the site should be retained where ever possible. Where existing services within RPAs require upgrading, the utmost care must be taken to minimise disturbance, and where feasible trenchless techniques are to be employed, and only where necessary should open excavations be considered.

Construction

Prior to the construction of the proposed vehicle entrance, a copy of the construction method statement should have been submitted and approved by the project arboriculturist and LPA tree officer, to ensure that there is no conflict with this method statement.

All excavations and construction work within or immediately adjacent to RPAs or canopies of retained trees is to be undertaken under the direct on-site supervision of an arboriculturist.

Foundations design

New foundations for buildings, structures and hard surfacing situated within the RPAs of retained trees are to be designed in conjunction with arboricultural advice to accommodate the likely loading of the structure. The foundations will be designed to limit the amount of excavation required within RPAs to retain roots that are important to the trees stability as identified during the site investigations.

The use of strip foundations within RPAs of retained trees can cause extensive root loss and as such are to be avoided.

Design of foundations for the gates, fencing and hard surfacing within the RPA of tree number 123 is to be designed to minimise the adverse impact upon trees and should pay particular attention to the existing ground levels and proposed finished floor level. Foundation design should be undertaken using site specific information in conjunction with the project arboriculturist and engineer.

Root damage can be minimised using:

- Piles, with a site investigation it is possible to determine their optimal location whilst avoiding damage to roots important for the stability of the tree. Investigative excavations are to be undertaken with the use of hand tools or compressed air displacement to a minimum depth of 600mm;
- Beams laid at or above ground level and or cantilevered as necessary to avoid tree roots identified by the site investigation
- Multi-dimensional confinement systems.

These are just an example of a few types of foundations that can be used to minimise root damage. In order to arrive at a suitable solution, site specific and specialist advice regarding foundation design should be sought from the project arboriculturist and engineer.

Large structures

Slabs for larger structures such as the dwelling should be designed and constructed with a ventilated air space between the underside of the slab and the existing soil surface. A specialist irrigation system is to be installed underneath the slab e.g. rain water runoff from the roof.

Small structures

Slabs for smaller structures (less than 20% of the total area of the un-surfaced RPA) such as garages and shed may be formed / constructed directly onto the existing soil surface. It may be possible to use a multi-dimensional confinement system such as CellWeb™ or similar as the foundation for these structures (specialist advice should be sought from the manufacturer).

Where piling is to be installed near to trees, the smallest practical pile diameter should be used, as this reduces the possibility of striking major tree roots, and reduces the size of the rig requires to sink the piles. If a piling mat is required, this should conform to the specification for ground boarding.

All and any excavations that may be required for foundations within the RPAs of retained trees will initially be undertaken manually under arboricultural supervision (see Manual excavation).

Gate and fence posts

Arbtech Consulting Limited have been informed that the proposed foundations will be constructed mini bore (piled) type of foundation, the foundations have not yet been fully designed and should be designed in conjunction with arboricultural advice so that the piles are located within the trial excavations and avoid all roots that were exposed. The piles to be used should be the smallest diameter piles practical, with the minimum number required.

Any piling rig should be situated outside of any RPAs of the retained trees or on top of ground boarding designed by the project engineer capable of dealing with the likely loading; all piles to be installed within the RPA of tree number 123 is to be installed under arboricultural supervision directly through the ground boarding which may only be removed upon completion of the installation of the pile foundation.

Hard Surfacing

The new hard surfacing to be situated within the RPAs of tree numbers 123 is to be designed in conjunction with arboricultural advice to accommodate the likely loading.

The design should not require excavation however the removal of the turf layer or other surface vegetation may be acceptable if necessary, but ideally the construction will be situated entirely above the existing ground level.

Appropriate options for the sub base of hard surfacing situated within the RPAs of retained trees include multi-dimensional confinement systems (CellWeb™ or similar). Alternatively piles, pads or elevated beams can be used to bridge over the RPAs, or following exploratory investigations to determine location, to provide support within the RPAs while allowing retention of roots of 25mm or greater in diameter.

Exploratory investigation is to be undertaken manually under arboricultural supervision using hand tools (See Manual excavation).

Prior to the installation of the hard surfacing within the RPAs vegetation may be removed using hand tools or sprayed with an approved non residual herbicide such as 'Glyphosate'.

Multi-dimensional confinement system

If a multi-dimensional confinement system (such as CellWeb™ or similar) is to be used it is to be laid entirely above the existing soil surface over a geo textile membrane and or a bi-axel geo-grid (such as tensar TriAx).

Based on the use of the design the hard surfacing is for a driveway (vehicular access); it is recommended by Geosynthetics Limited that a cell depth of between 100 and 200mm (vehicular access to include emergency access vehicles and HGVs) of their product Cellweb® TRP would be possibly suitable.

Installation of a multi-dimensional confinement system

a) Prepare the surface

- Remove any surface rocks and debris;
- Create a level surface by filling in any hollows with clean angular stone or sharp sand;
- Do not level off any high spots or compact the soil through rolling.

b) Layout Geotextile membrane

- Layout the permeable Geotextile membrane, overlaying edges of the required area by 300mm;
- Overlap any joints by 300m or more.

c) Layout multi-dimensional confinement system (MDC)

- Layout the collapsed MDC system on-top of the Geotextile membrane;
- Place one steel pin into the center cell at one end of the panel and secure it into the ground;
- Pull out the MDC to its full length (see manufacturers specifications), place a steel pin in the center at the opposite end and secure it into the ground;

- Pull out the MDC to its full width (see manufacturers specifications), and secure each corner into the ground with steel pins;
- Create a panel to the correct size using the required number of steel pins (as per the manufacture specifications);
- Makes sure all cells are fully extended (as per manufactures specifications);
- Staple adjacent panels together (as per manufacturers specifications);
- If a curved shape is required, the panels are to be cut down to the required size and shape once the MDC is pinned out. Do not curve or bend panels into place.

d) Infill with clean angular stone

- The infill material must be a clean (no fines) angular stone (as per manufactures specifications)
- Do not use M.O.T type 1 or crushed stone with fines within or adjacent to RPAs;
- Infill the MDC cells with clean angular stone, working towards the tree using the infilled panels as a platform;
- No compaction is requires of the infill. Do not use a whacker plate, roller or any other means of compaction.

e) Edge restraints

- All kerb edging should be situated on top of the MDC within RPAs, Do not excavate within RPAs to install kerb edging;
- Where edging is required for light structures, a peg and treated timber board edging is normally acceptable;
- Other options include wooden sleepers, plastic or metal edging;
- The outer edges of the supports may be banked up with clean top soil and or mulch.

f) Wearing course

- Install a permeable geotextile membrane, over lapping any joints by 300mm before laying the wearing course;
- Surfaces can include block paving, asphalt, loose gravel, resin bound gravel, concrete etc.;
- Within RPAs the wearing course shall be permeable to both water and air.

Concrete foundations

Prior to concrete being poured to form the foundations within or immediately adjacent to the RPAs of retained trees the excavation is to be lined and sealed to prevent any leaching of the concrete into the soil and causing desiccation of retained roots by concrete run off.

Manual excavation

Excavation within RPAs will be undertaken by hand under direct on-site arboricultural supervision of the required depth of the foundation; Or to a minimum of 600mm deep of any excavation, whether for proposed foundations, hard surfacing or underground

services. The total depth of the manual excavation will be determined by the arboriculturist whilst on site.

The soil is to be loosened with the aid of a fork or pick axe and then cleared with the aid of an Air-spade, Air-vac and or shovel. Any roots found will be cleanly severed by the arboricultural consultant with either a hand saw or secateurs.

Any roots found with a diameter of less than 25mm shall be cleanly severed by the arboricultural consultant. Any roots of 25mm and above shall be excavated around without damaging them; the arboricultural consultant shall decide if it's feasible or necessary to retain the root, if not it shall be severed.

The edge of the excavation closest to the trees will be covered with damp hessian to prevent soil collapse or contamination by concrete.

Soil beneath the depth may be sheet piled, regular piled or excavated deeper. Machinery may be used for this providing that it is situated outside of the RPA or has appropriate ground protection in place to move around on and work upon.

Services

Detailed drawings of proposed underground services are not available at this time; hence it is not possible to identify any specific potential impacts associated with the scheme at this stage.

Existing services within the site should be retained where ever possible. Where existing services within RPAs require upgrading, the upmost care must be taken to minimise disturbance, and where feasible trenchless techniques are to be employed, and only where necessary should open excavations be considered.

Where new services are to be introduced into the site they should be located outside of RPAs, where they will not interfere with tree roots. If any excavations are required within the RPAs all trenches are to be excavated by hand and radially to the tree trunks under direct on-site arboricultural supervision and are to be carried out under NJUG guidelines.

Final positions of any proposed services should be verified and approved by the arboricultural consultant and local authority tree officer before implementation.

New Underground services

Trenching for installation of underground services and drainage routes could sever any roots that may be present and as such adversely affects the health of the tree. For this reason particular care should be taken in routing and methods of installation of all underground services. All underground services and drainage routes should be located so that no excavations are required within RPAs.

Where it has been impossible to keep underground services from passing through RPAs or within close proximity to trees, these sections are to be installed in one of three ways in accordance with the guidance set out in National Joint Utilities Group guidelines (NJUG 4), under on site arboricultural supervision.

Trenchless Techniques

There are three main types of trenchless techniques, these include, guided and unguided boring and pipe replacement by lining or bursting. These allow for the installation, maintenance or renewal of underground services, without the disturbance of soil in which roots are likely to be growing. Starting and receiving pits for the boring machinery are to be located outside of the RPAs of any retained trees, with the bore depth being maintained at a minimum depth of 600mm below the existing ground level. Techniques involving external lubrication of the equipment shall use no material other than water as other lubricants could contaminate the soil (e.g. oil, bentonite, etc.).

Manual Excavation

Excavation within RPAs will be undertaken by hand under direct on-site arboricultural supervision of the required depth of the foundation; Or to a minimum of 600mm deep of any excavation, whether for proposed foundations, hard surfacing or underground services. The total depth of the manual excavation will be determined by the arboriculturist whilst on site.

The soil is to be loosened with the aid of a fork or pick axe and then cleared with the aid of an Air-spade, Air-vac and or shovel. Any roots found will be cleanly severed by the arboricultural consultant with either a hand saw or secateurs.

Any roots found with a diameter of less than 25mm shall be cleanly severed by the arboricultural consultant. Any roots of 25mm and above shall be excavated around without damaging them; the arboricultural consultant shall decide if it's feasible or necessary to retain the root, if not it shall be severed.

The edge of the excavation closest to the trees will be covered with damp hessian to prevent soil collapse or contamination by concrete.

Soil beneath the depth may be sheet piled, regular piled or excavated deeper. Machinery may be used for this providing that it is situated outside of the RPA or has appropriate ground protection in place to move around on and work upon.

Broken Trench – Hand Dug

This technique combines both trenchless techniques and manual excavation where excavation is unavoidable. Excavations should be limited to where there is clear access around and below the roots. All trenches are to shall be excavated by hand with the same precautions taken as for manual excavation. Open section of trench should only be large enough to allow access for linking to the next section.

Landscaping

Landscaping around retained trees may only be carried out once all tree protection measures have been removed (planting, turfing, fencing etc.).

All excavations within the Root Protection Areas shall be undertaken by hand and without reducing current ground levels unless it is agreed in writing with the LPA. At no time is the use of a rotavator permitted within the RPAs of retained tree.

Any tree roots discovered will be left in-situ and shall not be cut or otherwise damaged. Where possible, the soil structure within the Root Protection area shall be preserved.

No works will be carried out within the RPAs of any trees if the soil moisture is of such a level that soil compaction may be likely. Should the soil become compacted or has poor structure which would hinder the development of the existing trees and plants or any new plantings the arboriculturist should be consulted about soil decompaction techniques.

Monitoring and Supervision

Where trees have been identified within this method statement and tree protection plan drawing number Arbtech TPP 02 for retention, there should be an auditable system of arboricultural monitoring. This is to extend to arboricultural supervision whenever demolition or construction activity is to take place within or adjacent to any canopy or RPA.

The development's tree protection measures are to be monitored and all demolition and construction works to be undertaken within or adjacent to the RPAs of retained trees are to be supervised by project arboriculturist, who should be retained to record and report observations to the council at appropriate intervals.

Pre-commencement site meeting

Prior to the commencement of any works or machinery and materials arriving on site a pre-commencement site meeting involving the project arborist, land owner or agent, site manager, contractors and engineer (as appropriate) and the relevant LPA officers will be held to ensure that all aspects of the arboricultural method statement and tree protection are understood and for all parties to swap contact details (see Appendix 3).

Monitoring and supervision schedule

The initial monitoring visit will be to check that the tree protective measures are in the correct location and as specified within the approved method statement; if so to sign off their installation.

There after monitoring visits are to take place at regular intervals, to ensure that tree protection measures are in place and are functioning as designed or whenever necessary to undertake works to be carried out under arboricultural supervision. The frequency of the monitoring visits is to be determined with the LPA tree officer at the pre-commencement site meeting.

A record of all arboricultural monitoring and supervision visits will be kept and any faults will be logged, this will then be copied to the site agent, developer and local planning authority in a digital format.

If during the course of the development it is necessary for areas to be re-designed so that they would require changes to the approved arboricultural method statement or tree protection plan and so affecting retained trees the project arborist and LPA tree officer will be invited to attend a site meeting with all relevant parties. Prior to any changes being implemented these must have been approved in writing by the LPA tree officer.

Supervision

The arboricultural consultant will be required to attend site to directly supervise all demolition and construction works that are to be undertaken within or adjacent to the RPAs of all retained trees and will be advised a minimum of 72 hours prior to the commencement of any works that require his attendance, these will include:

1. Pre-commencement site meeting;
2. Location of protective measures;
3. Manual excavation of foundations for gate and fence posts within the RPA of tree number 123;
4. Installation of ' No Dig' hard surfacing;
5. Any excavations within and immediately adjacent to RPAs, including foundations, hard surfacing or underground services;
6. Removal of protective measures and arboricultural sign off.

Completion meeting

Once all construction works have been completed all materials and machinery has been removed from site the project arborist shall be informed and will invite the LPA tree officer to meet on site to discuss the process and discuss any final remedial works that may be required and to sign the development off so that the protective measures may be removed.

Appendix 1: Tree Survey Schedule

Tree Survey Schedule 1 Radlett Place, London, NW8 6BT

Client	Collins Construction PLC
Survey Date	5 th February 2016
Weather Conditions	Overcast but dry
Surveyor	Matthew Middle

Key:

Tree Number	A unique number or reference to identify trees or groups as shown on associated plans.
Species	Common and or taxonomic names.
Height	The height of the tree in meters (m).
Trunk Diameter	The stem diameter in millimetres (mm) taken at 1.5m above ground level unless otherwise specified.
Canopy Spread	The extent of the canopy taken in meters (m) to the principle points of the compass, North (N), East (E), South (S) and West (W).
Crown Clearance	The height of canopy clearance above ground level to the lowest point of the canopy, taken in meters (m).
Age Class	Age classification; Young (Y), Middle Aged (MA), Mature (M), Late Mature (LM), Veteran (V).
Physiological Condition	The general physiological condition of the tree; Average, Below average, Low, Dead.
Structural Condition	The general structural condition of the tree; Good, Moderate, Indifferent, Poor, Hazardous.
Comments	Notes and general comments on the structural condition of the tree, its environment and it estimated remaining contribution.
Category	The retention category referring to the quality and useful contribution in years; U = <10yrs; A = >40yrs; B = >20yrs; C = >10yrs. The retention sub category referring to the type of amenity; 1 = Arboricultural; 2 = Landscape; 3 = Cultural including conservation.

Tree No.	Species	Height (M)	Trunk Diameter (MM)	Canopy Spread (M)	Crown Clearance (M)	Age Class	Physiological Condition	Structural Condition	Comments	Category
123	London plane	20m	890mm	N 6m E 9m S 6m W 4m	S 4m W m	M	Average	Moderate	Offsite tree, situated on the frontage of the property; single trunk from base; all over canopy reduction with regrowth; of moderate quality and value; of long term potential.	B ₂

Appendix 2: Tree Protection Notice

(To be printed at A3 or larger)

Tree Protection Area

KEEP OUT

Do not move this fence

(TOWN & COUNTRY PLANNING ACT 1990)

**TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS
AND/OR ARE THE SUBJECT OF A TREE PRESERVATION ORDER.
CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL
PROSECUTION**

**ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN
PERMISSION OF THE LOCAL PLANNING AUTHORITY**


ARBTECH

Arbtech Consulting Limited.
Unit 3, Well House Barn, Chester Road, Chester, CH4 0DH
www.arbtech.co.uk - 01244 661170

Appendix 3: Contact Details

Name	Position	Company	Contact
	Client / Agent		
	Tree Officer		
	Arboricultural Consultant	Arbtech Consulting Ltd.	01244 661170 https://arbtech.co.uk
	Site Manager		
	Main contractor		

Document Production Record

Document number	Editor	Signature	Position	Issue number	Date
Arbtech AMS 04	Matthew Middle		Associate	1	15/04/2016

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ADDENDUM TO ARBTECH ARBORICULTURAL
METHOD STATEMENT 15.04.16

1 Radlett Place
London NW8 6BT

2nd June 2016

INTRODUCTION

The purpose of this Addendum is to supplement and answer the queries and observations made by the Planning Office Laura Hazelton in her email dated 21.04.16.

1.00 Trial Pits

The purpose of the trial pits was to locate suitable positions for four number small mini pile positions to support a guard rail to the trunk of the tree that will have no detrimental effect to the existing tree roots.

2.00 Proposed Foundations

The proposed foundations will be of approximately 200mm diameter mini piles to a depth not exceeding 3m. The intended purpose of these piles would be to support the proposed guarding railing to the trunk of the tree as shown on OSEL's drawing number (700)559.1 Rev P06 which formed part of the planning application.

Installation of the augered cast in situ mini piles would be via a small lightweight tripod rig positioned on localised load spreading timbers on a geotextile membrane to ensure that no damage occurs to the existing roots of the tree.

The intention is to use a specialist subcontractor to carry out these works.

The 4nr proposed locations will be as OSEL's drawing number (700)559.1 Rev P06.

The specialist subcontractor that will be used will be Tritex (part of the AE Yates group) mini piling telephone 01204-675109 or similar.

3.00 No Dig Surfacing Specification

The proposed no dig surface specification is as indicated on Arbetch drawing TPP02 dated April 2016.

The surface will be constructed without digging and comprise Geoweb root protection, see <http://greenfix.co.uk/wp-content/uploads/2013/12/Geoweb-TRP-Brochure-16-10-14.pdf> also attached, laid over Tensar Triax, see <http://www.tensar.co.uk/Systems-Products/TriAx-geogrids-TX/TriAx-TXG-geocomposites> also attached. Small holes below the Tensar Triax to be back filled with sharp sand.

The Geoweb will be backfilled by hand with no fines aggregate 20-30mm. the Geoweb will be overlaid with a permeable geotextile membrane.

Wearing course shall comprise of 100 x 100 x 80 thick National Bluestone cobbles laid on a granular bed. Cobbles will be laid with open joints.

The proposed works will be carried out by a specialist landscape subcontractor.

Tensor TriAx TX-G

Revolutionary Tensor technology for extremely wet conditions

Product Literature

Tensor TriAx TX-G

While we re-engineered the geogrid with TriAx to outperform even Tensor biaxial alternatives, there was still a need for a geocomposites that could combine the high performance structural stabilising effect of the geogrid with the separation function of a geotextile. This is for use in application areas with high water levels or mobile subgrade soils and when using fill that is not well graded. The geocomposites is installed geogrid side up so it interacts with the granular fill.

Tensor TriAx TX-G geogrid incorporates the advanced technology of TriAx which is then combined with a non-woven geotextile laminated to the geogrid structure. (Click [here](#) to see an animated demonstration of TriAx in action.) This process provides extra filtration and separation, preventing adverse effect on performance which can be created by fine subgrade particles moving up into an open-graded aggregate layer.



Tensor TriAx TX-G

Our team of experienced Engineers use the unique TensorPave software to provide everything from a basic application suggestion, all the way up to a full design and

supply service.



1 2 3

With TX and TX-G, benefits include:

Incredible performance on saturated soils

Additional separation when using open-grade aggregates

Reduction of the aggregate layer thickness by as much as half compared to an unstabilised aggregate layer

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Tensar Spectra Pavement Optimisation System

BROCHURES

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MODEL SPECIFICATIONS

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APPLICATION

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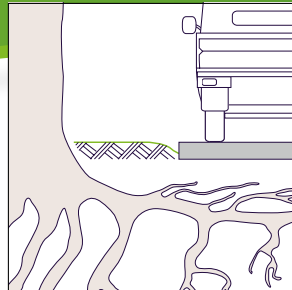
GEO SYSTEMS



GEOWEB®

TREE ROOT PROTECTION (TRP) SYSTEM

Powered by GEO SYSTEMS® technology.



defining **green** in cellular confinement

Greenfix™

SOIL STABILISATION AND EROSION CONTROL LTD

THE PROBLEM

CONSTRUCTION-RELATED TREE DAMAGE

Critical Root Zone/Tree Protection Zone is the minimum area beneath a tree that must remain undisturbed to preserve a sufficient amount of root mass in order to give a tree a chance of survival.

When construction equipment and vehicles intrude a tree's Critical Root Zone, they can cause negative impacts to the soil environment including compaction of the soil, damage to near-surface roots and ultimately endanger the structural integrity of the tree. The majority of a tree's root system is contained within the top three feet of the surface, and construction excavation and compaction can damage or even destroy roots to the point where trees may not survive.

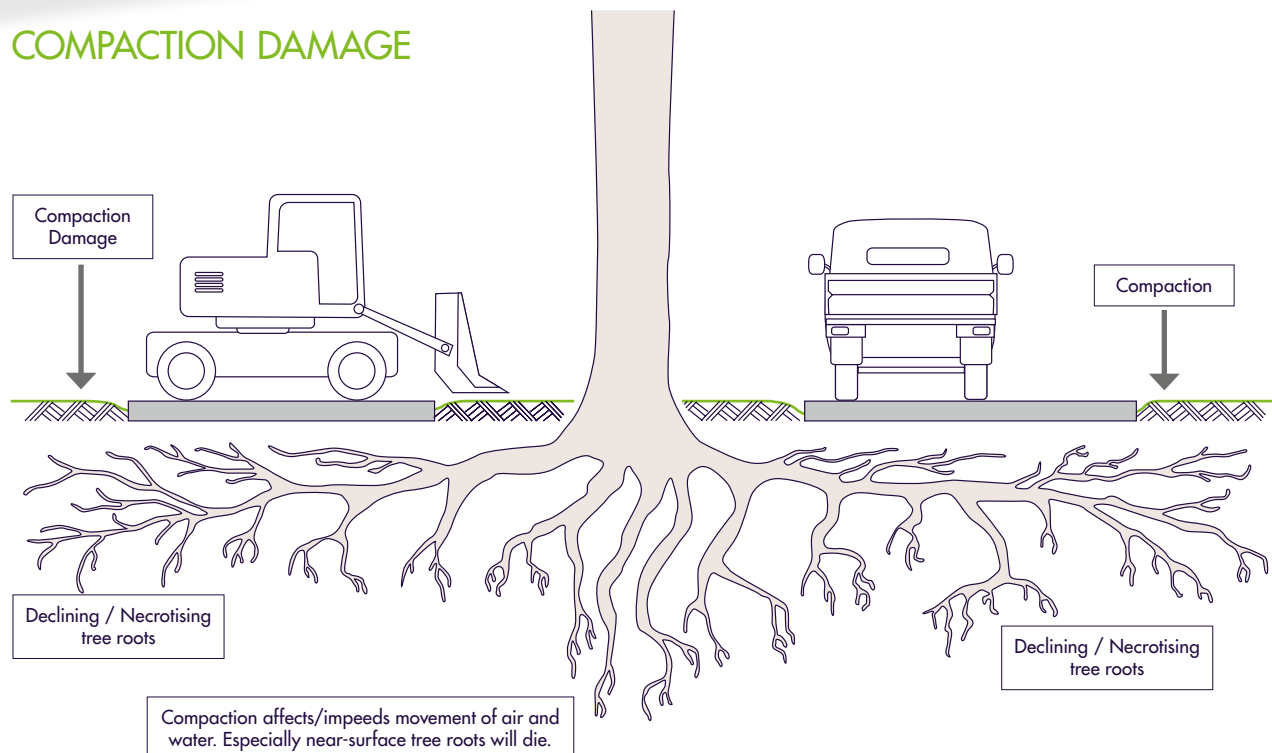
Tree Root Protection (TRP) systems should be eco-friendly as well as comply with local standards and regulations.*

*Compliance with Standards:

In the United Kingdom, Tree Root Protection systems must comply with the Arboricultural Method Statement as outlined in BS5837:2012 and may require supervision by an Arboriculturist.



COMPACTION DAMAGE



THE GEOWEB[®] SOLUTION

TREE ROOT PROTECTION (TRP) SYSTEM

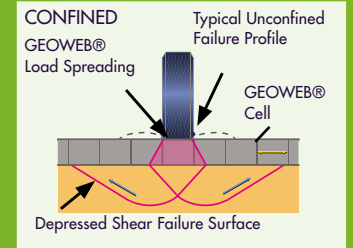
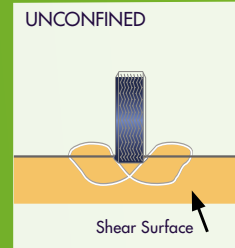


Used extensively in civil engineering construction for over 30 years, the GEOWEB[®] system is a three-dimensional structure that:

- provides strength to confined soils
- distributes loads laterally, not vertically
- reduces point loads
- reduces compaction of the subsoil

Manufactured from high quality, high-strength polyethylene with a textured surface and perforated walls, GEOWEB[®] cells with selected infill control shearing, lateral and vertical movement, and reduce subbase depth requirements.

The GEOWEB[®] system is a low impact development (LID) solution with exceptional load-bearing capabilities and environmental benefits. The system has a long history of solving heavy load support problems for roadways, road base support, parking lots, road shoulders, ports, trucking/intermodal terminals and railroads.



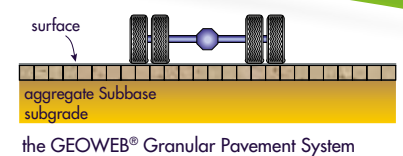
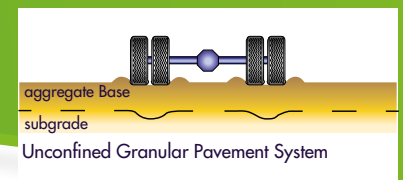
LOAD DISTRIBUTION

By distributing and bridging applied loads, the GEOWEB[®] TRP system reduces vertical stresses that are typically applied to the underlying soil and root zone.

The GEOWEB[®] system is ideally suited for tree root protection applications where weak subsoil or no-dig restrictions exist.

COST BENEFITS

The GEOWEB[®] TRP system is an economical solution for reducing construction vehicle impact to the tree root zone compared with other methods. Once installed, the system has minimal-to-no visibility.

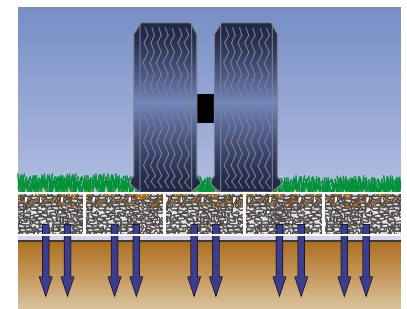


ENVIRONMENTAL BENEFITS

With permeable infill (topsoil/vegetation, aggregate, sand), perforated GEOWEB[®] cell walls offer environmental benefits:

- water infiltration
- lateral movement of air and water
- water and nutrient migration
- promotes root development

The tree root protection system can be a temporary or permanent solution.



GEOWEB®

TRP SYSTEM INSTALLATION

Step 1: Remove the upper grass and soft soils by hand or by machine if acceptable.

Step 2: Install a high-strength woven geotextile allowing adequate drainage as a separation layer between soft subgrade and GEOWEB® infill material.

Step 3: Expand GEOWEB® sections over the area to be protected and use temporary stakes or weights to hold sections open to prevent movement during infilling.

Step 4: Connect adjacent sections using ATRA® Keys. Position the sections so the slots are aligned, insert the key and turn 90 degrees locking the panels together. ATRA® Keys provide a long-term connection that is safer, quicker and stronger than staples or cable ties. In environmentally protected areas (SSSI in United Kingdom), ATRA® Keys can be used without the requirement for diesel-fueled compressors.

Step 5: For permeability, infill the fully connected GEOWEB® system with a well graded, crushed, angular stone such as MOT Type 1X (also known as MOT Type3). Over fill the cells by up to 30mm to allow for compaction.

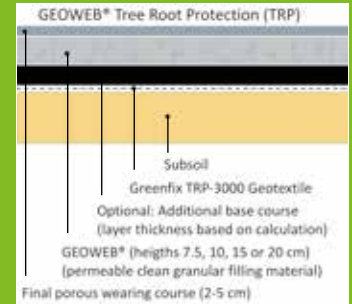
Step 6: Compact the fill material with conventional plant or non-vibratory plant when required. Fill should be maintained above the GEOWEB® system by a minimum of 10mm at all times or a permanent wearing course of blocks, porous asphalt or gravel installed.



DESIGN CONSIDERATIONS

It is important to ensure the correct GEOWEB® cell size and cell depth are specified and installed based on the anticipated pavement loads. These are calculated based on the following criteria:

- traffic type and loading
- frequency of traffic
- subgrade strength (typically CBR, Ev2, Cu or SPT values)
- infill type
- allowable settlement of the pavement



To assist you in determining the correct GEOWEB® solution for your application, Presto GEOSYSTEMS® or their network of distributors/representatives can assist with the calculation for your project. You can be confident that you will receive the most suitable and economical solution for your project.

PRESTO GEOSYSTEMS® COMMITMENT — To provide the highest quality products and solutions.

Presto GEOSYSTEMS® is committed to helping you apply the best solutions for your tree root protection needs. Our solutions-focused approach to solving problems adds value to every project. Rely on the leaders in the industry when you need a solution that is right for your application. Contact Presto GEOSYSTEMS® or our worldwide network of knowledgeable distributors/representatives for assistance.



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