

Arboricultural Impact Assessment & Method Statement Tree Protection Plan

Protected Status Of Trees

Trees may be legally protected, this may either be in the form of a Tree Preservation Order (TPO) or that the trees are located within a Conservation area. In addition some tree felling may require a felling licence from the Forestry Commission.

Potentially large penalties may be enforced for illegally carrying out works on protected trees. It is recommended that checks are made before any works are undertaken and no work should commence until permission has been granted. Please note that there are a number of exemptions from the requirement to obtain a felling licence including land on which full planning permission has been granted by the local authority, however this exemption does not cover land where only outline planning permission has been granted, or on land which has been allocated for residential development within local authority urban and local development plans.

AllAboutTrees has been able to ascertain with South Tyneside Council (the Local Planning Authority) on Friday 27th March 2020 that there are restrictions protecting trees on site. Trees to the front of the property are protected by Tree Preservation Orders and the site lies within the West Boldon Conservation area.

Permission must be sought and granted by the Local Planning Authority prior to any works carried out to TPO trees. In addition, 6 weeks' notice must be supplied to the Local Planning Authority for any proposed tree work not otherwise approved by any existing relevant planning permission in the Conservation Area.

TPO Reference: TPO 14	Species	AllAboutTrees Reference Number
Sycamore	T2	
Sycamore	T3	
Ash	T4	
Sycamore	T5	
Holly	T23	

Wildlife Habitats

Consideration must be given to wildlife when conducting tree works, particularly birds and bats.

Bats

All UK bats and their roosts are protected by law. The legislation protecting bats are:

- The Wildlife & Countryside Act 1981 (WCA)
- Conservation of Habitats and Species Regulations 2017

For all countries of the UK, the legal protection for bats and their roosts may be summarised as follows:

You will be committing a criminal offence if you:

- Deliberately capture, injure or kill a bat
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats
- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time)
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat
- Intentionally or recklessly obstruct access to a bat roost

"In a court, 'Voluntarily' will probably be interpreted as someone who, although not intending to capture/injure or kill a bat, performed the relevant action, being sufficiently informed and aware of the consequence his/her action will most likely have."

Penalties on conviction - the maximum fine is £5,000 per incident or per bat (some roosts contain several hundred bats), up to six months in prison, and forfeiture of items used to commit the offence, e.g. vehicles, plant, machinery.

No visual signs were found to confirm the presence of bats in the surveyed trees though a number of the trees have potential roost features and as such an appropriate level of caution must be exercised.

When carrying out tree works it is essential that the contractor or other competent person carries out a specific bats in trees risk assessment which can be obtained from the 'Arboricultural Association' or the Bat Conservation Trust (BCT). If evidence of bats is found work must stop immediately and Natural England/Batline contacted (0845 1300 228). A further inspection may well be required by a licensed bat handler or roost visitor.

Birds

In the UK, all wild birds, their nests and their eggs are protected by law.

In England, Scotland and Wales the legislation that protects wild birds is:

- The Wildlife and Countryside Act 1981
- The Countryside (or CROW) Act 2000

No nesting birds were seen at the time of inspection though given the scope of the site, and the extent of vegetation, potential exists for birds to nest and as such an appropriate level of caution must be exercised. As with bats the contractor has an obligation to carry out visual checks prior to works. Where possible tree works should be carried out in the period from August to the end of February in order to avoid the bird nesting season.

Order Of Operations

The following is proposed as to the optimal order of operations from an arboricultural perspective:

- Remove trees in conflict with the development (see section 5.2 of this document) and any identified to establish a higher level of arboricultural management. Carry out pruning works as specified in appendix 1 of this document. The tree works should wherever possible be carried out in accordance with BS3998:2010 Tree Work - Recommendations and contractors undertaking the work must comply with the legal obligations to wildlife (see section 4.8).
- Parking and storage of materials to be implemented in accordance with section 5.3 of this document.
- Erect protective barrier in the position indicated by the blue line on the TPP and as per the specification which forms section 5.4 of this document.
- Install ground protection in the position indicated by the orange hatching on the TPP and as per the specification which forms section 5.5 of this document.
- Undertake construction works.
 - Guidance for excavation inside RPAs is provided in section 5.6 of this document.
 - Guidance for formation of new surfacing within RPAs is provided in section 5.7 of this document. This is required for the ramped access between trees 7-8 and hedge 2.
 - Guidance regarding ground levels forms section 5.8 of this document.
 - Guidance for installation of services within RPAs (if required) is provided in section 5.9 of this document.
- Following completion of construction works the protective barriers and ground protection measures can be removed.

Tree Works

The first arboricultural works on site will be the removal of all the conflicting vegetation:

- Tree 6 and
- A limited portion of hedge 2

which are identified on the Tree Protection Plan (TPP) by the broken black ring surrounding the tree centre and referred to in appendix 1 of this report. The section of hedge 1 to be removed has had the coloured infill hatch, and RPA removed. The broken black ring has been placed around the coloured categorisation circle adjacent to the hedge label.

It would be appropriate to remove trees 3 and 9 at this time though this is not required to facilitate the development proposals.

The stumps may be ground out using a stump grinding machine or grubbed out manually.

Details of any prescribed pruning works are included within Appendix 1 of this report. The tree works should wherever possible be carried out in accordance with BS3998:2010 Tree Work - Recommendations.

Location of Parking & Storage

The contractor's storage & parking areas must be located outside of the RPAs of the retained trees or on the existing driveway.

All site storage areas, especially cement mixing and washing points must also be situated outside of the root protection areas (RPA). Where there is a possible risk of polluted water runoff heavy duty plastic sheeting and sand bags must be used to contain spillages and contamination.

Protective Barrier Erection

Trees on development sites are prone to damage during the course of demolition and construction works. Retained trees need to be protected in line with British Standard 5837:2012 Trees in relation to design, demolition & construction.

This usually involves identifying a construction exclusion zone around the tree which should remain undisturbed with appropriate protective barriers preventing access to this Root Protection Area for the duration of the project.

The minimum root protection areas (measured in a radius from the centre of the tree to the protective barrier) are outlined for each individual tree and the barrier layout is indicated on the plan.

The exact root spread of an individual tree is difficult to quantify, but in general, the bulk of a tree's roots are situated in the upper 600mm of the soil with the finer absorbing roots prevalent in the upper 250mm.

Dependant on soil conditions and the species of the tree, the root plate may extend radially for distances in excess of the height of the tree.

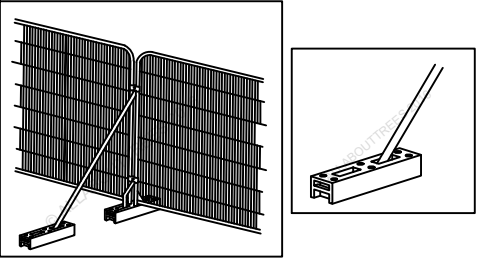
In the case of development sites, the root protection area is designed to prevent any significant long-term damage to the tree by protecting the root plate and to some extent the lower branches of the tree.

The barriers should be erected prior to work commencing on and should remain until construction activities have been completed. The root protection area should be considered essential and should not be removed or altered without prior recommendation by an Arboriculturalist and approval of the local planning authority.

The barrier should consist of proprietary 2m tall welded mesh panels mounted on rubber or concrete feet. The panels must be joined together with a minimum of two anti-lamper couplings situated at least 1m vertically apart and installed uniformly throughout the barrier so that they can only be removed from inside the barrier. The panels must be supported by stabiliser struts mounted on a block tray.

No fencing shall be made to any tree and all possible care must be taken to prevent damage to tree roots when locating the posts.

All types of barriers must be firmly attached to prevent movement by site personnel or vehicles and all-weather signs with the wording "Construction exclusion zone- keep out" should be attached.

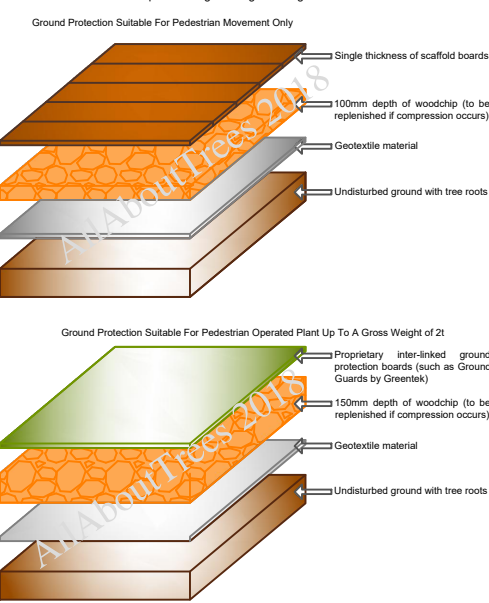


Ground Protection Within The Tree Root Protection Areas

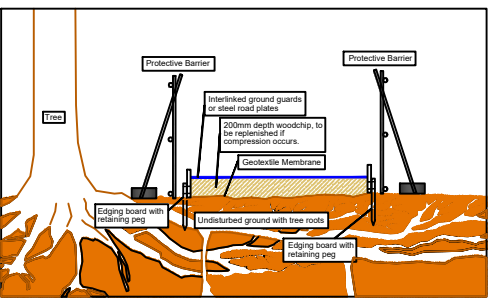
In some cases (adjacent to tree 15) it will be necessary to provide access within the RPA. To prevent damage the following technique should be observed. The area requiring this protection is marked in hatched orange on the TPP.

Temporary ground protection should be tailored to the likely load it will be subjected to. The following diagrams indicate the acceptable techniques for:

- Pedestrian
- Plant and vehicle access up to 2 tons gross weight
- Plant and vehicle access up to exceeding 2 tons gross weight



If the likely loading is to exceed 21 gross weight it will be necessary to produce an engineered solution with arboricultural advice to accommodate the likely load safely. One such example is shown below. In some cases it may be necessary to install a temporary road using a 3D cellular confinement system (such as Celweb by Geosynthetics Ltd).



Excavation Inside RPAs

It will not be acceptable to excavate with the use of a machine in the areas indicated by the orange hatching due to the potential for root damage. All excavation in these areas must be done so by hand with roots pruned as required. The following principles must be followed:

- Protective measures (where applicable) to be in place prior to commencement of excavation.
- All excavation to be carried out with the use of hand tools. This can include spade, pick, mattock, fork, etc.
- Site operatives to remain mindful of adjacent vegetation at all times employing utmost care to avoid any inadvertent damage.
- If appropriate below ground structures should be left in place if their removal was to cause excessive root disturbance.
- If a likely root will be encountered. A pair of secateurs and a hand saw must be available to cut any exposed roots. The root must be cleared of excess soil for the cut to be made and should, where possible, be cut off back to sound root material with a clean cut. Where possible the root should be cut back to a root branch point.
- No roots above 25mm diameter to be severed without prior removal by AllAboutTrees.
- Following any pruning the exposed roots must be wrapped in clean and dry hessian sacking to prevent desiccation and to protect them from rapid temperature changes. Prior to backfilling (which should take place as quickly as possible) all hessian sacking must be removed.
- The backfill should, where possible, include the placement of an inert granular material (such as top soil or sharp sand (not builders' sand)) around the roots. This should allow the soil to be compacted without damage to the roots securing a local aerated zone enabling the root to survive in the longer term.
- At any time the contractors require further assistance our office can and should be contacted on 01388 710481. If the issue cannot be solved over the phone an AllAboutTrees representative will attend site.

No Dig 'Tree Friendly' Porous Surfacing

It is proposed to form an access ramp between trees 7-8 and hedge 2. To minimise disturbance to underlying root systems the path must be formed using a 'Tree Friendly' construction method. The area which requires this tree friendly construction is indicated as hatched green on the TPP.

If the principles of the 'no dig' construction are followed, no significant permanent damage should occur to the retained trees.

The principal rules of construction are as follows:

- No roots are to be severed (except for hand digging to remove roots or protrusions taking care not to sever any roots over 2.5cm in diameter).
- The soil must not be compacted.
- Oxygen and water must be able to diffuse into the soil beneath the engineered surface.
- The construction of the road, footpath or parking bay will have to be above existing ground level.

The method of construction is:

- Ideally construction should be undertaken between the months of May and October when the ground is at its driest and least prone to overtopping roots. The soil should allow the soil to be compacted without damage to the roots securing a local aerated zone enabling the root to survive in the longer term.
- Ground vegetation should be carefully removed with any organic material being removed from the line of the surfacing to prevent the build up of anaerobic conditions beneath the surfacing which will damage the tree roots.
- No digging should take place within the protective zone except for the careful removal of organic matter by hand tools. Any hollows must be filled with sharp sand and any digging to remove roots or protrusions must be by hand taking care not to sever any roots over 2.5cm in diameter. Stumps should be ground out rather than excavated to prevent damage to the retained tree roots.
- The three dimensional cell structure is formed by ultrasonically welding polyethylene (perforated) strips and panels together to create a three dimensional network of interconnecting cells. A high degree of frictional interaction is developed between infill and cell wall, increasing the stiffness of the system. The use of cellular confinement reduces the bearing pressure on the subsoil by stabilising aggregate surfaces against rutting under wheel loads. Comparisons between cellular confinement and traditional aggregate and grid reinforced structures demonstrate a 50% reduction in construction thickness.
- Fill the cellular confinement system with a minimum of 100mm of aggregate (the content is dependant on the depth of the Celweb employed). The aggregate should not contain any fines and be of an inert type material such as whitestone chips rather than any time based product. The regular particle dimensions should be 20-40mm. As most urban soils are already alkaline in nature, the use of dolomite, limestone or crushed concrete is not suitable for this application as it can react with rain water with the potential to change the soil pH and form impermeable layers which impede water movement and gaseous exchange.

Photo 1: Use of new road for the commencement of works. Photo 2: Laying of Fibretex F4M geotextile material onto existing subgrade.

The method of providing a permeable surfacing is as follows:

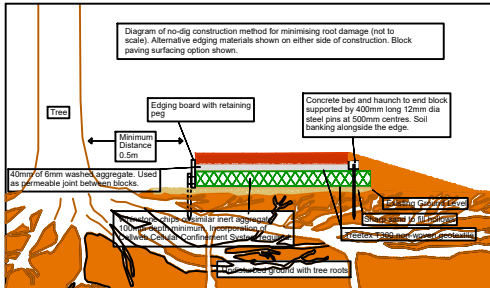
- Lay a Fibretex F4M non woven geotextile material directly on the existing subgrade. Overlay dry joints by 300mm.
- Lay and expand the cellular confinement system (e.g. Celweb by Geosynthetics Ltd) and anchor open during infilling. As a general indication only, a depth of at least 100mm is required for domestic traffic up to approximately 3 tons. A 200 mm depth should accommodate vehicles up to approximately 8 tons.
- The three dimensional cell structure is formed by ultrasonically welding polyethylene (perforated) strips and panels together to create a three dimensional network of interconnecting cells. A high degree of frictional interaction is developed between infill and cell wall, increasing the stiffness of the system. The use of cellular confinement reduces the bearing pressure on the subsoil by stabilising aggregate surfaces against rutting under wheel loads. Comparisons between cellular confinement and traditional aggregate and grid reinforced structures demonstrate a 50% reduction in construction thickness.
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Photo 3: Backfilling and filling the Cellweb system. Photo 4: Once filled the system can support up to 8 tons weight.

Final surfacing options

- Block Paving** will require the laying of a second layer of Fibretex F4M Geotextile separation fabric over the infilled Celweb sections. Then lay 40mm depth of 6mm washed gravel. Place parkers as per the manufacturers instructions using the 6mm washed aggregate as the jointing material. The use of porous blocks such as 80mm Priors by Marshalls are particularly tree friendly and allow natural rainfall to reach the rooting area.
- Porous tarmac** - place 25mm surcharge of the granular material above the Celweb system and lay the bitumen base and wearing course.
- Loose Gravel** - Place a second layer of Fibretex F4M Geotextile separation fabric over the infilled Celweb sections. Place decorative aggregate to the required depth. A treated timber edge should be provided to resist gravel movement.
- Grass blocks or gravel infilled blocks** - Lay a second layer of Fibretex F4M Geotextile separation fabric over the infilled Celweb sections. Place 50/50 rootzone bedding layer to the required depth. Lay recycled Duo Block 500 Grass protection system infilled with 50/50 rootzone mix. Seed as required. Alternatively the grass blocks may be infilled with gravel.

It is important that the edging material used does not encroach into the protected area and the use of conventional kerbing is not possible as the depth of excavation required for their installation will sever the tree roots. Edging supports such as angled steel section or primed edges are advised as shown in the following drawing although there are a number of varying kerbing options available which do not require any excavation and could be used above the existing ground level.



Due to the terrain in the location of the proposed access it may be necessary to use multiple layers of the cellular confinement system to create a flat surface with acceptable gradient.

The proximity of adjacent vegetation presents the use of protective measures in this location. Consequently site operatives will need to employ utmost care to avoid inadvertent damage.

Ground Level

There should be no alteration of the ground level within the RPA of any retained tree. This includes the lowering of the ground level via the excavation of existing material or the raising of the ground level via the importation of additional material.

Lowering of the ground level results in the inevitable severance of roots. As the majority of feeding roots are located towards the surface of the soil, lowering the ground level by even a few centimetres can have a drastic effect on the trees physiological health, greatly limiting the trees ability to uptake nutrients. A more significant reduction in ground level is likely to sever larger supporting roots resulting in immediate loss of structural integrity, predisposing the tree to failure.

Raising the ground level encourages anaerobic conditions, resulting in reduced gaseous exchange, a necessary part of the respiration process. Water penetration to the underlying root system is also limited. The roots are slowly suffocated leading to decline. Symptoms are likely to include wilting foliage, poor shoot elongation, late bud break, early leaf abscission, crown thinness, followed by dieback and eventually death.

Any level changes, installation of retaining structures etc, should take place outside of the RPA of retained trees.

Drainage Runs/ Underground Services

It is assumed that the existing service runs will be exploited where possible, but if new works are required it is important that they comply with the National Joint Utilities Group (NJUG) Guidelines for the planning, installation, and maintenance of utility services in proximity to trees and BS 5837:2012. The excavation of open trenches by machine will be unacceptable within the protective zone of any of the retained trees.

Wherever possible, services should be routed outside of any retained trees RPA. When this is not possible apparatus should be routed together in a common duct and any inspection chambers sited outside the RPA.

Acceptable techniques for the laying of services in order of preference are:

- Trenchless** - by use of thrust boring or similar techniques. The pit excavations for starting and receiving the machinery should be located outside of the root protection area. To avoid root damage, the mole should run at a depth of at least 600mm. Use of external lubricants on the mole other than water (eg oil or bentonite) should be avoided.
 - Trenchless Solutions For Installation Of Underground Services**
- | Method | Accuracy (MM) | Bore (A) diameter (MM) | Maximum penetration length (M) | Applications | Not suitable for |
|---------------------------------------|---------------|------------------------|--------------------------------|---|---|
| Microtunnelling | <20 | 100 to 300 | 40 | Gravity fall pipes, deep access, watercourse/ highway under crossings | Low-cost, proprietary, relative expense |
| Surface launched directional drilling | <100 | 25 to 100 | 1500 | Pressure pipes, cables including fibre optic | Gravity fall pipes, e.g. drains and sewers (B) |
| Pipe ramming | <150 | 150 to 200 | 70 | Any large-bore pipes and ducts | Rocky and other heavily disturbed soils |
| Impact moling (C) | <50 (B) | 30 to 180 (B) | 40 | Gas, water and cable conduits, e.g. from street to property | Any application that requires accuracy over distance in excess of 5m. |
- Dependant upon strata encountered
- (A) Pit-launched directional drilling can be used for gravity fall pipes up to 20m in subterranean length.
 - (B) Impact moling (also known as thrust-bore) generally requires soft, cohesive soils.
 - (C) Substantial inverse relationship between accuracy and distance.
 - (D) Figures given relate to single pass: up to 300mm bore achievable with multiple passes
- If trenchless insertion is not feasible the alternatives are detailed below in order of preference.

- Broken trench** - by using hand dug trench sections together with trenchless techniques. It should be limited to practical access and installation around or below the roots. The trench must be dug by hand (see following comments re continuous trenching) and only long enough to allow access for linking to the next section. The open sections should be kept as short as possible.
- Continuous trench** - the trench is excavated by hand and retains as many roots as possible. The surface layer is removed carefully and hand digging of the trench takes place. No roots over 2.5cm diameter or clusters of smaller roots (including fibrous) should be severed. The bank surrounding the roots must be maintained. Cutting of roots over 2.5cm diameter should not be attempted without the advice of a qualified Arboriculturalist.

If roots have to be cut, a sharp tool (defined as spade, narrow spade, fork, breaker bar, secateurs, hand saw, post hole shovel, hand trowel) should be used.

Backfilling

Reinstatement of street works must comply with the code of practice New Roads and Streetworks Act 1991 (Specification for the reinstatement of openings in highways), but where tree roots are involved backfilling should be carefully carried out to avoid direct damage to retained roots and excessive compaction of the soil around them.

The backfill should incorporate an inert granular material mixed with top soil or sharp sand (not builders sand) around the retained roots. This will allow a measure of compaction for resurfacing whilst creating an aerated zone around the roots.

Roots and in particular fine roots, are vulnerable to desiccation on exposure to air. The roots are at greatest risk when there are rapid fluctuations in the air temperature around them (especially winter diurnal temperatures). It is vitally important that the roots are covered with sacking whilst the trench is open. The sacking should be removed once the trench is backfilled.

Arboricultural Supervision

The following programme of supervision is proposed to assist in the preservation and protection of the retained trees during all aspects of the proposed development.

The supervision arrangements must 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 council to ensure that the appropriate protective measures are in place before any works commence on site and once the site is active monitor compliance with the Arboricultural conditions and advise on any tree problems that may arise.

Action	Programming	Extent of supervision	Nature of supervision
Pre-commencement meeting with the manager & Council tree officer	Before any site activity commences	Meeting on site	E-mail confirming results of meeting distributed to relevant parties
Tree works undertaken	Before any plant enters site or construction work commences	Confirm extent of tree works and protective barrier position. Confirmation of the protective barriers and other tree protection measures. And ensure the protection measures are installed and comply with the Tree Protection Plan (TPP)	E-mail confirming results of meeting distributed to relevant parties
Finalising tree protection barriers installation and other tree protection measures	At time of path extension and gate relocation	Provide photographs relating to completed tree protection	E-mail confirming results of meeting distributed to relevant parties
Excavation inside RPAs	At time of path extension and gate relocation	Communication with contractor to ensure compliance with AIBS	E-mail confirming results of meeting distributed to relevant parties
Installation of 3D confinement system	At time of path extension	Communication with contractor to ensure compliance with AIBS	E-mail confirming results of meeting distributed to relevant parties
Removal of a protective barrier and other tree protection measures	Once construction activities have finished	Communication with contractor for lifting before removal of barrier	E-mail confirming results of meeting distributed to relevant parties

Conclusion

Tree 6 and a limited portion of hedge 2 will need to be removed to facilitate the development proposal. Trees 3 and 9 have been identified for removal due to a limited safe useful life expectancy.

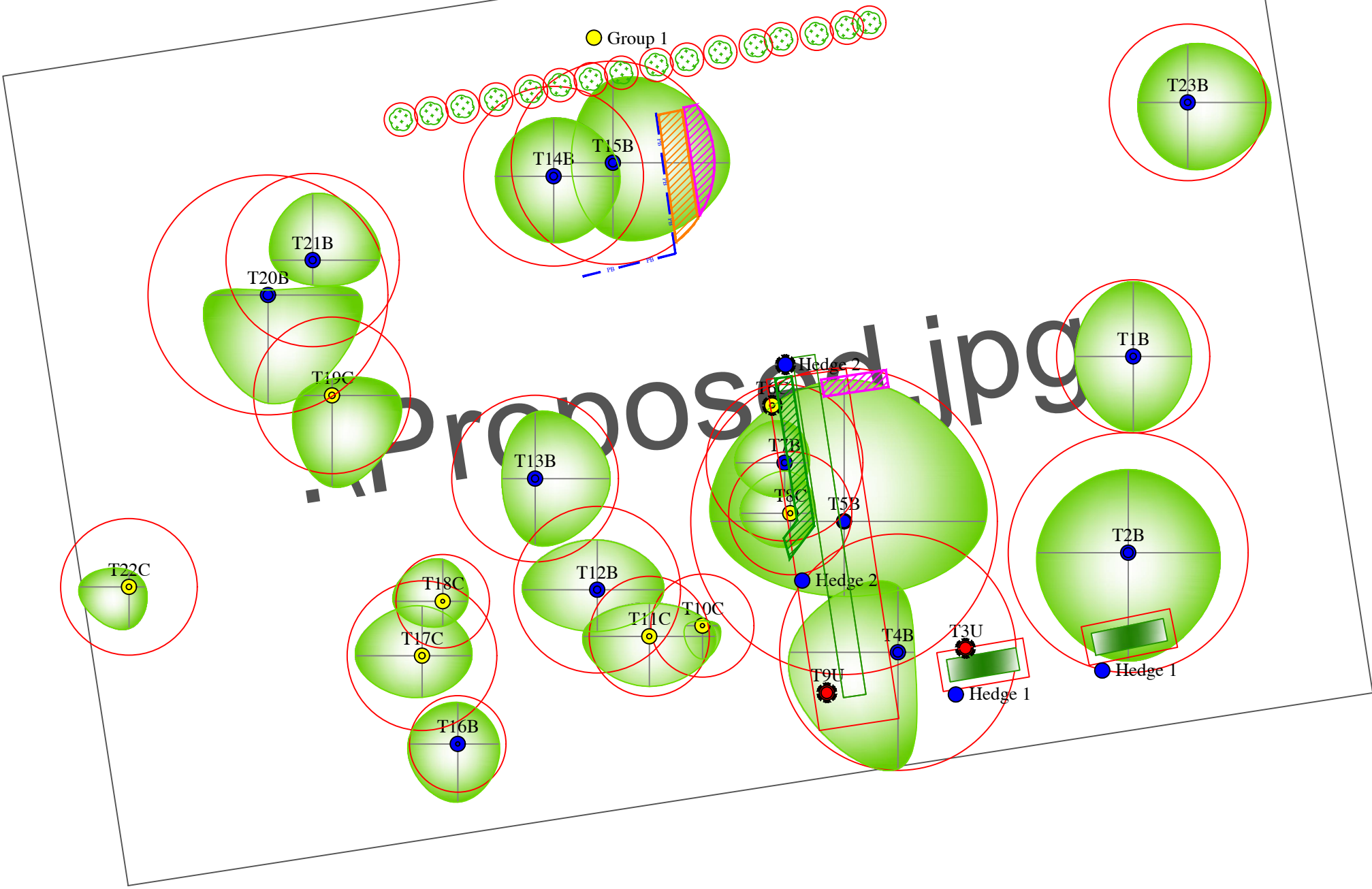
By using the protective elements dictated by British Standard 5837, no significant damage should take place to retained vegetation and tree cover should flourish in the longer term.

It is anticipated that all of the retained trees can be incorporated into the site design; however, it is vital that the ultimate size and spread of the trees should be considered when retaining trees near to the building and that shading and light penetration should also be considered when positioning the windows in the building.

It is the developer's responsibility to ensure that the details of the Arboricultural Method Statement and any agreed amendments are known and understood by all relevant site personnel. Copies of the agreed documents must be kept on site at all times and the site manager or other appropriate person must brief all personnel who could impact the trees on the specific tree protection requirements.

This should form part of the site induction procedure and be written into the appropriate site management documents.

0.0m 10.0m 20.0m 30.0m 40.0m 50.0m



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For details of the drawings or drawings in relation to this project, please contact the author.

Key:	
Tree Number	
Tree Crown Tree Shape (Shaded Light Green)	
Trees To Be Removed (Broken Black Ring Surrounding Center)	
Tree Quality Assessment (Centre Colours As Below)	
Green Centre = High Quality (Denoted By Letter A)	
Blue Centre = Moderate Quality (Denoted By Letter B)	
Yellow Centre = Low Quality (Denoted By Letter C)	
Red Centre = Unsuitable To Retain (Denoted By Letter U)	
BS Root Protection Area As Shown By The Red Circle Around The Tree	
Tree / Woodland Group (Root Protection Area Shown By Red Outline Surrounding Group)	
Hedge/Root Protection Area Shown By Red Outline Surrounding Hedge	
Removed Hedges/ Hatched Fill And Root Protection Area Removed	
Position Of Protective Barrier - Dashed Blue Line With Letters PB (Protective Barrier)	
Special 'No Dig, Tree Friendly' Construction Required (Areas Indicated By Green Hatching)	
Excavation By Hand Tools Only	
Ground Protection Required (Areas Indicated By Orange Hatching)	

Institute of Chartered Foresters
Registered Consultant

Arboricultural Impact Assessment & Method Statement
Tree Protection Plan (AIA & AMS TPP)

Retained Trees Shown On Proposed Layout With Protective Measures Indicated

Boldon Hall,
Redcar Terrace, West Boldon

For
Ec 360

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	Revision -