Arboricultural Method Statement

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 6th August 2010 that there are restrictions protecting the trees on the site. The site is not within a Conservation area however there are TPOs imposed on some trees within the site. The TPOs are cited as TPO no 148:2007 and TPO no 8:1977. TPO no 8:1977 also covers the large beech tree located at no.4 Lawn Drive (T 23). It is an offence to carry out any tree work without giving the required notice or applications .

Tree Works

The first arboricultural works on site will be the facilitative pruning works to trees 1, 4 & 5 which be necessary to allow the build to progress. It would also be appropriate to remove tree 21 at this time although this is not essential to facilitate the development and is for arboricultural management purposes.

The stump may either be ground out using a stump grinding machine or left to decay in situ.

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.

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 2010

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:

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

**In a court, 'deliberately' 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 indicate the presence of bats in the surveyed trees though a number of the mature trees within the site display characteristics found favourable to bats and as such caution must be exercised.

When carrying out tree works it is essential that the contractor or other competent person carriers 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 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.

Protective Barrier Erection

The protective barriers are to be erected prior to the commencement of site works including demolition, soil stripping or movement, bringing onto site of materials, supplies or machinery. Tree works can be undertaken prior to the erection of the barriers.

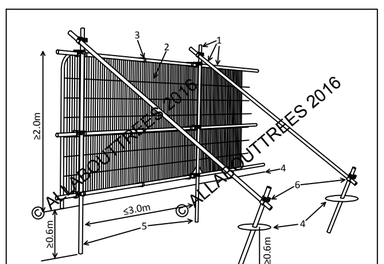
The barriers must be erected in the position indicated on the Tree Protection Plan (TPP) by the dark blue line and be constructed as per the following specification.

The barriers 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 a vertical and horizontal framework of scaffold tubing which is adequately braced to resist impacts. The vertical scaffold tubes need to be placed at a distance not exceeding 3m apart. The weldmesh or Heras panels need to be 2.3m tall and are securely attached to the scaffold framework with wire or scaffold clamps. The wire or scaffold clamps should be secured on the inside of the barrier to avoid easy dismantling. Panels on rubber or concrete feet are not resistant to impact and should not be used.

No fixing 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.



1 - Standard scaffold poles
2 - Heavy gauge 2.0m tall galvanized tube and welded mesh infill panels
3 - Panels secured to uprights and cross members with wire ties
4 - Existing (unaltered) ground level
5 - Uprights driven into the ground until secure (minimum depth 0.6m)
6 - Standard scaffold clamps



Ground Protection Areas & Erection Of Scaffolding Within The Trees Root Protection Areas

In some cases (adjacent to trees 1, 3-5 & 7-9) it will be necessary to provide access within the root protection area of the trees, or to create space for scaffolding and working areas. To prevent damage occurring to the trees, the following technique should be observed. The areas requiring this protection are marked in hatched orange on the tree protection plan.

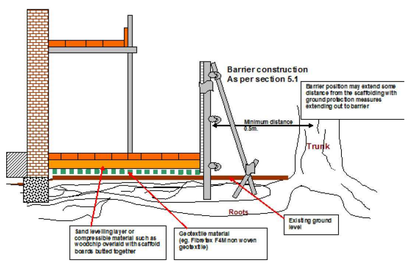
The following diagrams visualise the layout requirements. By sufficiently protecting the rootplate of the tree, the pedestrian access or scaffolding and associated working area can be placed within the root protection area. There is no limitation as to the size of the ground protection area, but we would advise that it is at least 0.5m from the trunk of any tree.

A summary of the requirements for the erection of the scaffolding and working area are detailed below.

- Protective barriers should be erected onto a framework of scaffolding (as per the fencing drawing to comply with the recommendations of BS 5837).
- The barrier is erected prior to the commencement of work at a suitable distance from the building to allow for the erection of the main scaffolding.
- A porous geotextile fabric should be laid onto the undisturbed ground surface and a layer of sand or compressible material such as woodchip applied to level the area.
- Boards should be laid onto the sand to protect the rootplate. Scaffold boards are usually adequate for pedestrian loads
- The boarding must remain until building works are completed.

As the building rises, additional scaffolding is erected within the area protected by the boards. The use of supplementary timber sole plates is advised.

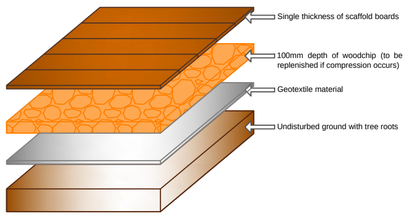
Erection of scaffolding within the root protection area of the tree to B S 5837 (not to scale)



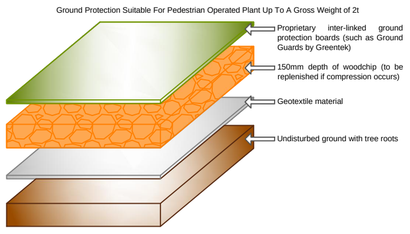
Temporary ground protection should be tailored to the likely load it will be subjected to. The following diagrams indicate the acceptable techniques for:

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

Ground Protection Suitable For Pedestrian Movement Only



Ground Protection Suitable For Pedestrian Operated Plant Up To A Gross Weight of 2t



If the likely loading is to exceed 2t 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 Cellweb by Geosynthetics Ltd).

Suitable For Wheeled Or Tracked Construction Traffic Exceeding 2t Gross Weight



1) 50mm X 50mm X 500mm timber stakes
2) 200mm x 50mm timber rails
3) Geotextile membrane
4) Base layer of Ground Guards by Greentek
5) Wood chippings or other compressible material
6) Interlinked Ground Guard plates

Location of Site Compound & Storage Areas

The contractor's site compound, storage & parking areas must be located outside of the root protection areas (RPAs) of the retained trees.

All site storage areas, especially cement mixing and washing points for plant and vehicles 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.

No Dig 'Tree Friendly' Porous Surfacing

The development requires the installation of 'tree friendly' no dig porous surfacing in the areas shown by the green hatching on the TPP adjacent to trees 3-5.

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:

1) No roots are to be severed (except for hand digging to remove rocks or protrusions taking care not to sever any roots over 2.5cm in diameter).
2) The soil must not be compacted
3) Oxygen and water must be able to diffuse into the soil beneath the engineered surface
4) The construction of the road, footpath or parking bay will have to be **above existing ground** level and at least 1m away from the trunks of the retained trees.

The **method of construction** is:

1) Ideally construction should be undertaken between the months of May and October when the ground is at its driest and less prone to compaction
2) 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.
3) 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, any digging to remove rocks 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 trees roots.



Photo 1- line of new road prior to the commencement of works



Photo 2- laying of Fibretex material onto existing subgrade

The method of providing a permeable surfacing is as follows:

1) Lay a Fibretex F4M non woven geotextile material directly on the existing subgrade. Overlap dry joints by 300mm

2) Lay and expand the cellular confinement system (e.g. Cellweb 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.

3) 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.



Photo 3- expanding and filling the Cellweb system



Photo 4- once filled the system can support plant to carry aggregate to the fill area

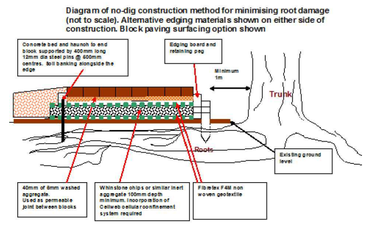
4) Fill the cellular confinement system with a minimum of 100mm of aggregate (the amount is dependant on the depth of the Cellweb employed). The aggregate should not contain any fines and be of an inert type material such as whinstone chips rather than any lime based product. The angular particle dimensions 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 impenetrable layers which impede water movement and gaseous exchange

Final surfacing options

- **Block Paving** -will require the laying of a second layer of Fibrex F4M Geotextile separation fabric over the infilled Cellweb sections. Then lay 40mm depth of 6mm washed gravel. Place paviors as per the manufacturers instructions using the 6mm washed aggregate as the jointing material. The use of porous blocks such as 80mm Priora 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 Cellweb system and lay the bitumen base and wearing course
- **Loose Gravel-** Place a second layer of Fibretex F4M Geotextile separation fabric over the infilled Cellweb sections. Place decorative aggregate to the required depth. A treated timber edge should be provided to restrict gravel movement
- **Grass blocks or gravel infilled blocks -** Lay a second layer of Fibretex F4M Geotextile separation fabric over the infilled Cellweb 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 pinned 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.

Diagram of no-dig construction method for minimising root damage (not to scale). Alternative edging materials shown on either side of construction. Block paving surfacing option shown



Foundation Design

The position of the proposed garage is within the root protection area (RPA [as indicated by the red circle on the plan]) of trees 4 & 5. To avoid damage to the root plate of the trees it will be necessary to construct the building in a more tree friendly manner than in a conventional build (in accordance with section 7.5.5 of BS 5837: 2012). In essence this means that traditional strip footing foundations cannot be used as they would sever a proportion of the roots and instead the building should be constructed on piles with either a pier beam grid or a cast slab (either pre cast or cast in situ) placed on top of the piles. The grid or slab can be laid at or above ground level but cannot be ground bearing to avoid any compaction of the ground overlying the roots. It may be possible to install a lip on the structure to support the brickwork and camouflage the piled foundation.

The piles will be positioned some distance from the trunk meaning that the larger tension roots will have declined in diameter significantly, intimating that no large structural roots should be encountered.

Various piling rigs are available for sites with limited space. A tracked mini pile rig can generally be used in spaces with a 4m overhead clearance with rig weights of <5 tonnes. For even more confined areas small rigs can be used that work with a maximum height of 2.7m and weigh only 500kg. Advice would have to be taken from the pile engineers as to which rig would be most appropriate for this site. The machine could stand on steel plating (or similar) laid on top of a layer of sand or compressible material such as woodchip to adequately spread the load.

Ground compaction will be absolutely minimal and gaseous exchange will continue to take place unimpeded. The root system of the tree is dynamic in nature producing a mass of new roots throughout the growing season which grow and survive to a varying extent. It is estimated that some species of hardwood trees lose up to 90% of the absorbing roots during winter and produce new rooting during the next season. As the shape and size of the root system is not immutable and is adventitious in form, the root system will adapt to the position of the new building over time and respond to the changing conditions without adversely affecting the tree.

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 bentinite) should be avoided.

Trenchless Solutions For Installation Of Underground Services

Method	Accuracy (MM)	Bore (A) diameter (MM)	Maximum subterranean length (M)	Applications	Not suitable for
Microtunnelling	<20	100 to 300	40	Gravity-fall pipes, deep apparatus, watercourse/ roadway under crossings	Low-cost projects due to relative expense
Surface - launched directional drilling	≈100	25 to 1200	150	Pressure popes, cables including fibre optic	Gravity fall pipes, e.g. drains and sewers **(B)**
Pipe ramming	≈150	150 to 2000	70	Any large-bore pipes and ducts	Rocky and other heavily obstructed soils
Impact moling (C)	≈50 **(D)**	30 to 180 **(E)**	40	Gas, water and cable connections, e.g. from street to property	Any application that requires accuracy over distances in excess of 5m.

(A) Dependant upon strata encountered
(B) Pit-launched directional drilling can be used for gravity fall pipes up to 20m in subterranean length
(C) Impact moling (also known as thrust-bore) generally requires soft, cohesive soils.
(D) Substantial inverse relationship between accuracy and distance
(E) 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 be 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 clumps of smaller roots (including fibrous) should be severed. The bark 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, handsaw, post hole shoveller, 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 is the preservation and protection of the retained trees during all aspects of the proposed development.

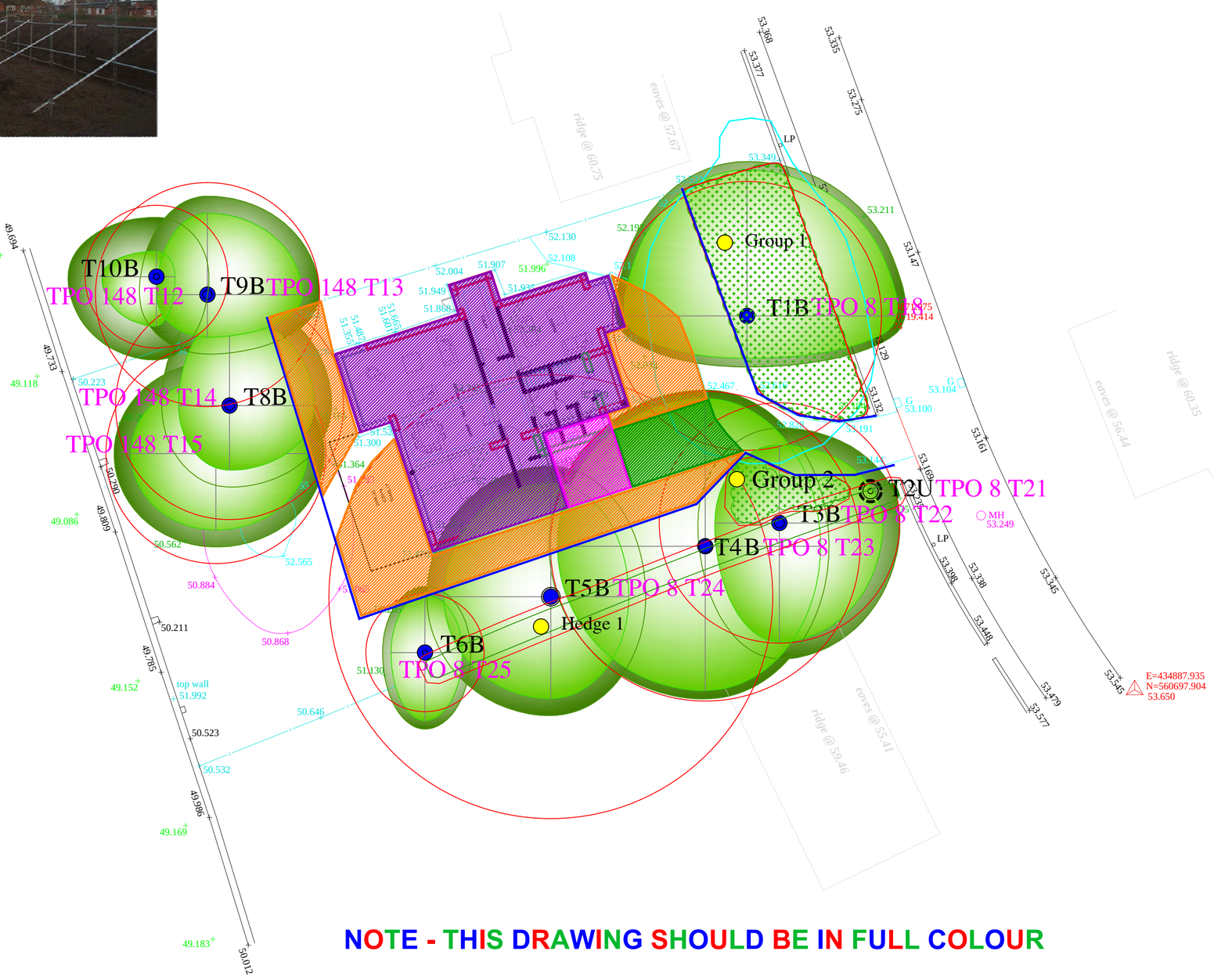
The supervision arrangements must be sufficiently flexible to allow for the supervision of all sensitive works as they occur. The Arboricultural Consultant's initial role is to liaise with the developer and the council to ensure that the appropriate protective measures are in place before any works commence 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 site manager & Council tree officer	Before any site activity commences	Meeting on site Review any updates to the proposal Confirm extent of tree works and protective barrier position.	Site meeting & letter or email confirming results of meeting distributed to relevant parties.
Tree works meeting with tree works contractor	Prior to commencement of tree works	Meeting on site to confirm tree works specification and method of working	Site meeting & letter or email confirming results of meeting distributed to relevant parties.
Tree works undertaken Finalising tree protection barrier installation and other tree protection measures	Before any plant enters site or demolition/construction work commences.	Confirm position of the protective barriers and any other tree protection measures have been installed and comply with the Tree Protection Plan (TPP) Provide photographs indicating completed tree protection	Site meeting & letter or email confirming results of meeting distributed to relevant parties.
Installation of pile foundations Installation of no dig porous surfacing within root protection areas Installation of services within root protection areas	Prior to installation of surfacing or services & during installation of surfaces and services	Meeting with contractor prior to installation and during installation of surfacing and services to ensure compliance with AIA	Site meeting & letter or email confirming results of meeting distributed to relevant parties.
Removal of protective barriers and other tree protection measures	Once construction activities have finished	Meeting with contractor for briefing before removal commences	Site meeting & letter or email confirming results of meeting distributed to relevant parties.

Site Management

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.



NOTE - THIS DRAWING SHOULD BE IN FULL COLOUR

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The original of this drawing was produced in colour - a monochrome copy should not be relied upon.

Key:

- Tree Number
- Tree Crown True Shape (Shaded Light Green)
- Predicted Future Growth Of Canopy (Shaded Dark Green & Surrounding Current Crown Shape)
- Trees To Be Removed Broken Black Ring Surrounding Centre
- 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
- Site Specific Root Protection Area (Modified According To Site Conditions. Area Remains The Same As BS Circle Representation Of RPA) Shown By Cyan Polyline.
- Tree / Woodland Groups
- Hedgerows
- Position Of Protective Barrier (Continuous Blue Line)
- Special 'No Dig, Tree Friendly' Construction Required (Areas Indicated By Green Hatching)
- Ground Protection Required (Areas Indicated By Orange Hatching)
- Pile Foundations Required
- Existing Foundations Already Installed

Institute of Chartered Foresters
Registered Consultant

Arboricultural Method Statement
Tree Protection Plan (AMS TPP Rev A)
Revision A
Retained Trees Shown On Proposed Layout With Protective Measures Indicated

5 Lawn Drive,

West Boldon

For

Mr S Lovely

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Scale 1:200 at A1 | Date 07.08.17

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-Urban Forestry
-Ecological Consultants

Drawing Ref.: AMS TPP | Revision: A