



# AllAboutTrees

Arboricultural & Ecological Consultancy  
Chartered Arboriculturalists & Environmentalists

Arboricultural Impact Assessment

For Trees On

Land At Church Lane,

Whitburn - Revision E



For

Fitz Architects Ltd



# Document Verification

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Prepared By	<ul style="list-style-type: none"><li>• T Archment ND HND Arb Tech. Arbor A</li></ul>
Authorised By	<ul style="list-style-type: none"><li>• Andrew Watson FLS MICFor CBiol MSB FARborA CEnv LCGI</li></ul>



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## 1. Introduction

1.1 We are instructed by Fitz Architects Ltd to provide an updated Arboricultural Impact Assessment (AIA) for the significant trees located within a specified area adjacent to Church Lane, Whitburn. This report is revision 'E'.

1.2 This report is produced to evaluate the proposed construction of a residential dwelling with associated infrastructure. The developments juxtaposition with the existing trees is considered.

1.3 We were provided with the following documents:

- Existing plan in digital AutoCAD format
- Proposed development plans in PDF

1.4 This assessment is concerned with recording the species, size and condition of the trees. Recommendations are made where appropriate to establish acceptable levels of safety for the site and also to establish a higher level of arboricultural management.

1.5 The trees are also evaluated for the purposes of British Standard 5837–2012 Trees in relation to design, demolition & construction, with regard to their quality and value. The type and size of the root protection area is calculated and the position of the protective barriers is determined. The remaining contribution or safe useful life expectancy is estimated as an indication of the trees period of retention.

1.6 All observations were from ground level without detailed investigation.

1.7 Trees are living organisms whose health and condition may change rapidly and all observations are based on the status of the tree at the time of inspection.

## 2. Protected Status Of Trees

2.1 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.

2.2 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.

2.3 There are restrictions protecting the trees on the site. The site is located within a Conservation Area and 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. Furthermore, there are three Tree Preservation Orders (TPO) which protect the trees. A breakdown is provided in the below table. The quality of the maps supplied with the TPO are not of sufficient detail to accurately identify a number of the trees. Consequently, some of the cells in the below table have multiple references.

Species	AAT Reference	TPO No. 154 2007	TPO No. 22 1981	TPO 317
Sycamore	30	28	A2	-
Sycamore	31	-	A2	-
Sycamore	32	30	A2	-
Sycamore	39	31	A2	-
Sycamore	40	34	A2	-
Sycamore	43	33	A2	-
Sycamore	44	35	A2	-
Sycamore	47	36	A2	-
Sycamore	48	-	A2	-
Sycamore	50	-	-	5
Sycamore	59	-	-	2
Sycamore	66	-	24	-
Sycamore	68	-	23	-
Sycamore	70	-	20/21	-
Sycamore	71	-	20/21	-
Sycamore	72	-	20/21	-
Sycamore	73	-	17/18	-
Sycamore	74	-	16	-

### 3. Site Visit & Description

Site location – N 54° 56' 51.96 W 01° 22' 00.12  
 O/S Grid reference- NZ 406 616 GB Grid



*Figure 1 - The study area is indicated by the red boundary line as shown on the above image.*

3.1 Site visits were undertaken in February 2014 by Tim Archment. The weather was fine with no visibility constraints.

3.2 The study area is located in the village of Whitburn less than half a mile from the coast.

3.3 The study area formed part of the walled garden associated with Whitburn Hall. A number of the walls remain in situ providing interesting features. Unfortunately parts are in a state of disrepair and vandalism appears to be problematic.

3.4 The dilapidated wall provides the northern boundary of the study area. Land north of this wall is a woodland area dominated by sycamore with low numbers of other species. Some past tree works are evident although there are a significant number of trees in need of arboricultural works, including both pruning and removal.

The study area itself was previously occupied by a residential dwelling. Aerial photography indicates this was demolished between 2002 and 2005. Following this the site has been left derelict and the land has been colonised by a mix of ruderal plants, dominated by bramble and interspersed with other species.

3.5 Miscreant activity appears to be problematic throughout the study area. Vandalism, littering and drug use were all evident within the site.



3.6 Both Japanese knotweed (*Fallopia japonica*) and Giant hogweed (*Heracleum mantegazzianum*) are growing within the woodland to the north. Both are highly invasive species and included within Schedule 9 of the Wildlife And Countryside Act 1981. This makes it an offence to plant or otherwise cause either species to grow in the wild. It can also leave the landowner open to third party litigation – landowners can be sued for costs and damages if they fail to prevent spread to a neighbouring property.

Additionally, there are well documented dangers associated with Giant hogweed. The sap contains toxic chemicals known as ‘furanocoumarins’. When these come into contact with the skin in the presence of sunlight, they cause phyto-photodermatitis which begins as a reddened area followed by severe burns and blistering. The burns can last for several months and strip the natural UV protection from the skin. In turn the skin becomes hypersensitive to UV light which can last for years. Furthermore, the sap can cause blindness if brought into contact with the eyes.

It will be necessary to employ a suitably licensed professional to begin an eradication programme of the Schedule 9 species.

3.7 The site is relatively flat with no apparent drainage issues.

## 4. Appraisal

4.1 The trees have been surveyed on site and plotted on the site plan. Their positions are considered accurate given the provision of a detailed topographical survey. Some trees however were missed during the land survey and the positions of these have been determined using laser distometers and triangulation calculations.

4.2 All significant trees have been inspected and some of the smaller specimens have been included for accuracy. Individual recommendations are included within Appendix 1 of this report.

4.3 Following adjustments to the planning application, this report has been amended. The study area has been reduced and much of the information collated for the original report is now redundant. As such, it has been removed from the plans and accompanying reports though the original numbers have been retained for the purpose of continuity. Revision E is concerned with trees 30-32, 39-40, 43-44 & 47-74 and groups 1-3 & 5-7.

### 4.4 Root Protection Areas (RPAs)

4.4.1 The British Standard Root Protection Areas (RPAs) are indicated by the red circles surrounding the trunk position of the trees on the associated plans. These indicative circles do not take into consideration site specific conditions such as the presence of buildings, roads, footpaths, topography,

underground utility services etc. and are representative of typical root morphology where said structures are not encountered.

#### 4.5 Tree Removals

4.5.1 It will be necessary to remove some of the existing trees to facilitate the proposed development and to establish a higher level of arboricultural management for the site.

- Trees 52-54, 57 & 63-65 and group 1 will need to be removed to facilitate the construction of the new building and associated infrastructure.
- Trees 31, 43-44 and 47-48 should be removed due to structural defects, a limited safe useful life expectancy and for the purpose of arboricultural management.

4.5.2 The removal of trees 31, 43-44 and 47-48 is not essential to facilitate the development and has been specified to establish a higher level of arboricultural management. Their removal should only be undertaken by the relevant persons. For the purpose of this report, it is assumed they will be retained, and the TPP has been designed to give them protection during the construction process.

4.5.3 To mitigate the above removals new planting should take place throughout the site. Careful consideration should be given to all new planting positions to ensure the trees can grow fully into maturity without requiring major or regular pruning works. New specimens should not be positioned in close proximity to buildings, windows or utility services.

4.5.4 Additional planting could be introduced within the woodland area to the north which would benefit both the limited species and age range. Broadly speaking, the planting of British natives is encouraged although there are many non-native species which make valuable contribution to British woodlands and gardens. Trees which will eventually reach the canopy layer as well as those which will form an understorey should be included.

- Suggested canopy trees include;
  - English Oak – *Quercus robur*
  - Beech – *Fagus sylvatica*
  - Downy Birch – *Betula pubescens*
  - Scots Pine – *Pinus sylvestris*
  - Wych elm – *Ulmus glabra*
- Suggested understorey species include;



Holly – *Ilex aquifolium*  
 Hazel – *Corylus avellana*  
 Hawthorn – *Crataegus monogyna*  
 Rowan – *Sorbus aucuparia*  
 Blackthorn – *Prunus spinosa*

4.5.5 There is also sufficient space around the garden area of the proposed dwelling which could be considered for inclusion in a planting scheme. Again, the planting of British natives is encouraged but a non-native individual could form an interesting garden feature if desirable.

- Non natives often used as interesting feature trees include the following;

Monkey Puzzle – *Araucaria araucana*  
 Cedar of Lebanon – *Cedrus libani*  
 Weeping Spruce – *Picea breweriana*  
 Campbell's Magnolia – *Magnolia campbellii*  
 Paper-bark Maple – *Acer griseum*

4.5.6 The above species are only suggestions and the lists are by no means definitive. There are many more species which may be considered for inclusion in a planting scheme. Full details of any replanting scheme should be agreed with the LPA during the planning consultation process.

#### **4.6 Retained Trees**

4.6.1 Protective barriers as per section 5.1 of this report should be erected around all retained trees in the position indicated by the blue line on the Tree Protection Plan prior to any works on site. Signs should also be attached stating that the area is a protected zone and should not be entered.

#### **4.7 Special 'Tree Friendly' Construction**

4.7.1 It is usual practice, when constructing hard surfacing within the RPA of retained trees, to use a 3D cellular confinement system to prevent compaction related damage to the underlying root systems of trees. This is normally coupled with a permeable final surface which allows water penetration and gaseous exchange to continue unhindered.

4.7.2 Research shows compaction of soil structure takes place over a relatively quick period, within the first few passes of a vehicle. The damage reaches a plateau with subsequent passes doing little to worsen the damage.

4.7.3 Given the sites past use as a residential dwelling, the use of a 3D cellular confinement system is considered redundant. However, the final

surfacing should be permeable to allow water penetration and gaseous exchange.

4.7.4 Final surfacing options include;

- **Block paving or paving slabs** – The use of porous blocks such as 80mm Piora by Marshalls are particularly tree friendly and allow natural rainfall to reach the rooting area.
- **In-situ concrete** – in-situ concrete forms an impermeable surface though can be made permeable with by forming drainage holes (diameter 50mm) at regular intervals (between 300-600mm) and backfilling the resultant holes with no fines gravel or aggregate
- **Porous tarmac and resin bonded gravels** – many different products exist, some of which are permeable and some are not. Product specification must be consulted.
- **Loose Gravel**
- **Gravel infilled blocks** - Lay Turfpave sub-surface paving system and infill with gravel.

## 4.8 Car Ports

4.8.1 The proposed plans indicate car ports will be located along the northern boundary of the study area. These will be constructed using a timber frame and will support a green roof. This will be acceptable providing the holes for the posts are dug by hand with any roots encountered appropriately pruned. If the posts are set into a concrete base, the concrete must be sheathed to prevent the phytotoxic effect of concrete on surrounding roots.

## 4.9 Ground Protection Measures

4.9.1 It will be necessary to have access within the root protection areas (RPAs) of some of the trees. This includes areas of both hard standing and areas of soft ground (formerly associated with the garden of the old dwelling).

4.9.2 To avoid compaction damage to the underlying roots during construction, ground protection measures as per section 5.2 of this report will be required in the areas shown as hatched orange on the Tree Protection Plan (TPP). This will provide both a working area and space for scaffolding and allow access around the building. This methodology should be implemented at the time of barrier erection, remain in situ throughout the build and only removed when all construction activity has finished.

4.9.3 The trees that require ground protection in the area of soft ground formerly associated with the garden of the old dwelling are:

- Group 5.

4.9.4 Trees which may require ground protection in areas currently covered by hard standing include;

- Trees 32, 39-40, 43-44, 47, 66-72, 74, group 3 and group 7.

4.9.5 It is suggested the old tarmac surfacing is left in situ through the construction of the new dwelling to act as ground protection for the retained trees. Following completion of the project the old tarmac surfacing may be lifted and replaced with the new final surfacing. This will have the added advantage of preventing construction related traffic using the new surfacing.

4.9.6 If the hard surfacing is to be lifted at the start of the project it will be necessary to install ground protection measures in these areas covered by trees 32, 39-40, 43-44, 47, 66-72, 74, group 3 and group 7 in accordance with section 5.2 of this document.

#### 4.10 Schedule 9 Plants

##### Japanese Knotweed

4.10.1 Japanese knotweed (*Fallopia japonica*) is established at various locations around the site.



Figure 2 - Japanese Knotweed (*Fallopia japonica*)

4.10.2 Japanese knotweed is an invasive perennial introduced to the UK from Japan between 1825 and 1841 as an ornamental plant, and as cattle fodder. Today Japanese knotweed is recognised as an invasive and threatening species. It is classed as a 'controlled waste' in Britain under part 2 of the Environmental protection Act 1990 which requires disposal of all parts, and infected soil, by a licensed waste controller.

4.10.3 Japanese knotweed can spread prolifically through rhizomes, generating from fragments as small as 0.4g. This makes a thorough control strategy extremely important, given Japanese knotweeds ability to damage manmade structures. Japanese knotweed's invasive manner and strong growth is capable of damaging foundations, buildings, roads, paths etc.

4.10.4 As a non-native Japanese knotweed thrives in the UK as many of the pests and diseases which control it in Japan are not present in the UK. Our native flora cannot compete with the vigorous summer growth or the thick mulch of decaying canes and leaves over winter. As such Japanese knotweed thrives in the UK, to the detriment of our native species.

4.10.5 Legislation relevant to Japanese knotweed is as follows:

- **Wildlife and Countryside Act (1981):** Under Schedule 9, Section 14 of the Act, it is an offence to plant or otherwise cause the species to grow in the wild.
- **Environmental Protection Act (1990):** Japanese knotweed is classed as 'controlled waste' and as such must be disposed of safely at a licensed landfill site according to the Environmental Protection Act (Duty of Care) Regulations 1991. Soil containing rhizome material can be regarded as contaminated and, if taken off site, must be disposed of at a suitably licensed landfill site and buried to a depth of at least 5 m.
- **Third party litigation** – Landowners can be sued for costs and damages if they fail to prevent knotweed from spreading to a neighbouring property. Failure to manage and dispose of Japanese knotweed responsibly may lead to prosecution.

4.10.6 The Japanese Knotweed appears to be under a management programme with herbicidal treatment. It will be necessary to continue this programme until the knotweed is eradicated.

### **Giant Hogweed**

4.10.7 The desiccated remains of a number of Giant hogweed plants were found around the study area. It is unclear whether these plants are established or have been dumped here.

4.10.8 Giant hogweed was introduced to Britain over 100 years ago and has since established itself as an invasive species. The plant reaches heights of between 2 and 5m tall and can last between 5 and 7 years. With the exception of its size, it closely resembles the common hogweed, *Heracleum sphondylium*.

4.10.9 Giant hogweed flowers in its final year producing between 1,500 and 100,000 seeds. A number of desiccated flower heads were found.

4.10.10 As mentioned earlier, the sap of Giant hogweed contains toxic chemicals known as ‘furanocoumarins’. When brought into contact with the skin, and in the presence of sunlight, they cause phyto-photodermatitis which begins as a reddened area followed by severe burns and blistering. The burns can last for several months and strip the natural UV protection from the skin. In turn the skin becomes hypersensitive to UV light which can last for years. Furthermore, the sap can cause blindness if brought into contact with the eyes.

4.10.11 It is suggested an additional walkover survey is carried out in the active growing season to confirm the presence or absence of Giant Hogweed with appropriate management practices implemented following this.



Figure 3 – Desiccated flower head of Giant Hogweed found in study area.

## 4.11 Fungal Pathogens

### ***Ganoderma applanatum* – Artists fungus**

4.11.1 Fungal fruiting brackets of *Ganoderma applanatum* were noted growing at the base of T52.

4.11.2 *Ganoderma* is a principle decay fungi that causes a ‘selective delignification’ white rot decay which degrades lignin and to a lesser extent the cellulose and hemicelluloses and of the wood (which gives the wood strength and flexibility) eventually causing the wood to become soft with the consequence of possible ductile fracture or the complete root failure. It is common on beech but can also be found on a wide range of broadleaved hosts.

4.11.3 As with any basal fungus, decay by this species can cause mechanical failure of the stem base. However, the partially decayed wood



retains considerable tensile strength due to the fact that the decay involves selective delignification. For this reason, when failure occurs in stems infected by these fungi, the residual wall thickness of sound wood tends to be much less than 30-35% of the stem radius.

### ***Kretzschmaria deusta* – Charcoal fungus**

4.11.4 Tree 31 was found to be host to the fungal pathogen *Kretzschmaria deusta*. Charcoal fungus is renowned for causing sudden and catastrophic failure of trees. Tree 31 is already dead and as such lacks the ability to put on any adaptive growth. The tree also leans towards a small building within the grounds of the adjacent cricket pitch. This tree should be removed as part of site management and in the interests of safety.

4.11.5 Charcoal fungus preferentially destroys the cellulose content of the wood before degrading the heavily lignified parts of the wood cells at a very late stage.

4.11.6 This fungus induces a brittle ceramic fracture of the trunk and/or root system with fracturing tending to occur before an advanced white rot has established. The fracture surface can be quite hard.

4.11.7 The fungus is particularly dangerous as it is often difficult to locate and the brittle fracture associated with the decay tends to occur without warning of incipient failure.



Figure 4 – *Kretzschmaria deusta* fruiting bodies around base of T31

## **4.12 Ground Level**

4.12.1 The ground level must not be altered within the RPA of any retained tree, group or hedgerow. This includes the removal of the existing material



via excavation or the raising of the ground level via importation of new material.

#### 4.13 Wildlife Habitats

4.13.1 As part of the survey the significant trees were inspected from ground level with the use of binoculars for signs of wildlife habitation, in particular birds and bats.

##### Bats

4.13.2 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

4.13.3 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.)*

4.13.4 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.

4.13.5 No visual signs were found to indicate the presence of bats in the surveyed trees though a number of trees within the study area display

characteristics found favourable to bats and as such caution must be exercised.

4.13.6 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**

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

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

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

4.13.9 No nesting birds were present at the time of inspection though signs of previous nesting activity were evident and as such caution must be exercised.

4.13.10 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.

## 5. Tree Protection Measures

### 5.1 Root Protection Area & Barrier Specification

5.1.1 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.

5.1.2 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.

5.1.3 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.

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

5.1.5 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.

5.1.6 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.

5.1.7 The barriers should be erected prior to work commencing on site 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.

5.1.8 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 and driven securely into the ground for a minimum depth of 0.6m. Care should be taken when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid any structural roots. The weldmesh or Heras panels need to be a minimum 2.0m 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.

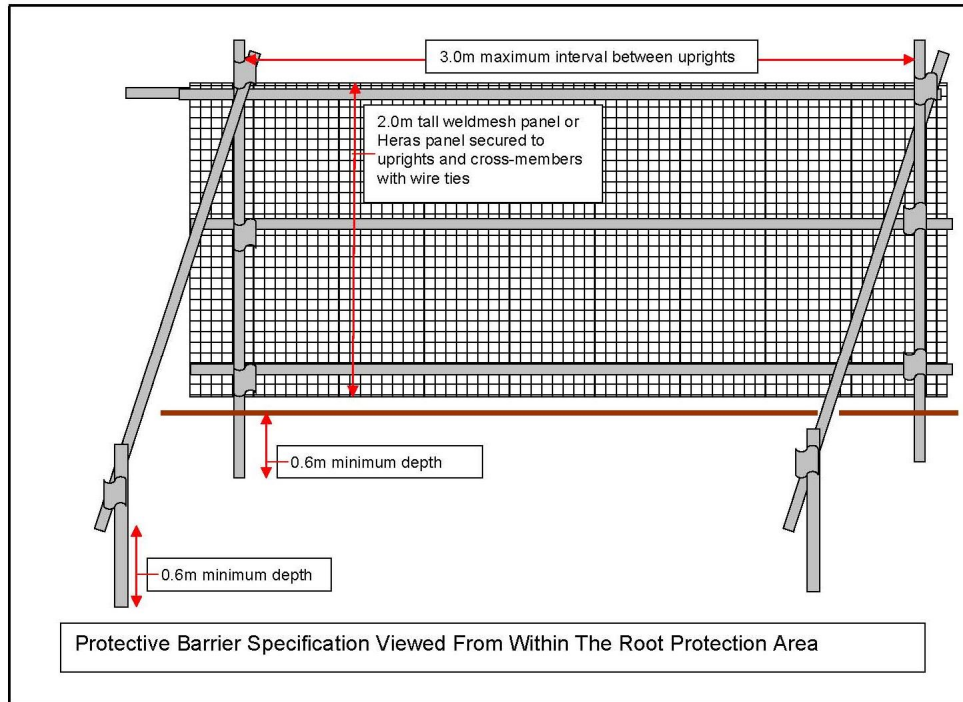


Figure 5 – Protective barrier specification



Figure 6 – Actual barrier erected on site

5.1.9 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.

5.1.10 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.

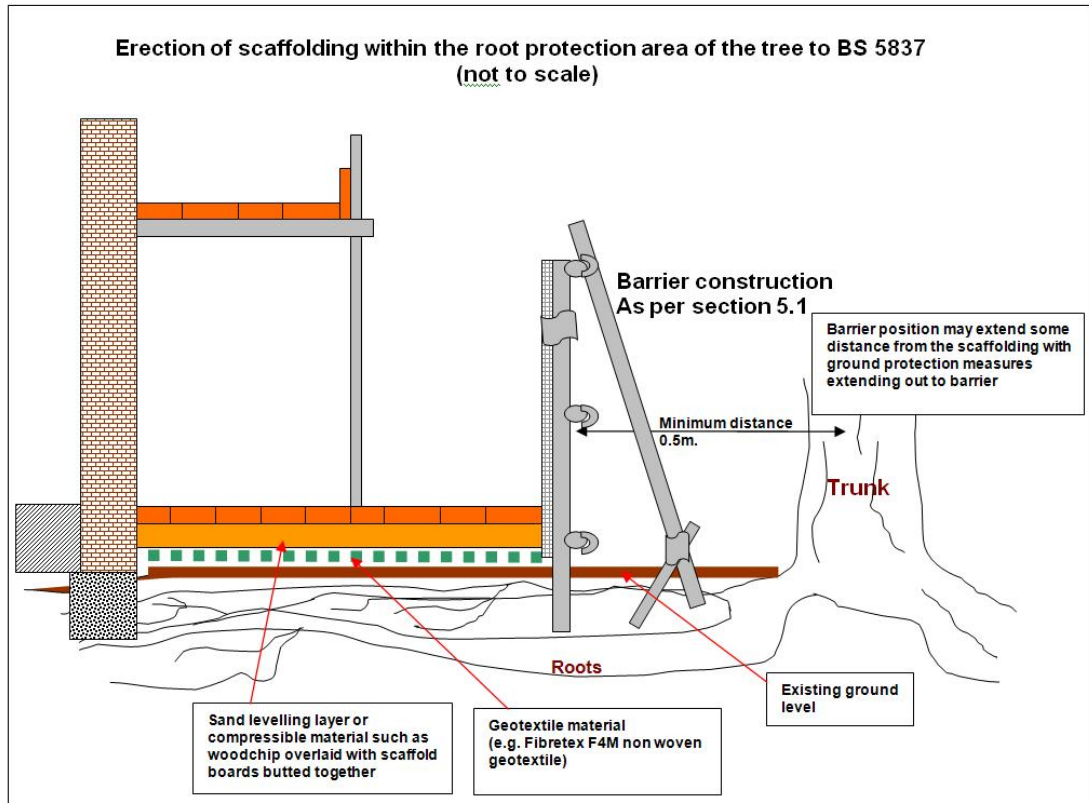
## **5.2 Ground Protection Areas & Erection Of Scaffolding Within The Trees Root Protection Areas**

5.2.1 In some cases 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.

5.2.2 The following diagrams visualise the layout requirements. By sufficiently protecting the rootplate of the tree, the access, 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.

5.2.3 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 barrier drawing in section 5.1 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. Vehicle and plant access requires a more robust system.
- The ground protection must remain in situ until all construction works have been completed.



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

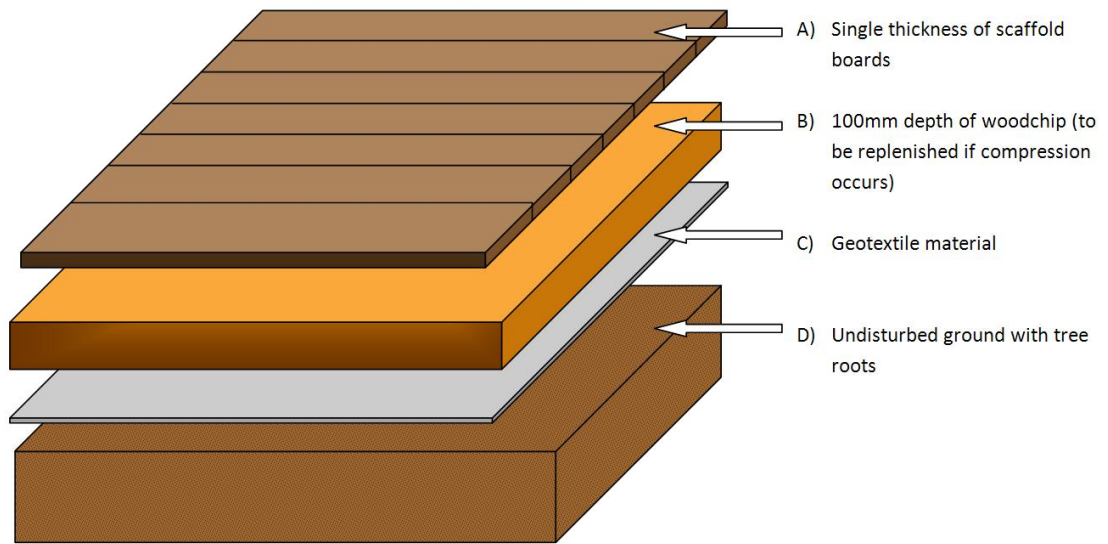
5.2.5 Care will need to be taken not to compact or damage the rootplate of the trees when the footings are dug out and if the excavator is likely to be within the root protection area, steel plating must be laid on top of a layer of sand or compressible material such as woodchip to adequately spread the load.

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

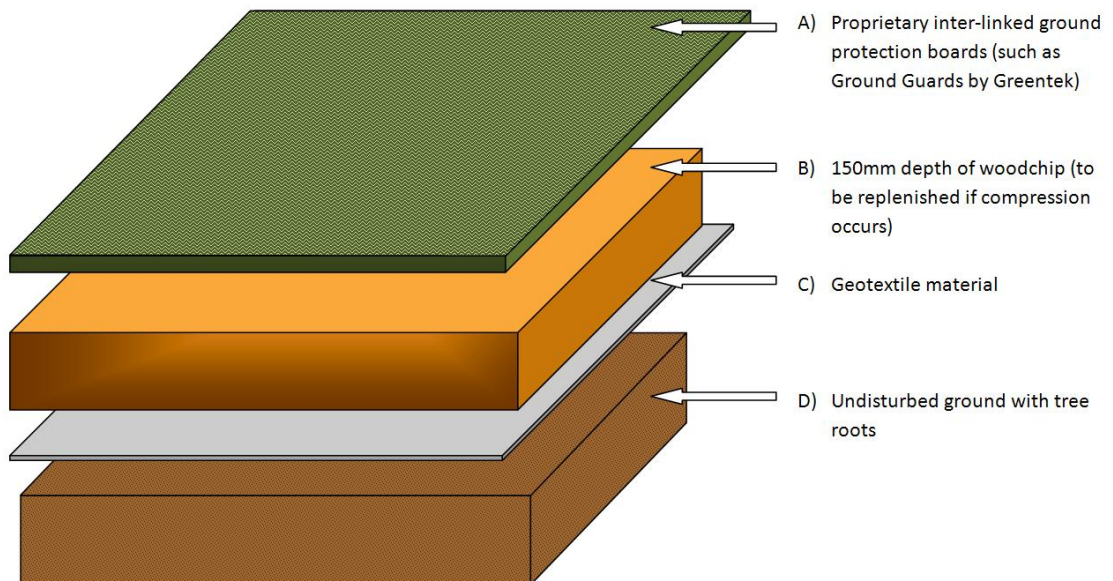
- Pedestrian
- Plant and vehicle access up to 2 tons gross weight
- Plant and vehicle access up exceeding 2 tons gross weight



Ground Protection Suitable For Pedestrian Movement Only



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



5.2.7 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

### 5.3 Service Runs

5.3.1 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.

5.3.2 Acceptable techniques (fuller details in the appendices) for the laying of services in order of preference are:

- **Trenchless-** by using thrust boring or similar techniques
- **Broken Trench-** to be dug by hand
- **Continuous trench-** to be dug by hand

5.3.3 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.

5.3.4 When underground apparatus is to pass within the RPA of a retained tree, trenchless insertion methods should be used (see table below) with

entry and retrieval pits sited outside the RPA. Shallow services runs may be dug with hand tools if appropriate.

Trenchless Solutions For Installation Of Underground Services					
Method	Accuracy (MM)	Bore <sup>(A)</sup> 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 <sup>(B)</sup>
Pipe ramming	≈150	150 to 2000	70	Any large-bore pipes and ducts	Rocky and other heavily obstructed soils
Impact moling <sup>(C)</sup>	≈50 <sup>(D)</sup>	30 to 180 <sup>(E)</sup>	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

## 6. Conclusion

6.1 As with any construction exercise near trees, there are potential areas of conflict where damage could be caused to retained trees.

6.2 By using the protective elements dictated by British Standard 5837, no significant damage should take place during the construction phase and the tree cover should flourish in the longer term.

6.3 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.

6.4 All tree works must conform rigorously to BS 3998 (2010) 'Recommendations for Tree Work'.

For and on behalf of  
AllAboutTrees Ltd

Andrew Watson FLS MICFor CBiol MSB FArborA CEnv LCGI  
-Chartered Arboriculturalist & Registered Consultant

## Appendix 1

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
30	Sycamore <i>Acer pseudoplatanus</i>	13.5	2	4	6.5	3	320	1	3.5	3.5 E	Middle aged	Fair	Fair	3.8	20-40	B - Moderate	Deadwood. Asymmetric crown spread; canopy distorted due to group pressure.	This tree will not be affected by the proposed development.  Crown clean to remove the deadwood.	None	22	20	B
31	Sycamore <i>Acer pseudoplatanus</i>	13	0	0	0	0	370	1	0	0 N	Middle aged	Dead	Dead	4.4	<10	U - Unsuitable for retention	Dead tree. Basal decay. Extensive stem decay. Leaning towards building. Charcoal fungus present.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.  This tree has been recommended for removal given its compromised condition. This removal is not essential to facilitate the development and should only be undertaken by the relevant persons to	Low	22	20	A

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	<p>establish a higher level of arboricultural management. The TPP has been designed to allow retention during construction.</p> <p>It is however recommended this tree is removed in the interests of safety.</p>					
32	Sycamore <i>Acer pseudoplatanus</i>	14.5	3.5	6	5.5	5	573	2	2.5	2.5 SW	Mature	Fair	Fair	6.9	20-40	B - Moderate	<p>No major visible defects.</p> <p>Minor/small diameter deadwood retained in canopy.</p> <p>2x codominant stems from approximately 0.8m.</p>	<p>This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.</p> <p>Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.</p> <p>No tree works required at the present time.</p>	None	22	20	-
39	Sycamore <i>Acer pseudoplatanus</i>	13.5	1	3.5	3.5	2	330	1	2.5	2.5 E	Middle aged	Fair	Fair	4	10-20	C - Low	<p>Deadwood.</p> <p>Asymmetric crown spread; canopy distorted due to group pressure.</p>	<p>This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.</p>	None	22	20	A



Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.7 for further details.  Crown clean to remove the deadwood.					
40	Sycamore <i>Acer pseudoplatanus</i>	17	3	6.5	5.5	5	640	1	6	5 NE	Mature	Fair	Fair	7.7	40+	A -High	No major visible defects.  Deadwood.  Broad spreading canopy.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.  Crown clean to remove the deadwood.	Low	22	20	A
43	Sycamore <i>Acer pseudoplatanus</i>	15.5	3	6.5	4	3.5	520	1	5	5 S	Mature	Fair	Poor	6.2	10-20	C - Low	Structurally poor.  Stem divides at 3.5m.  Water filled hollow with decay present at union.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.	Low	22	20	A

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	<p>Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.</p> <p>Crown clean to remove the deadwood.</p> <p>This tree has been recommended for removal given its compromised condition. This removal is not essential to facilitate the development and should only be undertaken by the relevant persons to establish a higher level of arboricultural management. The TPP has been designed to allow retention during construction.</p>					
44	Sycamore <i>Acer pseudoplatanus</i>	8.5	0	7	2	2.5	370	1	3.5	5 SW	Middle aged	Fair	Poor	4.4	10-20	C - Low	<p>Poor quality individual of low value.</p> <p>Poor form and shape.</p> <p>Structurally poor.</p> <p>Hollow stem.</p>	<p>This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.</p> <p>Ground protection</p>	Low	22	20	A

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	Heavily asymmetric.	measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.  Crown clean to remove the deadwood.  This tree has been recommended for removal given its compromised condition. This removal is not essential to facilitate the development and should only be undertaken by the relevant persons to establish a higher level of arboricultural management. The TPP has been designed to allow retention during construction.				
47	Sycamore <i>Acer pseudoplatanus</i>	15	3.5	6.5	3	4	480	1	5	5 SW	Mature	Fair	Poor	5.8	10-20	C - Low	Decay cavity at approximately 5.0m on south; extent of decay unknown although slight reactive bulge evident.  Number of bark wounds on lower stem.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  Ground protection measures required in	Moderate	22	20	A

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	<p>the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.</p> <p>Crown clean to remove the deadwood.</p> <p>This tree has been recommended for removal given its compromised condition. This removal is not essential to facilitate the development and should only be undertaken by the relevant persons to establish a higher level of arboricultural management. The TPP has been designed to allow retention during construction.</p>					
48	Sycamore <i>Acer pseudoplatanus</i>	13	1	2	1.5	2.5	320	1	8.5	8.5 E	Middle aged	Poor	Poor	3.8	<10	U - Unsuitable for retention	<p>Poor quality individual of low value.</p> <p>Extensive stem decay.</p> <p>Deadwood.</p> <p>Structurally poor.</p>	<p>This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.</p> <p>Ground protection measures required in the area indicated by</p>	Low	22	20	A

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.  Crown clean to remove the deadwood.  This tree has been recommended for removal given its compromised condition. This removal is not essential to facilitate the development and should only be undertaken by the relevant persons to establish a higher level of arboricultural management. The TPP has been designed to allow retention during construction.					
49	Wild Cherry <i>Prunus avium</i>	6.5	1.5	2.5	3	2	140	1	2.5	2 SE	Middle aged	Poor	Fair	1.7	10-20	C - Low	Poor quality individual of low value.  Deadwood.  Crown distorted due to group pressure.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  Crown clean to remove the deadwood.	None	17	16	B
50	Sycamore	6	2	1.5	1.5	2	80	1	1.5	1.5	Young	Fair	Fair	1	20-40	C - Low	No major visible defects.	This tree is retainable	None	22	20	-

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
	<i>Acer pseudoplatanus</i>								NE								and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  No tree works required at the present time.					
51	Sycamore <i>Acer pseudoplatanus</i>	11	2	4	3	3.5	419	5	1.5	1.5 E	Middle aged	Fair	Fair	5	20-40	C - Low	No major visible defects.  Multiple stems from ground level.  Possible regenerative growth from coppiced stool.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  No tree works required at the present time.	None	22	20	-
52	Wild Cherry <i>Prunus avium</i>	8.5	5.5	4.5	4	3.5	350	1	2	1.5 W	Mature	Fair	Poor	4.2	10-20	C - Low	Deadwood.  Low vitality indicated by poor shoot elongation.  Low bud/leaf density.  <i>Ganoderma spp.</i> brackets at base.	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	17	16	A
53	Wild Cherry <i>Prunus avium</i>	7.5	5	4	6	2.5	400	1	1.5	1.5 E	Middle aged	Fair	Fair	4.8	20-40	B - Moderate	Deadwood.  Asymmetric crown spread; canopy distorted due to group pressure.  Areas of stem wounding.  Slight lean to south east.	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	17	16	A



Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																Stub cuts.						
54	Wild Cherry <i>Prunus avium</i>	8.5	6.5	3	3.5	3	310	1	2	1.5 S	Middle aged	Fair	Fair	3.7	20-40	B - Moderate	Minor/small diameter deadwood retained in canopy. Crown distorted due to group pressure. Old nest in canopy.	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	17	16	A
55	Sycamore <i>Acer pseudoplatanus</i>	10	2.5	2.5	5	1	240	1	4	3.5 E	Middle aged	Fair	Fair	2.9	40+	B - Moderate	No major visible defects. Stem divides above 1.5m. Crown distorted due to group pressure.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP. No tree works required at the present time.	None	22	20	-
56	Sycamore <i>Acer pseudoplatanus</i>	10	1.5	4	2.5	1.5	260	1	3	2.5 W	Middle aged	Fair	Fair	3.1	40+	B - Moderate	No major visible defects. Stem divides above 1.5m. Crown distorted due to group pressure.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP. No tree works required at the present time.	None	22	20	-
57	Sycamore <i>Acer pseudoplatanus</i>	12	2.5	2	1.5	1.5	170	1	3	3 NW	Middle aged	Fair	Poor	2	20-40	C - Low	Etiolated specimen.	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	22	20	A
58	Sycamore <i>Acer</i>	12	4.5	3	1.5	1.5	270	3	2.5	2.5 NE	Middle aged	Fair	Fair	3.2	20-40	C - Low	Multiple stems from ground level.	This tree is retainable and will be adequately protected	None	22	20	-

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
	<i>pseudoplatanus</i>															Minor/small diameter deadwood retained in canopy.  Crown distorted due to group pressure.	by the position of the protective barrier as indicated by the blue line on the TPP.  No tree works required at the present time.					
59	Sycamore <i>Acer pseudoplatanus</i>	10	0.5	4	2.5	2	160	1	1	1.5 SE	Middle aged	Fair	Fair	1.9	20-40	B - Moderate	No major visible defects.  Stem divides above 1.5m.  Crown distorted due to group pressure.  Abuts boundary wall.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  No tree works required at the present time.	None	22	20	-
60	Sycamore <i>Acer pseudoplatanus</i>	12	3	4	0.5	3	255	6	2	2 SE	Middle aged	Fair	Fair	3.1	10-20	C - Low	Multiple stems from ground level; the resulting fork unions are tight and are considered structurally compromised.  Crown distorted due to group pressure.  Bark stripped from two stems.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  No tree works required at the present time.	None	22	20	-
61	Yew <i>Taxus baccata Fastigiata</i>	5	2	2.5	2.5	2	330	1	1.5	0 N	Middle aged	Fair	Fair	4	40+	B - Moderate	Multiple stems below 1.5m.  Broken branches in crown.  Remove broken/hanging	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.	None	12	6	C

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	branches.					
62	Sycamore <i>Acer pseudoplatanus</i>	12	3	4.5	5.5	4	302	2	2.5	3 E	Middle aged	Fair	Fair	3.6	20-40	B - Moderate	No major visible defects. 2x codominant stems from ground level.	This tree is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP.  No tree works required at the present time.	None	22	20	-
63	Goat Willow <i>Salix caprea</i>	10	4	2.5	3.5	3.5	320	1	1.5	2 NE	Middle aged	Fair	Fair	3.8	10-20	C - Low	No major visible defects. Minor/small diameter deadwood retained in canopy.  1x sycamore and 1x elder abut at base.	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	12	12	A
64	Apple <i>Malus</i>	5.5	1	4	2.5	4	240	1	2.5	1 E	Mature	Poor	Poor	2.9	10-20	C - Low	Poor quality individual of low value. Deadwood. Asymmetric crown spread; canopy distorted due to group pressure.  Abuts wall and oversailing entrance road.	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	10	8	A
65	Apple <i>Malus</i>	4	2.5	1.5	0	3	140	1	1.5	1 N	Middle aged	Poor	Poor	1.7	<10	U - Unsuitable for retention	Poor quality individual of low value. Extensive stem decay. Deadwood. Asymmetric crown spread; canopy distorted due to	This tree conflicts with the proposed design layout and will need to be removed to facilitate the development.	None	10	8	A

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																group pressure. Abuts wall and oversailing entrance road.						
66	Sycamore <i>Acer pseudoplatanus</i>	17	7	8.5	5	7.5	900	1	4	2.5 S	Mature	Fair	Fair	10.8	40+	A -High	Remote assessment with some dimensions estimated due to access constraints. Located in neighbouring property outside of the site boundary. Multiple stems above 1.5m. Deadwood. Number of small apertures. Collision damage on lowest southern branch oversailing access road.	This tree is retainable and is naturally protected by its position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. Crown clean to remove the deadwood. Remove lowest southern limb to allow unimpeded vehicular access.	Moderate	22	20	B
67	Lawson Cypress <i>Chamaecyparis lawsoniana</i>	6	2	2.5	2	3	220	1	1.5	1.5 S	Middle aged	Fair	Fair	2.6	20-40	B - Moderate	Remote assessment with some dimensions estimated due to access constraints. Located in neighbouring property outside of the site boundary. No major visible defects.	This tree is retainable and is naturally protected by its position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section	None	18	8	-

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	4.9 for further details. No tree works required at the present time.					
68	Sycamore <i>Acer pseudoplatanus</i>	15	5	6	7	1	500	1	4	5 SW	Middle aged	Fair	Fair	6	20-40	B - Moderate	Leans to the east. Minor/small diameter deadwood retained in canopy. Asymmetric crown spread; canopy distorted due to group pressure.	This tree is retainable and is naturally protected by its position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. No tree works required at the present time.	Low	22	20	-
69	Lawson Cypress <i>Chamaecyparis lawsoniana</i>	12.5	2.5	2	3	2	240	1	1.5	1.5 N	Middle aged	Fair	Fair	2.9	20-40	B - Moderate	Remote assessment with some dimensions estimated due to access constraints. Located in neighbouring property outside of the site boundary. No major visible defects. Growing into canopy of adjacent sycamore.	This tree is retainable and is naturally protected by its position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. No tree works required at the present time.	None	18	8	-

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
																	present time.					
70	Sycamore <i>Acer pseudoplatanus</i>	12.5	4	4.5	2.5	5	450	1	2	3 SE	Middle aged	Fair	Fair	5.4	20-40	B - Moderate	<p>Remote assessment with some dimensions estimated due to access constraints.</p> <p>Located in neighbouring property outside of the site boundary.</p> <p>Torn stubs.</p> <p>Asymmetric crown spread; canopy distorted due to group pressure.</p>	<p>This tree is retainable and is naturally protected by its position behind the stone wall.</p> <p>Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.</p> <p>No tree works required at the present time.</p>	Low	22	20	-
71	Sycamore <i>Acer pseudoplatanus</i>	11	1	7	3	3	500	1	4	4 SW	Middle aged	Fair	Fair	6	20-40	B - Moderate	<p>Remote assessment with some dimensions estimated due to access constraints.</p> <p>Located in neighbouring property outside of the site boundary.</p> <p>Stem divides below 1.5m.</p> <p>Minor/small diameter deadwood retained in canopy.</p> <p>Asymmetric crown spread; canopy distorted due to group pressure.</p>	<p>This tree is retainable and is naturally protected by its position behind the stone wall.</p> <p>Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.</p> <p>No tree works required at the present time.</p>	Low	22	20	-
72	Sycamore <i>Acer</i>	16	6	7	6.5	5	650	1	3	4.5 SE	Mature	Fair	Fair	7.8	40+	A -High	<p>Remote assessment with some dimensions estimated due to access</p>	<p>This tree is retainable and is naturally protected by its</p>	Low	22	20	-

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
	<i>pseudoplatanus</i>															constraints. Located in neighbouring property outside of the site boundary. No major visible defects. Deadwood. Oversailing into study area.	position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. No tree works required at the present time.					
73	Sycamore <i>Acer pseudoplatanus</i>	14	5	6	7	7	400	1	4	3.5 SE	Middle aged	Fair	Fair	4.8	10-20	C - Low	Remote assessment with some dimensions estimated due to access constraints. Located in neighbouring property outside of the site boundary. Broken / hanging branches in crown. Deadwood. Crown distorted due to group pressure. Areas of stem decay in upper canopy.	This tree is retainable and is naturally protected by its position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. Crown clean to remove the deadwood. Remove broken/hanging branches.	Low	22	20	C
74	Sycamore <i>Acer</i>	17.5	8.5	7.5	7.5	6	750	1	3	2 S	Mature	Fair	Fair	9	40+	A -High	Remote assessment with some dimensions estimated due to access	This tree is retainable and is naturally protected by its	Low	22	20	A



Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
	<i>pseudoplatanus</i>															constraints. Located in neighbouring property outside of the site boundary. Stem divides above 1.5m. Minor/small diameter deadwood retained in canopy. In conflict with boundary wall.	position behind the stone wall. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. Relocate boundary wall to remove conflict.					
<b>Tree Groups</b>																						
1	Bramble, Buddleja, Sycamore <i>Rubus fruticosus, Buddleja spp., Acer pseudoplatanus</i>	4	-	-	-	-	100	1	-	-	Young	Fair	Fair	1.2	10-20	C - Low	Self set plants occupying disturbed ground in location of demolished building. Dominated by bramble with low numbers of Buddleja and sycamore. Low quality group of little value.	This group conflicts with the proposed design and will need to be removed to facilitate the development.	None	22	20	A
2	Elder <i>Sambucus nigra</i>	6	-	-	-	-	250	1	-	-	Middle aged	Fair	Fair	3	10-20	C - Low	Scattered elder understorey to mature trees. Combination of young healthy individuals of older declining trees.	This group is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP. No tree works required at the present time.	None	10	8	-
3	Sycamore	18	-	-	-	-	900	1	-	-	Matur	Fair	Fair	10.8	40+	A -High	Remote assessment with	This group is	Moderat	22	20	-

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
	Beech <i>Acer pseudoplatanus, Fagus sylvatica</i>									e						some dimensions estimated due to access constraints.  Mature individuals growing around garden in adjacent property.  Some edge individuals oversailing into study area.	retainable and is naturally protected by its position behind the stone wall.  Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details.  No tree works required at the present time.	e				
5	Sycamore Ash Wych Elm <i>Acer pseudoplatanus, Fraxinus excelsior, Ulmus glabra</i>	17	-	-	-	-	750	1	-	-	Mature	Fair	Fair	9	40+	A -High  Mature trees growing in grounds of adjacent property.  Tree management is in place.  Number of poor quality individuals in group.  Dominated by sycamore with isolated examples of other species.	A significant portion of this group will not be affected by the proposed development.  Those sections adjacent to the site are naturally protected by the position of the stone wall.  Ground protection measures, in accordance with section 5.2 of this document, required in the area indicated by the orange hatching.  Continue with current maintenance	Low	23	18	-	

Tree No.	Species Common Name <i>Latin Name</i>	Height (M)	Crown Spread (M)				Trunk Dia (MM)	No. Of Stems	Height Of Lower Canopy (M)	First Sign Branch (M) (Position)	Age	Physiological Condition	Structural Condition	Root Prot Area Radii (M)	Estimated Remaining Contribution (Years)	Tree Quality Assessment	Comments	Maintenance	Bat Roost Potential	Ultimate Size For Species (M)		Priority
			N	S	E	W														Height	Spread	
6	Aspen <i>Populus tremula</i>	21	-	-	-	-	650	1	-	-	Mature	Fair	Fair	7.8	40+	A -High	Cluster of three aspen in neighbouring park. Oversailing into site. Negligible amounts of deadwood retained in canopy.	programme. This group is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP. No tree works required at the present time.	Low	25	20	-
7	Sycamore Cherry Plum Cherry Laurel Goat Willow Swedish Whitebeam Elder  <i>Acer pseudoplatanus,</i> <i>Prunus cerasifera,</i> <i>Prunus laurocerasus,</i> <i>Salix caprea,</i> <i>Sorbus intermedia,</i> <i>Sambucus nigra</i>	10	-	-	-	-	350	1	-	-	Middle aged	Fair	Fair	4.2	20-40	B - Moderate	No major visible defects. Variety of planted individuals in adjacent park. Some oversailing into the study area.	This group is retainable and will be adequately protected by the position of the protective barrier as indicated by the blue line on the TPP. Ground protection measures required in the area indicated by the orange hatching if surfacing removed at start of project. Please see section 4.9 for further details. Reduce and crown lift oversailing individuals to provide adequate clearance over the access road.	None	22	20	A

# Appendix 2(1)

## Glossary of Terms

- 1 Reference number:** An individual identifying number
- 2 Species:** Species identification is based on visual field observations and lists the common name. In some cases the botanical name will be used where there is no common alternative. On in-depth surveys the botanical name only may be used
- 3 Height:** Height is estimated to the nearest metre. On computerised surveys this may be within a range of heights. When measured height is required, a clinometer is used to measure to the nearest metre
- 4 Diameter:** Trunk diameter measured at 1.5 metres from ground level and recorded in millimetres. In some surveys this is indicated as a range
- 5 Spread:** Measurement of canopy from the trunk to the nearest metre in four directions, North, South, East, and West in metres
- 6 Lower crown Clearance:** Height in metres of crown clearance above adjacent ground level
- 7 Age:** Either an estimate (or statement if accurately known) of the age of the tree, classified as:
  - Y** = Young tree, established tree usually up to one third of expected ultimate height & spread
  - MA** = middle aged, usually between one third and two thirds of ultimate height & spread
  - M** = Mature, more or less at full height but still increasing in girth & spread
  - OM** = Over mature, grown to full size and becoming senescent,
  - V** = Veteran tree, individuals surviving beyond the typical age range for the species
- 8 Physiological Condition:** Good = Healthy tree with good vitality,  
Fair = Moderate health and vitality normal or slightly less for species and age  
Poor = Poor shape or form - signs of decline in crown, may have structural weakness.  
Dead = dead or dying tree
- 9 Structural Condition:** Good = No visible structural defects  
Fair = Only minor structural defects  
Poor = Defects which may need to be rectified or regularly monitored  
Remove = Severe defects which may result in imminent failure or collapse
- 10 Management Recommendations:** General comments on the condition of the tree or group and any action required. potential for wildlife habitats
- 11 Estimated Remaining Contribution:** Safe Useful Life Expectancy (SULE): in some cases the age ranges are modified  
Short: 0 – 10years                      Medium: 10– 20 Years  
Intermediate: 20-40                      Long: 40 + years
- 12 Tree Quality:** Assessment of tree quality see following cascade chart for details
- 13 Priority:** A - Works to achieve an acceptable level of safety or required to facilitate the development  
B - Works to achieve higher levels of arboricultural management.  
C - To improve the aesthetic appearance.
- 14 Ultimate Size:** Taken from Arboriculture Research Note 8490ARB or NHBC Standards Chapter 4.2 as appropriate The Normal Ultimate Height in an Urban Situation in metres. Ultimate spread of the Crown in metres.
- 15 Root Protection Area:** The distance at which the protective barrier should be erected measured in a radii from the centre of the trunk in metres.
- 16 Pruning:** Pruning shall be defined as the removal of living or dead parts of a plant by the Contractor. Such parts may be soft growth, twigs, branches, limbs or sections of the tree trunk. The cut material may vary from small to large in size.

- 17 Crown Cleaning:** Cleaning out is defined as the removal of dead, dying or diseased branchwood, broken branches or stubs left from previous tree surgery operations (see also 16 Deadwooding) together with all unwanted objects, which may include ivy (if specified) and/or other climbing plants, nails, redundant cable bracing, rope swings, tree houses and windblown rubbish from the tree, and any such debris from any cavities within the tree.
- 18 Deadwood Removal:** Dead-wooding shall be defined as the removal of all dead and dying branches and limbs from the tree.
- 19 Crown Lifting:** Crown lifting shall be defined as the removal of all soft growth and branches or parts thereof which are below or which extend below the height specified in the tender documents. It is recognised that the resultant canopy base might not be one single level but might be stepped to allow for different clearances, for example where a tree overhangs both the footway and the road where different height clearances are required.
- 20 Crown Reduction:** Crown reduction shall be defined as the reduction of the complete outline dimension of the canopy, from the tips of limbs and branches to the main trunk, by pruning growth to an acceptable branch, twig or but to leave a flowing silhouette.

## Appendix 2(11) Cascade Chart For Assessing Tree Quality

Category and definition  Trees to be considered for retention	Criteria – Subcategories			Identification on plan
	1. Mainly arboricultural values	2. Mainly landscape values	3. Mainly cultural values, including conservation	
<p><b><u>Category High = A</u></b></p> <p>Trees of high quality with an estimated remaining life expectancy of at least 40 years</p>	Trees that are particularly good examples of their species, especially, if rare or unusual, or those that are essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation historical, commemorative or other value (e.g. veteran trees or wood – pasture)	Green
<p><b><u>Category Moderate = B</u></b></p> <p>Trees of moderate quality with an estimated remaining life expectancy of at least 20 years</p>	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	Blue
<p><b><u>Category Low = C</u></b></p> <p>Trees of low quality with an estimated remaining life expectancy of at least 10 years; or young trees with a stem diameter below 150mm</p>	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value, and/ or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural benefits	Yellow
<p><b><u>Category = U Trees unsuitable for retention</u></b></p> <p>Those of such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years</p>	<p>NOTE Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation</p> <ul style="list-style-type: none"> <li>• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other U category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)</li> <li>• Trees that are dead or are showing signs of significant, immediate and irreversible overall decline</li> <li>• Trees infected with pathogens of significance to the health and/or safety of other trees nearby (e.g. Dutch elm disease) or very low quality trees suppressing adjacent trees of better quality</li> <li>• Habitat reinstatement may be appropriate (e.g. U category trees used as a bat roost- installation of bat box in nearby tree)</li> </ul>			Red

Appendix 2(111)  
Guidelines for the Planning, installation and  
Maintenance of utility services in proximity to trees-  
Based on information from National Joint Utilities  
Group (NJUG)

Ideally all services should be placed outside of the trees root protection area, but in some situations this is not feasible due to the confines of the site. If services must be laid within the root protection area acceptable techniques are detailed below in order of preference.

- **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 (e.g. oil or bentonite) should be avoided.
- **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.

#### **Planning of services**

When laying new or replacement services it is wise to plan ahead to prevent future direct damage to the services from root growth by placing the services within a duct.

If roots have grown into a drain or duct and proliferated to cause a blockage, removal of the root mass will only have a temporary affect and the root will regrow. The fault is in the pipe or duct, not the tree roots and the only answer is to repair or replace the damaged area. Particular problems occur with old salt glazed pipes where clay has been used to seal the joints and has subsequently dried out leaving a gap for the roots to infiltrate.

A popular myth has arisen that tree roots are attracted to water or nutrients within piped systems, this is not so. Roots are adventitious and grow in all directions proliferating in areas where moisture or nutrients are present. They tend to grow near to the pipe to make use of the condensation or moisture build up on the outside of the pipe but will enter the pipe through any crack or damaged joint. They are not capable of breaking into sound pipes.





# AllAboutTrees

Arboricultural & Ecological Consultancy  
Chartered Arboriculturalists & Environmentalists

Unit B10 Durham Dales Centre  
Castle Gardens  
Stanhope  
Co Durham  
DL13 2FJ

Telephone 0191 3739494 / 01388 529200 Facsimile 01388 529200

Email – [info@allabouttrees.co.uk](mailto:info@allabouttrees.co.uk)  
[www.allabouttrees.co.uk](http://www.allabouttrees.co.uk)

Registered in England & Wales No. 5301671  
Registered Office: Unit B10 Durham Dales Centre, Castle Gardens, Stanhope,  
Co Durham DL13 2FJ