SELWYN TREES
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Tree Survey

Survey for trees at site:	Westfield House, 47 Victoria Road, Barnsley, S70 2BU
Prepared for:	Emerald Developments Ltd.
Reference	TreeSurvey **0155 (Revised)**
Survey date(s)	19/04/2018
Surveyor (s)	R Selwyn BSc Arboriculture/ R Selwyn BA(Hons)

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‘Tree Location and Root Protection Map Revised’ is attached separately.

‘Tree Shade Map Revised’ is attached separately.

‘Tree Protection Plan Map Revised B’ map is attached separately

1.0 Introduction

1.1 Emerald Developments Ltd engaged Selwyn Trees to advise and draw up Arboricultural impact assessments and method statements with regards to the property 47 Victoria Road, Barnsley, S70 2BU. The brief included drawing up these reports as per BS5837: 2012- 'Trees in relation to Design, Demolition and Construction - Recommendations' to ensure that trees to be retained are protected during any future development.

1.2 A tree assessment survey was carried out to assess the condition of any trees before any development work was applied for. This would be used in relation to planning applications and to accompany and inform of the status and condition of the trees. The tree condition survey assessed the condition of the trees, categorised the trees and provided calculated RPA (Root Protection Area information in accordance with BS 5837:2012). The tree survey and quality of assessment are in Appendix 1.

1.3 Guidelines for an access layout have been prepared for the site.

1.4 We have been provided with the following documents:

- 001-Barnsley- Existing 2 storey building 171215.pdf
- 201- Barnsley- 2 storey building 171215.pdf
- 202-Barnsley-Apartment building 171215.pdf
- 203A-Barnsley-Site layout plan 210318.pdf
- Barnsley- Site location Map.pdf

1.5 The report was compiled by Rachel Selwyn, BSc (Hons) in Arboriculture and Urban Forestry, and who has 5 years' experience working for Selwyn Trees; and was assisted by Richard Selwyn.

2.0 Scope of Report

2.1 The Arboricultural issues in relation to the proposed development at the above site are addressed in this report.

2.2 The purpose of this report is to allow and help the preservation of the trees to be retained within the site in respect to any future proposed developments. The report aims to comment on the arboricultural implications of any proposed development and set out preservation guidelines including tree protection methods, working techniques and construction practices.

2.3 If the principles and guidelines set out in this report are not followed, then there is a risk of damage or death being caused to trees to be retained by construction activities. Any damage caused to trees may result in a decline in health or complete tree failure.

2.4 Any development proposed adhering to the guidelines set out are crucial for the success of the recommendations, which are to be approved and enforced by the Local Planning Authority (LPA). If the recommendations are acceptable then we recommend they should be controlled at key stages of the development.

3.0 Caveats and limitations

3.1 The inspection was carried out from a ground level Visual Tree Assessment. The survey did not include any climbing or investigation beyond what was visible from accessible points from ground level. The report did not include an inspection of the root systems below ground. Digital Scanning Software and other decay detection methods were not available to detect internal decay.

3.2 This report includes an evaluation of the tree(s) on the day the site visit was made. Site visits were made on the 16th and 17th of January 2018, and an additional visit was made on the 22nd March to review findings made by the tree officer on an independent visit. Where access was limited measurements were estimated. This report takes into account findings from all these visits.

3.3 No soil samples were taken

3.4 Any legal descriptions stated or given by the consultant are understood to be accurate.

3.5 Selwyn Trees will not assume responsibility for legal matters that arise from this survey, and will not be required to act as a legal witness to give testimony or attend court unless agreed arrangements are subsequently made.

3.6 The tree condition report is valid only for typical weather conditions. Healthy trees, or parts of healthy trees, may fail at any time. Structural failures occur when the stresses due to the forces acting on a tree exceed the strength of the tree structure or the tree–soil connection supporting the tree. Even a structurally strong tree, free of defects, will fail when a load is applied that exceeds the load-carrying capacity of one or more of its parts. Most tree structural failures involve a combination of structural defects or conditions, such as the presence of decay or poor structure and an unusual or extreme loading event, such as a strong wind. Healthy trees may fail in unusually high or unpredictable winds or violent storms and as the consequences of such weather phenomena are unforeseeable, Selwyn Trees cannot be held liable for any such failures.

3.7 Trees are changeable organisms; their health and condition can change rapidly due to the dynamic nature and other site conditions. Therefore this report is only valid for the 12 month period from the date of the site survey.

3.8 Land managers are responsible for any work on surveyed trees.

3.9 Where similar trees are growing in large groups, their height and diameters may be estimated. Where trees are young in age their measurements may be denoted as ‘young’.

4.0 Site Description

4.1 The site is the land at the property; 47 Victoria Road, Barnsley, S70 2BU. The report was commissioned by Mr M Byrne from Emerald Developments Ltd. The site

consists of a number of mature and early mature trees. A number of small young self-set trees and bushes are also present, which are too small to be of significance, but have been noted. The bushes and self-set trees form dense understory habitats beneath some of the trees, resulting in difficulty accessing and observing such trees. The site borders a neighbouring property to its east, Victoria Road to the South and Sackville Street to the South West. Western Street Motors borders the site to the North and North West. The access to the site is currently via the south entrance driveway from Victoria Road. Another access driveway is present to the west of the site from Sackville Street, but is currently bordered up and not in use. The site has boundary walls around most of its perimeter and Heras fencing in place to prevent access by the public. The main existing building and the existing one storey buildings to the rear of it, are all currently in disrepair. The site has had little to no management in recent years and therefore is overrun with understory plants and shrubs. The existing driveway from the south of the site has been covered by vegetation, and the site in general is derelict and no maintenance work has been carried out on the trees or other vegetation areas in some time. 25 trees within the site are subject to Barnsley Metropolitan Council Tree Preservation Order TPO1 2007. The topography of the site is mostly level, but the ground level appeared to be higher close to the boundary walls.

5.0 Background

5.1 Any development work on the site may detrimentally affect trees to be retained if those trees do not receive protection. The risk of damage to trees both above and below ground needs to be controlled by a strong physical barrier. The ground beneath the trees might be used by traffic or for storage of materials or be excavated, all of these will potentially be detrimental to the root systems.

5.2 The majority of tree roots generally occur in the top 90cm of soil, as at lower depths there is less access to water and oxygen. Contrary to popular belief mature trees do not have large tap roots that obtain water from great depths. Tree roots need to take up water, oxygen and minerals in order to survive. Therefore any compromise to a trees rooting area may affect a tree's stability, ability to function and survival.

5.3 Construction activity can significantly affect the rooting area by compacting soil around trees and thus reducing the pore spaces. Pores are very important in soil for holding water and oxygen. Compaction inhibits root growth and penetration as well as decreasing the oxygen in the soil that is essential for the growth and function of the roots.

5.4 Damage caused to rooting environments can disrupt the balance between the roots and crown established by a tree over many years, and this could be potentially detrimental to the tree health or may compromise the structural integrity or the stability of the tree.

5.5 Possibilities of damage to trees during and following construction processes include direct and indirect damage. Direct damage involves the mechanical physical damage to trees or their roots or roots systems via machinery, soil excavation or hazards such as fire. Indirect damage involves injury that occurs to a tree by activities that take

place near the tree, such as compaction, level changes, soil damage or chemical contamination near the root plate.

5.6 For trees to be retained, light tree surgery work such as crown lifting and/or other tree protection methods along with implemented construction methods can reduce the risk of damage.

5.7 For protecting trees that are to be retained BS 5837:2012 –'Trees in relation to Design, Demolition and Construction' gives guidance on how to manage trees close to proposed works. BS 5837:2012 gives guidance on calculating the Root Protection Area (RPA) around a tree which estimates the area of soil needed to ensure the survival of retained trees.

5.8 The RPA gives guidance on the rooting area needed in order for a tree to survive. Once the RPA around trees to be retained has been set, no entry into the RPA by machinery should be allowed, nor should the RPAs be used for any type of storage or access pathway. Encroaching into a trees RPA should only be undertaken if agreed by the Local Planning Authority LPA. By adopting such measures, lasting damage to existing trees can be avoided and the amenity values can be preserved.

5.9 RPAs may be subject to a 20% offset but on one side only. The offset must be accounted for on the remaining sides.

5.10 Considering the RPA and existing site features (including natural and man-made topography) it is our opinion that; by adopting construction and tree protection techniques that minimise root disturbance, it will be possible to achieve successful construction of a proposed development.

6.0 Arboricultural Issues Relating to future Proposed Developments (Arboricultural Impact Assessment)

6.1 The most significant arboricultural issue on the site relates to any future proposals for new building work and driveways on the site situated close to existing trees.

6.2 The Tree Condition Survey identified approximately 31 trees in total. There were some smaller trees and shrubs on site that were not significant or substantial and hence not included in the survey.

6.3 The main current access route to the site is the existing driveway to the south of the site from Victoria Road. As part of the assessment, access driveways for vehicles, machinery and construction must be planned in order to reduce the impact on retained trees. The access driveways for vehicles and pedestrians must ideally not be within the RPAs of retained trees. The current existing entrance to the site is the main access driveway into the property from Victoria Road, which is in close proximity to trees numbered T6, T7 and T8 in the tree condition survey in appendix 1.

6.4 New tarmac driveways are proposed to run from the entrance at the south of the site, along the east boundary to the north of the site, and from the west of the site towards the existing property. The RPA's of trees T2, T3, T4, T5, T6, T7, and T21, would all be affected by the proposed driveways. The trees on the east boundary in particular (T2, T3, T4, T5, T6 and T7) would be in very close proximity to the proposed driveway. For tree roots to be retained undamaged there must be no excavation, no soil stripping and no grading of the site within the Root Protection Area, ie. no digging. Therefore, in order to protect the existing trees, laying some form of ground protection such as Cell Web which is compliant with BS5837:2012 (see Appendix 4) would be required to reduce the effect of ground compaction from vehicle traffic. No dig construction methods must be used in areas where the RPAs of retained trees are encroached by driveways or car parks. No-dig construction methods adhere to the following principles; roots must not be severed, cut or broken; ground levels must not change (no digging, no soil raising); soil must not be compacted (no tracking of vehicles); and oxygen must be able to diffuse into the soil beneath the engineered surface. In all areas where the RPAs of retained trees are affected by proposed driveways and car parks ground protection such as cell web must be used in order for the proposal to be acceptable. See details on Cell Web for more information in Appendix 4.

6.5 Areas of new car parking are also proposed. The proposed car parking towards the north east of the site, and the proposed car parking close to the entrance driveway to the south east of the site do not affect the RPAs of any retained trees. The proposed car parking close to the west entrance to the west of the site, does affect the RPAs of T21, T27, T28 and T29. T28 and T29 are relatively young trees that can be removed if they obstruct the proposed driveway from the west entrance of the site. These trees are too young to currently be of high significance. The removal of T27 is considered acceptable as it is not a tree of high significance or value. The area of driveway which encroaches into the RPA of T21 must be constructed using no dig methods and geotextile ground protection such as Cell Web must also be used (see appendix 4).

Cellular ground protection systems, such as Cell Web, have a unique cellular structure and perforated cell walls which reduces the vertical load pressures on sub soils to tree roots, therefore preventing damage. With clean granular materials as infill, air and moisture can reach the roots to encourage healthy prolonged growth. This form of ground protection prevents the compaction of sub soils. Cell Web is compliant with BS5837:2012.

6.6 The existing two storey building is proposed to be refurbished, and the single storey building to the rear is proposed to be removed and rebuilt using the same footprints. Passage of vehicles across unprotected soil surfaces must be avoided especially where the soil is wet, as this will cause breakage of surface roots, soil compaction and consequently prevent soil aeration. There must be no compaction of the soil. Therefore suitable ground protection should be in place before any construction or demolition work is carried out. Tree protective fencing around the RPAs of retained trees should be in place before any demolition or construction work is carried out to prevent vehicular access damage. See 'Tree Protection Plan Map Revised B' and the Arboricultural Method Statement.

6.7 As detailed in the tree condition survey (Appendix 1), trees T14 and T15 are situated in very close proximity to the existing building. These trees are unlikely to be suitable for long term retention in such close proximity to a property, therefore their removal is considered acceptable. T15 in particular was observed to have a significant structural defect, with a V- shaped union which could potentially fail in the future, therefore limiting its overall potential contribution. T11 has a cavity on its main stem and therefore does not have a long term future. Therefore this tree has been indicated for removal. T10 also has a cavity on its main stem, therefore it may also not have a long term future therefore its removal is considered acceptable.

6.8 Replacement planting is recommended to compensate for trees required for removal.

6.9 **Tree Retention/Arboricultural Works**

6.9.1 Trees to be retained due to their amenity and environmental value will be retained and protected to ensure their survival and longevity in their environment. Minor works to some of the retained trees have been suggested as part of tree protection methods and/or general tree management i.e. dead wooding/crown lifting. Such works are shown in the Tree Works Schedule in Appendix 3. A number of trees on site are protected by TPOs (Tree Preservation Orders) therefore any proposed tree work on protected trees will require consent from the LPA.

6.10 **Crown Protection**

6.10.1 Pruning or access facilitation pruning may need to be undertaken to complete the proposed works. The trees that have been recommended pruning work for access facilitation are T1, T2, T3, T4, T5, T6, T7, T8, and T21. These trees have low hanging branches which may cause obstructions to vehicle and machinery access. Crown lifting pruning has therefore been recommended. Please see the recommendations in the Tree Condition Survey and the Tree Work Schedule, Appendix 3. Some recommendations have also been made to improve the trees on site. In particular trees with low hanging branches overhanging the pavement and road

have been recommended for crown lifting as part of general maintenance. However these are not necessary to allow development. Details are given in the Tree Works Schedule Appendix 3.

6.11 **Construction Site Access**

6.11.1 Site access is to be via the South of the site via Victoria Road. Any other access roads must be planned so that they do not impede the RPAs of retained trees.

6.12 **Construction Site Layout**

6.12.1 There should be a dedicated construction compound on the site that should not be located within the RPA of any of the trees on or surrounding the site.

6.13 **Construction Site Materials**

6.13.1 Avoid washing out mixers around the edge of the RPA.

6.14 **Planting**

6.14.1 Once a construction proposal design has been agreed, a comprehensive planting scheme should be implemented to sensitively retain the natural environment in response to the trees to be removed.

7.0 Tree Constraints Plan

7.1 The RPA (Root Protection Area) for each tree has been calculated and plotted on the map. The following factors should be taken into account which may change its shape but not reduce its area whilst still providing adequate protection for the root system:

(a) The likely tolerance of the tree to the root disturbance or damage based on factors such as species, age and condition and presence of other trees. (For individual open grown trees only, it may be acceptable to offset the distance by up to 20% in one direction).

(b) The morphology and disposition of the roots, when known to be influenced by past or existing site conditions (e.g. the presence of roads, structures and underground services).

(c) The soil type and structure.

(d) Topography and drainage.

(e) Where any significant part of a tree's crown overhangs the provisional position of tree protection area, these parts may sustain damage during the construction period. In such cases, it may be necessary to increase the extent of tree protection barriers to contain and thereby protect the spread of the crown. Protection may also be achieved by access facilitation pruning. The need for such measures, including the precise extent of pruning is described in the individual tree work schedule under preliminary management recommendations.

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Arboricultural Method Statement

1.0 A summary of Sequenced methods:

The developer's arboriculturalist must be informed of any changes to this schedule:

Pre-development stage

- *Phase 1 Pre- contract meeting*
- *Phase 2 Undertake Arboricultural works:* A tree application will be submitted to the local authority to carry out tree pruning work and tree removals. Once consent has been granted, the removal of trees directly/indirectly impacted by the development can be undertaken, and the pruning of trees will be undertaken, as detailed in Appendix 3 Tree Works Schedule Plan. Ivy will be cut from the trees where specified and ground vegetation will be cleared where specified.
- *Phase 3 Tree Protective fencing.* Protective fencing will be installed as detailed in the 'Tree Protection Plan Map Revised B'
- *Phase 4 Ground protection:* ground protection installed in locations as directed in the 'Tree Protection Plan Map Revised B'

Development Stage

- This stage is subject to site monitoring visits by the developer's arboriculturalist at intervals as agreed at the pre-commencement site meeting. These visits are to ensure that the agreed protection measures are functional and correctly achieving their purpose.
- *Phase 1: Site accessible to demolition and construction traffic*
- *Phase 2: Development*
- *Phase 3: Development completion.*
- *Phase 4: Removal of tree protective fencing*
- *Phase 5: Landscaping*

2.0 Pre-development Stage

2.1 The methodology described follows a logical sequence with reference to British Standard BS 5837:2012- 'Trees in relation to Design, Demolition and Construction – Recommendations' and British Standard BS 3998: 2010 Tree Work- Recommendations National Joint Utilities Group Guidelines. It is important that successful enforcement of the guidance and principles set out are put in place from the offset.

3.0 Phase 1 Pre Contract Meeting

3.1 An onsite meeting will be held with all relevant parties; including the developer, appointed arboricultural supervisor and Local Planning Authority (LPA) representative. The purpose of this meeting is to agree tree works, location of permanent and temporary access, location of site storage, and the location of tree preservation barriers.

The table shows an auditable system detailing specific site events requiring input/supervision as per BS 5837:2012 section 6.3.

Activity	Arboricultural supervision required, and by whom?	Date action undertaken
Undertaking of suggested tree work	Yes by appointed contractor	
Erection of protective fencing	Yes by Arboriculturist and site supervisor	
Installation of temporary ground protection (if deemed necessary)	Yes by Arboriculturist and site supervisor	
Dismantling of protective measures	Yes by site supervisor	

Note: existing planning regulations include the provision for local planning authorities to enforce planning requirements. The project Arboriculturist appointed by any developer can only help monitor site activity. Any enforcement is the responsibility of the local authority.

4.0 Phase 2 Undertake Arboricultural Works

4.1 A number of trees on the site are protected by a Tree Preservation Order (TPO). Some trees require pruning work for access facilitation and some tree removals have also been specified.

4.2 Trees protected by TPO's will need consent from the LPA before any tree work is carried out. An application will be submitted to the council detailing the tree works required.

4.3 Tree work removals and pruning work shall be carried out following consent. The works recommended are shown in Appendix 3 Tree Works Schedule Plan, with some recommendations deemed necessary whether the site is developed or not, especially the removal of poor trees with suspect structural conditions. Some trees on the site are covered in ivy and the ivy will be cut and removed from such trees.

4.4 It is required that tree works to be carried out will be carried out by qualified arboricultural contractors in line with Health and Safety Executive guidelines. All works should be carried out in accordance with British Standard BS3998: 2010 Tree work – Recommendations'.

4.5 Tree work will conform to British Standard BS3998:2010 ‘Tree work-Recommendations’ and will conform to arboricultural best practice. All tree works should be undertaken by professional arboricultural contractors who have appropriate insurance and experience. Any statutory protection will be applied to tree works and unless considered urgent or unavoidable due to health and safety issues are subjected to compliance with relevant wildlife legislation.

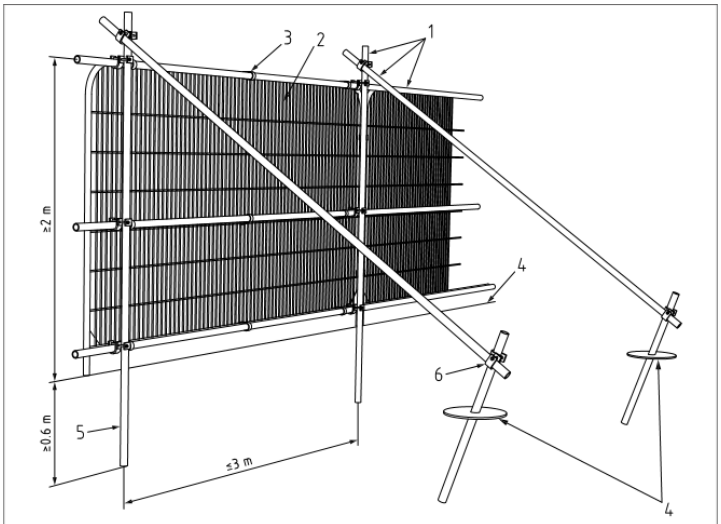
4.6 Any particularly protected species such as nesting birds or bat roosts need particular care, as they are protected under the Wildlife and Countryside Act 1981 (as amended) from harm or killing and applies to active birds nest and roosting or hibernating bats. Nesting birds are protected as soon as they start nesting and constructing nests, therefore unless adequate mitigation is introduced to discourage bird nesting before the start of February no tree work should be programed between mid-February to August.

5.0 Phase 3 Tree Protection Fencing

5.1 Prior to any materials or machinery being brought onto site and before any construction or demolition works, Tree Protection Fencing will be installed and remain in place throughout construction, and only be removed after construction has been completed. The position of the Tree Protection Fencing needs to be as shown and directed in the ‘Tree Protection Plan Map Revised B’.

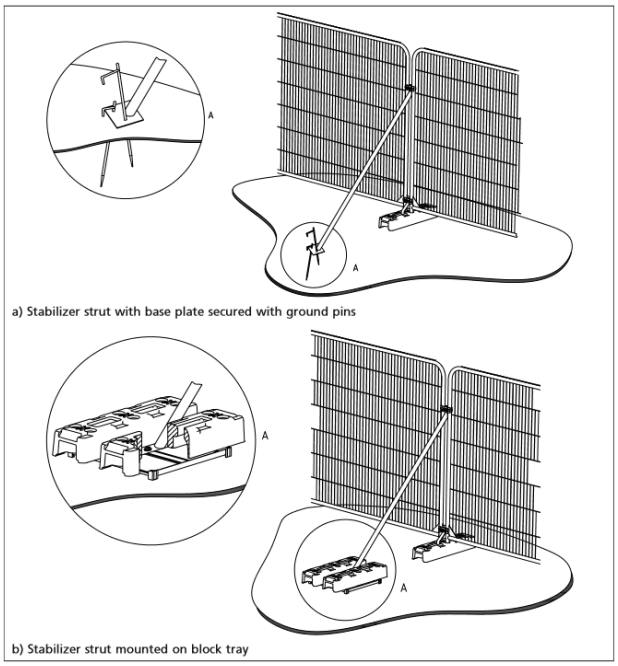
5.2 The Tree Protective Fencing will conform to the default specification shown in section 6.2.2.2 of BS 5837:2012 and the above ground stabilization method will be used as per section 6.2.2.3 of the BS 5837 and is shown below, and in Appendix 4 in this document. The fencing will be positioned appropriately to ensure access ways are not blocked so that emergency vehicles and deliveries can safely access the site.

Fig 1. Protective Fencing



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

Fig 2: Examples of above ground stabilizing systems BS 5837:2012 –Trees in relation to Design, Demolition and Construction



5.3 Vertical barriers will be erected to create a construction exclusion zone. Once installed, the Tree Protection Fencing will not be removed or altered without prior agreement of the arboriculturalist and approval of the Local Authority.

5.4 The Tree Protection barriers installed will be fit for purpose of excluding construction activity. It will be ensured that the barriers remain rigid and complete for the duration of the project.

5.5 The default specification will consist of a vertical and horizontal scaffold framework, well braced to resist impacts, as illustrated in Figure 2. The vertical tubes will be spaced at a maximum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels will be securely fixed. Care will be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots.

5.6 Should any alternative method of barrier construction be proposed, consultation with the developer's arboriculturalist will be obtained to clarify the efficacy of the revised design prior to informing the local planning authority and obtaining their consent.

5.7 Inside the exclusion area of the Protective fencing, the following will apply:

- No mechanical excavation
- No excavation by any other means without having first been approved by the local planning authority and arboriculturalist.
- No ground level changes
- No storage of plant or materials
- No storage or handling of any chemicals
- No vehicular access.

5.8 Fixed to the outside of the fencing will be words such as 'TREE PROTECTION AREA – NO ACCESS OR WORKING WITHIN THIS AREA' See appendix 5. These notices will be fixed to the fencing using suitable fixings such as tie wires and should be A3 in size and laminated.

Fig. 3: Example of Tree Protection site notice (also shown in Appendix 5)



5.9 All site contractors, the site agent and all other personnel will be informed of the Tree Protection fencing and their roles and importance. At all times during construction, a copy of the Tree Protection Plan will be displayed.

5.10 The Protective Fencing will be inspected by the arboriculturalist and no materials will be brought on site and no vehicle access, construction or demolition will be carried out until the Protective Fencing has been inspected.

5.11 RPAs

5.11.1 Based on the tree survey data, root protection areas (RPA's) have been determined for every retained tree. The RPA's are designed to protect at least a functional minimum of tree root mass in order to ensure that the trees survive the construction process.

5.11.2 It is the responsibility of everyone engaged in the construction process to respect the tree protection measures and observe the necessary precautions within and adjacent to them.

6.0 Phase 4 Ground Protection

6.1 Ground protection has been specified in locations shown on the 'Tree Protection Plan Map Revised B'.

6.2 For tree roots to be retained undamaged there must be no excavation, no soil stripping and no grading of the site within the Root Protection Area, ie. no digging. Therefore, in order to protect the existing trees, laying a form of ground protection such as Cell Web, which is specifically designed for protecting ground and is compliant with BS5837:2012 (see Appendix 4), is required to reduce the effect of ground compaction from vehicle traffic. No dig construction methods must be used in areas where the

RPAs of retained trees are encroached by driveways or car parks. No-dig construction methods must adhere to the following principles; roots must not be severed, cut or broken; ground levels must not change (no digging, no soil raising); soil must not be compacted (no tracking of vehicles); and oxygen must be able to diffuse into the soil beneath the engineered surface. See details on Cell Web for more information in Appendix 4.

6.3 Cellular ground protection systems, such as Cell web, have a unique cellular structure and perforated cell walls which reduces the vertical load pressures on sub soils to tree roots, therefore preventing damage. With clean granular materials as infill, air and moisture can reach the roots to encourage healthy prolonged growth.

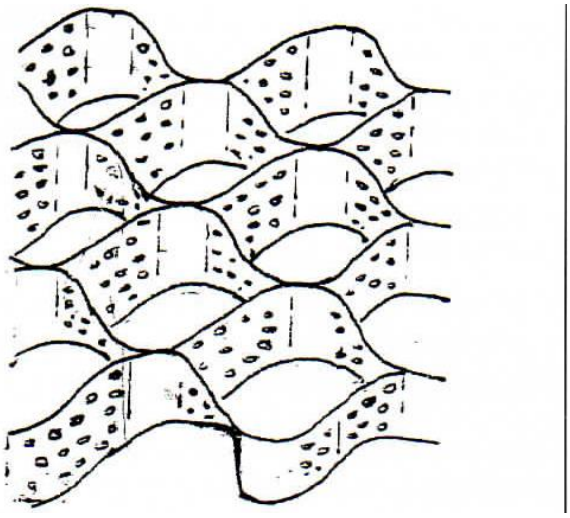
6.4 The manufacturer of Cell Web, Geosynthetics Ltd, provides a full engineering service, including the provisions of surveys, structural designs, CAD Drawings and installation supervision at no extra cost to the client.

6.5 Cell Web features and benefits:

- No dig solution
- Prevents compaction of sub soils
- Complies with BS5837: 2012
- 100% success rate
- Geosynthetics Ltd provide full technical support
- Provides moisture and air paths
- Independently tested
- Environmentally friendly
- Simple to install

Information for the supplier is shown below:
http://www.geosyn.co.uk/product/cellweb-tree-root-protection

Fig. 4. Diagram of 3-dimensional load spreader, (such as Cell Web) from Arboricultural Practice Note 12, (2007)



6.6 The installation of the ground protection will be overseen by the arboriculturalist. No materials will be brought on site and no vehicle access, construction or demolition will be carried out until the ground protection has been installed and inspected.

7.0 Development Stage

7.1 This stage is subject to site monitoring visits by the arboriculturalist at intervals as agreed at the pre-commencement site meeting. These visits are to ensure that the agreed protection measures are functional and correctly achieving their purpose

8.0 Phase 1: Site accessible to demolition and construction traffic

8.1 Avoiding crown and stem damage:- Planning of site operations will take sufficient account of wide loads, tall loads and plant with booms, jibs and counterweights (including drilling rigs), in order that they can operate without coming into contact with retained trees. Such contact can result in serious damage to the trees and might make their safe retention impossible. Consequently, any transit or traverse of plant in proximity to trees will be conducted under the supervision of a banksman, to ensure that adequate clearance from trees is maintained at all times.

8.2 All demolition debris comprising of building materials (concrete, bricks, corrugated sheets etc.) will be removed from the site. Storage will be beyond tree protection barriers and no top or sub-soil is to be removed within the Tree Protective Fencing. No soil should be piled into areas within Tree Protective Fencing.

8.3 Underground service and drainage service routes shall be located beyond the RPA of all trees retained. Any excavation for services within the tree protection area will be undertaken following the guidelines published by NJUG Guidelines for the planning, Installation and Maintenance of Utility Apparatus in proximity to trees.

8.4 If the service runs are located within the RPA due to engineering difficulties post permission, the route will be designed to be as far away from any of the trees and all possible trenchless techniques are considered.

8.5 An Arboricultural Officer or Consultant must supervise if a trench has to be excavated within the area designated as the RPA. It must be remembered that hand digging is time consuming and efficiency is often compromised due to the space and size needed to install the piping, ducting or actual service run within the trench. Air excavation needs to be considered when locating services within the RPA as this minimises damage caused to root systems.

8.6 Development notes from BS 5837: 2012

8.6.1 To avoid disturbance to the physical protection, it is essential to make allowance for, and plan, all construction operations which will be undertaken in the vicinity of trees. Factors that need to be considered include, but are not limited to:

a) Site construction access;
b) The intensity and nature of the construction activity;
c) Contractors' car parking;
d) Phasing of construction works;
e) The space needed for foundation excavations and construction works;
f) The availability of special construction techniques;
g) The location and space needed for all temporary and permanent apparatus and service runs, including foul and surface water drains, land drains, soakaways, gas, oil, water, electricity, telephone, television or other communication cables;
h) All changes in ground level, including the location of retaining walls, steps and making adequate allowance for foundations of such walls and backfillings;
i) Working space for cranes, plant, scaffolding and access during works;
j) Space for site huts, temporary toilet facilities (including their drainage) and other temporary structures;
k) The type and extent of landscape works which will be needed within the protected areas, and the effects these will have on the root system;
l) Space for storing (whether temporary or long-term) materials, spoil and fuel and the mixing of cement and concrete;
m) The effects of slope on the movement of potentially harmful liquid spillages towards or into protected areas.

9.0 Phase 2: Development

9.1 The existing 2 storey building is to be refurbished and the existing one storey building is to be removed and rebuilt using the same footprints. The removal of the single storey building must only commence after tree protective fencing and ground protection have been laid in the relevant RPA areas.

10.0 Phase 3: Development completion

10.1 All materials, vehicles, storage facilities removed from site and all development completed before tree protective fencing is removed.

11.0 Phase 4: Removal of tree protective fencing

11.1 Remove tree protective fencing after development is completed, as agreed by the arboriculturalist.

12.0 Phase 5: Landscaping

12.1 Landscape operatives to be briefed and landscaping implemented. A comprehensive planting scheme will be implemented to sensitively retain the natural environment in response to the trees to be removed. Planting schemes will also be designed to promote the existing natural environment which is in line with the current Green Infrastructure and Tree strategies developed by local councils.

13.0 Conclusion

13.1 All retained trees shall be protected before and during any construction as per the fencing detail and the arboricultural supervision measures outlined. Tree protection in addition to the Arboricultural supervision measures detailed will ensure no significant root disruption will occur to trees shown for retention during enabling works or construction.

13.2 There are no significant arboricultural reasons that preclude any proposed construction as a whole on the site. However, ground protection is required for some individual trees on the site, which have been indicated in the 'Tree Protection Plan Map Revised B'. Further detail on these trees are given in the following sections.

14.0 Additional information for hard surfacing from BS 5837

Types of hard surfaces and their suitability in proximity to trees:

General
If a hard surface is proposed above the granular material, a permeable and gas-porous finished surface (wearing course) should be installed.
In some situations, consideration should be given to constructing the final surface prior to the main building works, so as to provide protection for the roots at subsequent stages. However, it may be desirable to protect the final surface from drainage with a temporary covering.

Washed gravel
Washed gravel retains its porosity unless excessively consolidated and is particularly useful where changes of level occur or an irregular shape is needed around the stem of a tree. Gravel is easily renewed or topped up. Although weeds may become established, they can be controlled by chemical or mechanical means.
However, gravel is rarely suitable for use where there is vehicle or pedestrian traffic for example, in residential areas. Materials with a high fines content, such as binding gravels or hoggin, should not be used due to their almost impermeable texture when consolidated.

Paving slabs and block pavers
Paving slabs and block pavers are available with built in infiltration spaces between the slabs or blocks. These are ideal, though they should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

In situ concrete
As in situ concrete forms an impermeable surface, falls and openings should be provided for water and air to enter the soil. This can be achieved by forming 50mm diameter holes in the construction of a slab at regular spacing's of 300-600mm (as determined by an engineer) and back-filling the resulting holes with no-fines gravel or aggregate. A high standard of material and workmanship is needed if frost damaged and excessive wear are to be avoided.

Bitumen paving
Bitumen paving can consist of porous or impermeable material. As the interstices in unsealed tar paving will eventually become blocked by silt, all such paving should be laid following the same principles as those for impermeable surfaces. Its use within the RPA should, therefore, be restricted to the following parameters: *new impermeable surfacing within the RPA should be restricted to a maximum width of 3m and situated tangentially to one side of a tree only, or confined to an area no greater than 20% of the RPA whichever is smaller.*

Edge supports
The excavation needed for the placement of kerbs, edgings and their associated foundations and haunchings can damage tree roots. Within the RPA, this should be avoided either by the use of alternative methods of edge support or by not using supports at all.
For example, where kerbing is required for light structures, such as footpaths, peg and board edging may be acceptable. For more substantial structures, such as estate roads, railway sleepers may be acceptable, retained in place with track pins or road pins. In some situations, for example where the roadway needs to traverse a lateral slope, gabions could be used to provide a kerbing solution (in this example, the gabions are installed on the down-hill side of the road). Gabions can be inter-linked, or pinned in place. Where it is necessary to pin

kerbing in place, the pins should, where practical, be located clear of any major tree roots visible on the surface.

Appendix 1

Arboricultural survey and Root Protection Area Plan and BS 5837:2012 Chart for Tree Quality Assessment

BS 5837: 2012 Pre-development Tree Condition Survey

At: 47 Victoria Road, Barnsley, S70 2BU

Prepared for: Emerald Developments Ltd

Prepared by:

Rachel Selwyn, Richard Selwyn

Dated: 19th April 2018

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1.0 Introduction

2.0 Instructions and Brief

2.1 The brief was to undertake a tree survey in accordance with British Standard BS 5837:2012 'Trees in relation to design, demolition and construction: Recommendations'.

2.2 Plans supplied by the client were:

- 001-Barnsley- Existing 2 storey building 171215.pdf
- 201 – Barnsley – 2 storey building 171215.pdf
- 202-Barnsley-Apartment building 171215.pdf
- 203A-Barnsley-Site layout plan 210318.pdf
- Barnsley- Site location Map.pdf

2.3 The site was surveyed by Selwyn Trees on the 16th and 17th of January 2018 and an additional visit was made on the 22nd March to review findings made by the tree officer on an independent visit. A detailed inventory of the trees was undertaken. The survey is based on the conditions found on the day(s) and based on the findings of the visit. Quantitative data is provided on tree species, height, diameter, age class, crown spread, British Standard category, crown clearance and brief assessment on tree condition and future potential. Trees found to be structurally dangerous or in poor condition are identified.

2.4 With regards to British Standard BS 5837:2012 'Trees in relation to design, demolition and construction- Recommendations' a calculation has been made for the theoretical Root Protection Areas (RPA) in metres.

2.5 This survey should be regarded as an initial assessment and appraisal of the trees on the site and gives outlines of construction practices around trees to BS 5837:2012 'Trees in relation to design, demolition and construction- Recommendations'

2.6 The location of the trees is shown in the attached map plan. A map showing shade created by the trees is also attached separately.

2.7 Information recorded in the survey includes:

Survey Reference number- Recorded on Tree Survey and tagged on the tree

Species - Species identification is based on visual observation with the common English name given first and the botanical name give in italics. If the species was not identified it is marked with Unidentified.

Tree Heights – These were measured in metres using laser technology. Where access was limited or there was little visibility due to overcrowding heights were estimated.

Stem Diameters – Measured using diameter tape in mm. In the case of grouped trees the largest diameter was recorded.

Crown Spread - The crown spread was measured in meters in the North, South, East and West directions. Where access was limited crown spread was estimated.

Crown Clearance - the height of the first significant branch was measured. Where access or visibility was limited this was estimated.

Age class – trees were recorded as young, semi-mature, early mature, mature, over mature as prescribed in BS 5837:2012.

Condition – tree condition was recorded briefly particularly in respect to structural and/or physiological condition (eg. The presence of decay, physical defects and/or preliminary management recommendations)

Where trees are grouped or in case of woodlands, the condition stated will be typical of the feature. Groups of trees and woodlands are represented and the RPA will be included in the total area shown. The RPA will be calculated by taking an average measurement of stem diameter.

Estimated Remaining Contribution/ Life Expectancy – estimated (eg. Less than 10, 10-20, 20 - 40, 40+)

Retention Category- Corresponds with BS 5837:2012

A - Trees of high quality and value, including visual amenity (sub categories 1, 2, 3). It is usual for such trees to be retained unless the planning merits of a particular scheme or lay-out override.

B – Trees of moderate quality and value, including visual amenity value (sub categories 1, 2, 3). Such trees should be considered for retention

C – Trees of low quality and value including visual amenity (sub categories, 1, 2, 3)

U – Trees in such a condition that they cannot be realistically retained as living trees in the context of the current land use for longer than 10 years

Sub categories – trees in categories A to C will qualify under one or more of three sub categories (1, 2, 3). Sub categories 1, 2 and 3 are intended to reflect arboricultural and landscape qualities, and cultural values, respectively. This is set out in Appendix 2.

The tree survey lists which sub category applies. Each sub category is intended to have equal weight such that, for example, an A1 tree has the same retention priority as an A2 tree. Some trees could qualify under more than 1 criterion.

Physiological condition

Those trees marked ‘Good’ can generally be classed as having good overall structural and physiological condition. They usually contribute significantly to the local or site amenity.

Those trees marked ‘Fair’ can generally be classed as having reasonable structural and physiological condition. They may contain smaller areas of included bark within either major or minor fork junctions. They may be subject to single or multiple fungal invasions, bacterial or virus. They may be subject to minor crown dieback, unusually pale or smaller foliage or have been subjected to outside influences such as restriction of rooting spread, vandalism or mechanical damage, but should be viewed as in generally good overall condition.

Those trees marked 'Poor' can generally be classed as having poor overall structural or physiological condition. They may contain large areas of included bark either within major fork junctions. They may be subject to single or multiple fungal invasions, bacteria or virus. They may contain splits or cracks throughout the branching structure. They may be subject to significant crown dieback or exhibit unusually pale or small foliage. They may be subject to outside influences such as restriction of rooting spread, vandalism or mechanical damage and costly to retain.

Root Protection Area (RPA) –All trees in retention categories A, B and C have their RPA calculated and the RPA figure given represents the radial distance, from the trees trunk, at which barriers should be erected. The calculation for the RPA is as per section 4.6 of BS 5837:2012.

For single stem trees, the RPA should be calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods below should be used. In all cases, the stem diameter(s) should be measured in accordance with Annex C, and the RPA should be determined from Annex D. The calculated RPA for each tree should be capped to 707 m2.

a) For trees with two to five stems, the combined stem diameter should be calculated as follows:

$$\sqrt{(Stem\ diameter\ 1)^2 + (Stem\ diameter\ 2)^2 \ldots + (Stem\ diameter\ 5)^2}$$

b) For trees with more than five stems (not illustrated in Annex C), the combined stem diameter should be calculated as follows:

$$\sqrt{(mean\ stem\ diameter)^2\ x\ number\ of\ stems}$$

N.B. Where all stem diameters were not accessible, this averaging formula has been adopted.

The RPA for each tree should initially be plotted as a circle centred on the base of the stem. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.

Any deviation in the RPA from the original circular plot should take account of the following factors whilst still providing adequate protection for the root system: a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus); b) topography and drainage; c) the soil type and structure; d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.

3.0 Observations and Comments

3.1 The Site

3.1.2 The site is the property at 47 Victoria Road, Barnsley, S70 2BU. The site consists of several trees. Victoria Road lies to the south and is also the main access route into the property. Approximately 31 trees were identified. A number of smaller understory

self-set trees and shrubs were also present, but were not measured as they were not significant.

3.2 The Trees

3.2.1 Approximately 31 trees were identified on the site. Most of the trees on the site were categorised as B or C. Trees were surveyed if they had a stem diameter above 75mm as per the BS 5837: 2012 guidelines. Trees with stem diameters less than this are classed as too young to be significant. Such trees may be removed. Trees present on the site vary in age from semi-mature to mature. The trees present on the site add to the visual amenity of the area.

3.2.2 The trees have been categorised as to their condition and quality, and this can be used as a guide when determining any trees to be removed. Category A trees are trees of high quality and should if at all possible be considered for retention and incorporated into any planning designs. Category B trees are trees of moderate quality with moderate amenity value. Such trees should be considered for retention but removal may be acceptable if the planning merits of a particular scheme override. Category C trees are generally of low quality and can be removed if desired. However, whilst such Category C trees are of low quality as individuals, they may have a greater wildlife value when present in groups. Therefore the removal of large numbers of such trees should be considered as to the impact on the local environment. Some trees have been specified for removal due to being dead or in poor condition.

3.2.3 It should be noted that there are a number of Category B trees on this site and the removal of all such trees will have an impact on the amenity value of the area and wildlife habitat. It is therefore recommended that whilst the removal of some category B trees may be acceptable, such trees should be retained if possible.

3.2.4 The proposal plans for the site include refurbishment of the existing two storey building, and the removal and rebuilding of the one storey building to the rear. T1 is situated relatively close to the rear building to be removed and rebuilt. Protective fencing should be placed around the RPA of the tree before any construction work starts. The trees running down the east of the site, T2, T3, T4, T5, T6 and T7 will all have their RPAs affected by the proposed driveway. Therefore the driveway should be constructed with a no-dig method and use geotextile ground protection such as Cell Web. See the ‘Tree Protection Plan Map Revised B’, Arboricultural Method Statement and Appendix 4 for more details.

3.2.5 The other trees also affected by the proposed driveways and car parks are T21, T27, T28 and T29. T28 and T29 are relatively young trees that can be removed. These trees are too young to currently be of high significance. The removal of T27 is considered acceptable as it is not a tree of high significance or value. The area of driveway which encroaches into the RPA of T21 must be constructed using no dig methods and geotextile ground protection such as Cell Web must also be used (see appendix 4).

3.2.5 T1, T2, T3, T4, T5, T6 and T7 will require access facilitation pruning work to allow vehicle and machinery access to the development without damaging these trees. T21 will also require access facilitation pruning work as branches grow over the proposed west access driveway. Crown lifting these trees to create 4m of ground clearance over

the proposed driveway areas has therefore been recommended (See appendix 3 Tree Works Schedule). T3, T4, T5 and T6 also have branches which reach to and over the existing two storey building, so tip reduction pruning of the west branches has been recommended to manage the trees during the proposed refurbishment of the building.(See appendix 3 Tree Works Schedule). Any tree work should conform to British Standard BS3998:2010 'Tree work-Recommendations' and should conform to arboricultural best practice. All tree works are to be undertaken by professional arboricultural contractors who have appropriate insurance and experience.

3.2.5 As a general observation the trees on the site appear to have had little maintenance in recent years, and therefore general tree maintenance work has been identified for some trees on the site (See appendix 3 Tree Work Schedule). Many of the trees were ivy clad, some with significant amounts of ivy growing on them. The ivy makes trees difficult to inspect as it can conceal hidden defects. A number of trees also had thick understory shrubs and vegetation growing around their bases, which also made inspection of the trees very difficult. It is recommended that ivy is severed, or removed, from the affected trees, and that the areas around the bases of trees cleared of vegetation. Then re-inspection of some of the most affected trees can be undertaken if necessary. There are a number of self-set trees and plants on the site, which are of low value and may be removed as part of maintenance and management of the site.

3.2.6 A number of trees are not affected by the current proposals. However, general management and maintenance has been recommended for some trees on the site. In particular the trees bordering Victoria Road to the south of the site have branches overhanging the boundary therefore some crown lifting has been recommended. See Appendix 3 Tree Works Schedule for full details of tree works.

3.2.7 Trees T14 and T15 are situated very close to the existing two storey building (approx. 3m). They are both very large and mature. Such mature trees are generally unsuitable to be positioned so close to buildings, as they have large spreading crowns which can cause conflict with structures. Additionally, T15 was observed to have a significant V-shaped union between its two main stems. V-shaped unions have the possibility of failure because the wood in the union is more weakly attached. Therefore it's unlikely that these trees have long term futures because they are in unsuitable positions with regards to the existing building, and T15 has the possibility of failure due to its structure. Removal of these trees would therefore be considered acceptable.

3.2.8 T11 was noted to have a cavity with some decay present. This tree can therefore be removed. T10 also has a cavity on its main stem, therefore it may also not have a long term future therefore its removal is also considered acceptable.

3.2.9 Some trees require monitoring due to their conditions or defects present. Such trees have been indicated in the Tree Works Schedule (Appendix 3).

3.2.9 Overall, we feel that construction on the site as a whole is possible if the current tree merits can be incorporated into the designs.

3.2.10 We recommend that a replanting scheme should be designed to compensate for those trees removed. It is envisaged that such a policy will provide for a more effective long term safeguarding of tree amenity in the area.

4.0 Conclusions

4.1 The proposal is considered to be acceptable from an arboricultural perspective if the existing tree merits can be incorporated into the building designs. In particular, the RPAs of existing trees that have proposed driveways and car parks running through them should be protected from excessive compaction as discussed. Such areas must be constructed using no-dig methods and use a specially designed geotextile form of ground protection, such as Cell Web, to protect the tree roots from compaction. The removal of T14 and T15 is considered acceptable as their positions and structures limit their overall future contribution. The removal of T27, T28 and T29 is also considered acceptable as these trees are not of high value. T10 and T11 are also noted for removal due to them both having cavities which limit their overall future contribution. Facilitative access pruning of trees growing over proposed driveways, towards the existing buildings and proposed developments has been recommended to create appropriate clearance. Such recommendations have been given in the Tree Condition Survey and the Tree Works Schedule (Appendix 3). As a number of trees are covered by TPOs (Tree Preservation Orders), consent will have to be obtained from the LPA before tree work can be carried out. Such pruning work should be managed sensitively in accordance with BS3998:2010 Tree Work Recommendations. Of course, there may always be some conflict between trees and proposals, but if trees can be incorporated into planning designs, then the effect of buildings and construction on trees and vice versa may be limited.

4.2 A replanting scheme should be designed to compensate for trees removed. It is envisaged that such a policy will provide for a more effective long term safeguarding of tree amenity in the area. The enhancement of the natural environment as per the strategies set out by the local council, should also be incorporated into the planning designs.

Tree Condition Survey.

The Map ‘Tree Location and Root Protection Map Revised’ is attached separately.

The Map ‘Tree Protection Plan Map Revised B’ is attached separately.

5.0 Tree Condition Survey Key:

U = Red

A = Green

B = Blue

B/C = Yellow

C = Grey

DBH – Diameter at Breast Height

Est. Remain. Cont. = Estimated remaining contribution

Some trees were measured as clumps therefore the lengths and depths of these groups were measured instead of N, S, E, W crown spread. For such groups, the lengths were inputted into 'N' sand the depths were inputted into 'E'.

Where access was limited, measurements were estimated.

H = indicates part of a hedge and the measurements are grouped as a hedge

G = indicates shrubs and measurements were taken as part of a group

Some trees may be given two categories.

Ref.	Species	Latin	Age Class	Est. Remain. Cont.	BS		Tree height (m)	Stem DBH (mm)	No. stems	Crown Spread (m)				Crown clear (m)	Structural condition	RPA radius (m)	RPA area m²	Additional comments	Recommendations
					Cat.	Sub. Cat.				N	S	E	W						
T1	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	1	11.76	610	1	6.5	5.9	6.7	6.5	0.6W	Fair	7.3m	168.4	The tree is mature and is ivy clad. Epicormic growth is present at the base of the tree. The main structure of the tree is obscured by ivy. The tree is situated on slightly raised ground, and mounding was observed around the base of the tree. Understory shrubs are present beneath the tree canopy. The tree has a large spreading crown; it has had little maintenance in recent years.	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from the ground and crown clean to remove deadwood as part of general maintenance. Inspect biennially.
T2	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	15.5	560	1	3.5	3.5	1.9	4.1	5W	Fair	6.7m	141.9	The tree is ivy clad and therefore it is difficult to observe the structure. The tree is situated on the boundary, with some branches overhanging into the neighbouring property. The tree has previously been "topped", resulting in several shooting upright branches. Such branches can be weakly attached therefore should be monitored for signs of failure. The tree has an upright structure and a slightly unbalanced crown, and has thick vegetation underneath it.	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from the ground and crown clean to remove deadwood as part of general maintenance. Inspect biennially.
T3	Beech TPO 1	*Fagus sylvatica*	Mature	20-40	B	2	19.5	600	1	9	5.3	4.6	6.3	5.5N	Fair	7.2m	162.9	Some ivy is present on the tree making it difficult to observe the structure. The tree has a large spreading crown which overhangs the boundary into the neighbouring property and overhangs the roof of the building on the site. The top of the crown was observed to be leaning slightly towards the boundary, and the tree is situated on slightly raised ground. A large wound that has healed effectively was observed.	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from over the proposed driveway and crown clean to remove deadwood as part of general maintenance. Tip reduction pruning to create 3m clearance from the roof the development in order to facilitate construction access. Inspect biennially.
T4	London plane TPO 1	*Platanus x hispanica*	Early Mature	10-20	C	2	14.0	465	1	3	5.8	9	3.5	4NE	Fair/Poor	5.6m	97.8	The tree is ivy clad and is suppressed by the neighbouring trees. It is situated on slightly higher ground level. The tree has been previously "topped" and	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m

																		therefore has several upright stems in the main canopy. The tree is leaning slightly towards the neighbouring property. as it is suppressed by neighbouring trees it may not have a long term future	clearance from over the proposed driveway and crown clean to remove deadwood as part of general maintenance. Tip reduction pruning to create 3m clearance from the roof of the development in order to facilitate construction access. Inspect biennially.
T5	London Plane TPO 1	*Platanus x hispanica*	Mature	20-40	B	2	16.0	550	1	3.5	7.0	8.0	4.8	6E	Fair	6.6m	136.9	The tree has a large spreading crown and is ivy clad which is obscuring the structure. The tree has codominant stems. Branches are overhanging the boundary towards the neighbouring property. Branches are also leaning on the building on the site and the tree is leaning towards the building. Overall the tree appeared quite balanced.	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from over the proposed driveway and crown clean to remove deadwood as part of general maintenance. Tip reduction pruning to create 3m clearance from the roof of the development in order to facilitate construction access. Inspect biennially
T6	London Plane TPO 1	*Platanus x hispanica*	Early mature	20-40	B	2	16.0	470	1	2.5	5.8	4.5	6.0	4E	Fair	5.6m	99.9	The tree has reaching branches touching the house and overhanging into the neighbouring property. Some deadwood and broken branches are present. Thick understory shrubs present around the tree making access difficult to inspect. Tree is leaning slightly SW	Clear understory shrubs to aid future inspections. Crown lift to create 4m clearance from over the proposed driveway and tip reduction pruning to create 3m clearance away from the roof of the development to facilitate construction access. Inspect biennially
T7	London Plane TPO 1	*Platanus x hispanica*	Early mature	20-40	B	2	15.2	540	1	2.5	6.9	5.0	5.5	3W	Fair	6.5m	131.9	The tree has a spreading crown, with branches overhanging boundary into neighbouring property. The tree has a busy crown, which may require future management. Some ivy is present on the tree and thick understory shrubs are present around the base, making inspection difficult.	Clear understory shrubs and Sever 1m band of ivy at base of tree to aid future inspections. Crown lift to create 4m clearance from over the proposed driveway to facilitate construction

																		access. Inspect biennially
T8	London Plane TPO 1	*Platanus x hispanica*	Mature	20-40	B	2	18.6	590	1	1.4	3.0	7.5	5.4	4E	Fair	7.1m	157.5	The tree is situated on border with the road. The tree has an unbalanced crown. The crown is also quite busy. Pendulous branches are present overhanging the driveway and road. Some ivy is present. Tree is situated on slightly higher ground than level of the site. Understory holly trees are present next to it. Tree is leaning slightly in an east direction.	Crown lift pendulous branches over road and over driveway to create 4m clearance from the ground to facilitate construction access. Sever 1m band of ivy at base of tree and clear vegetation around the base of the tree to aid future inspections. Inspect biennially
T9	Beech TPO 1	*Fagus sylvatica*	Mature	20-40	B	2	23	660	1	6.5	5.5	4.8	6.0	2.5N	Fair	7.9m	197.1	The tree has a fair structure. A large wound that is healing is present on the main stem. This cavity should be monitored as it extends into the main trunk of the tree. Branches overhang the road. Some deadwood and some crossing and rubbing branches are present in the crown, therefore the crown appears quite busy.	Monitor cavity annually extending into the main stem of the tree. Crown lift low hanging branches overhanging the road to create 4m clearance from the road. Inspect biennially.
T10	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	C	2	19.2	515	1	4.7	5	5.5	3.2	6N	Fair	6.2m	120.0	The tree has a spreading crown with branches overhanging the road. A bulging growth is present at the base of the tree on the west side. There was no mounding observed around the base of the tree. A cavity is present on the south side of the stem approximately 2m above the ground. The tree crown and structure appeared to be in a fair condition. The cavity indicates that there may be decay present, which may progress in time. Therefore the tree should be monitored regularly. A smaller wound is also present on the north side of the main stem approximately 2-3m above the ground.	Tree has a large cavity on the main stem. Removal is acceptable as the decay will likely progress limiting the trees overall future contribution.
T11	Lime TPO 1	*Tilia x europaea*	Early mature	10-20	U		16.7	440	1	3.0	5.0	3.6	3.2	2S	Poor	5.3m	87.6	A cavity is present on the SE side of the main stem, indicating the presence of some decay. The tree is situated close to the boundary with the road. Branches are overhanging the road. Some deadwood is present in the canopy and some hanging deadwood is present. Sprouting	Remove tree due to decay present.

																	epicormic growth is present at the base of tree, obscuring the base of the tree from detailed inspection.	
T12	Sycamore TPO 1	*Acer pseudoplatanus*	Early mature	20-40	B	2	15.2	370	1	4.3	4.8	3.5	5.5	7NW	Fair	4.4m	61.9	Some ivy is present on the tree, and understory shrubs are present around the base of the tree. A small mound is present on south side of tree. Tree has a straight stem, and future growth can be expected	Sever 1m band of ivy at base of tree to aid future inspections. Monitor biennially
T13	Sycamore TPO 1	*Acer pseudoplatanus*	Semi-mature	10-20	C	2	16.15	310	1	3.3	2.3	3.2	4.8	6E	Fair	3.7m	43.5	The tree is single stemmed and tall. The tree is being crowded and confined by neighbouring trees. As a result its structure and crown spread is suppressed, and therefore is not significant in comparison to neighbouring trees. Some ivy is present on the tree and some deadwood is present.	Sever 1m band of ivy at base of tree to aid future inspections. Crown clean to remove deadwood. Inspect biennially
T14	Beech	*Fagus sylvatica*	Very mature	10-20	B	1	18.6	598	1	4.0	6.7	7.4	5.8	1E	Fair	7.2m	161.8	The tree is very large and is situated in close proximity to the existing building (approx. 3.2m). Some deadwood is present and the tree is situated on sloping ground. The tree is crowding and growing over the property as it has a large spreading crown. The tree likely has had little to no management in recent years. A tree of this size would likely be unsuitable in such close proximity to an occupied property. Therefore it may not have a long term future.	Tree is mature and is very close to property, therefore would be unsuitable if the property were to become occupied and become a high risk target. Therefore removal would be acceptable.
T15	Beech	*Fagus sylvatica*	Very mature	10-20	C	1	25.0	740	1	7.1	4.0	4.5	9.5	1E	Poor	8.9m	247.8	The tree has a large V-shaped union between its two main stems. The stems have merged and trapped the bark between them. V-shaped unions are weaker than U-shaped unions because the wood is more weakly attached, therefore failure is possible. The tree is situated very close to the property (3.0m) and is leaning towards the property. The tree has a large crown which is spreading over the property.	The significant V-shaped union poses a possible risk of failure. The tree would be unsuitable in such close proximity to an occupied property. Therefore it may not have a long term future and therefore removal would be acceptable.
T16	Horse Chestnut TPO 1	*Aesculus hippocastanum*	Mature	20-40	B	2	14.3	630	1	4.5	7.0	4.5	5.0	2S	Fair	7.6m	179.6	The tree is leaning slightly towards the road, and branches overhang the boundary towards the road. The tree is situated on slightly raised ground. Some deadwood is present in the crown and lots of understory vegetation	Clear understory vegetation around the tree to aid future inspections. Crown lift low hanging branches over road to create 4m clearance from the

																		surround the tree making inspection difficult. Some bleeding is present on the main stem of the tree, possibly indicating an early sign of horse chestnut bleeding canker. The tree still appeared to be in a fair condition but should be monitored regularly for any deterioration.	road. Monitor annually for any deterioration in condition from suspected Horse chestnut bleeding canker.
T17	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	11.8	435	1	5.0	5.0	3.5	3.0	3S	Fair	5.2m	85.6	Branches overhang the road and lots of understory shrubs surround the base of the tree, making inspection difficult. Some deadwood is present in the crown. Overall fair condition	Clear understory vegetation around the tree to aid future inspections. Crown lift low hanging branches to create 4m clearance from over road. Inspect biennially
T18	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	17	480	1	5.5	5.0	5.5	3.2	4S	Fair	5.8m	104.2	Tree is set in from the boundary slightly. A small cavity is present on west side of the main stem approximately 3m from the ground. Its crown is slightly confined by neighbouring trees. Overall fair.	Inspect biennially
T19	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	18.5	550	1	9.5	5.5	9.9	6.0	3W	Fair	6.6m	136.9	Some sprouting epicormic shoots are present at the base of the tree. The top part of stem was observed to be leaning east. Understory vegetation is present around the base making inspection difficult. The tree leans away from the road. A small healing cavity is present on SW side of the main stem. Spreading branches spread into the site (east). The tree has very large spreading lateral branches. Some deadwood is present in the crown	Clear understorey vegetation to aid future inspections. Inspect biennially
T20	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	17.5	480	1	6.3	5.0	4.2	3.5	3S	Poor	5.8m	104.2	The tree is very ivy clad. The stem separates into 3 stems approx. 3-4m high. The stems are leaning east away from the road, but some branches do overhang the road. The tree is situated on slightly higher ground and is slightly confined by neighbouring trees. The stems are upright, therefore there may be V-shaped unions, but these are obscured by ivy, therefore an inspection of the unions was not possible. Some epicormic growths are present	Sever 1m band of ivy at base of tree to aid future inspection. Re-inspect unions when ivy has been cleared. Inspect annually. Crown lift branches overhanging road to create 4m clearance.

																		sprouting from the base of the tree.	
T21	Ash TPO 1	*Fraxinus excelsior*	Early mature	10-20	C	2	17.5	460	1	5.0	6.0	2.3	5.0	3W	Poor	5.5m	95.7	The tree is almost entirely covered in ivy, and appears smothered by it. The structure was very difficult to inspect due to the thick ivy. Some deadwood was observed.	Sever 1m band of ivy at base of tree and re-inspect tree. Crown lift low hanging branches to create 4m clearance from over the new proposed driveway. Inspect annually
T22	Sycamore TPO 1	*Acer pseudoplatanus*	Early mature	20-40	B	2	11.8	358	1	4.1	3.8	2.8	5.0	3S	Fair	4.3m	58.0	Tree is slightly crowded by neighbouring trees and has a fair structure.	Inspect annually
T23	Sycamore TPO 1	*Acer pseudoplatanus*	Early mature	20-40	B	2	10.5	290	1	2.4	2.4	3.3	5.0	5N	Fair	3.5m	38.1	The tree is suppressed by neighbouring trees, and has a slightly unbalanced crown. Ivy is present on the main stem, making inspection of the main stem difficult.. The tree is leaning north.	Sever 1m band of ivy at base of tree to aid future inspections. Inspect biennially
T24	Lime TPO 1	*Tilia x europaea*	Early mature	20-40	B	2	10.5	335	1	4.2	3.7	4.2	4.0	1.5E	Fair	4.0m	50.8	The tree is situated close to the boundary and branches overhang the boundary. The tree is codominant at 2m high, and the union appeared okay. Some deadwood was observed and some crossing branches were observed. The tree is slightly confined by the neighbouring trees.	Crown lift low hanging branches over boundary to create 4m clearance from the ground. Inspect biennially
T25	Lime TPO 1	*Tilia x europaea*	Early mature	20-40	B	2	17.6	470	1	3.8	4.5	4.5	5.0	3N	Fair	5.6m	99.9	The tree has a busy crown and is ivy clad. Some deadwood and hanging dead branches are present. Lots of understory vegetation and shrubs are present around the base of the tree, making inspection difficult. Branches are overhanging the north boundary	Sever 1m band of ivy at base of tree and clear understory vegetation around the base of the tree to aid future inspection. Inspect biennially
T26	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	18.0	690	1	5.5	6.0	8.1	8.0	4S	Fair	8.3m	215.4	The tree has a large spreading crown and is covered in thick ivy making inspection difficult. The stem separates into three stems at approximately 3-4m high. The tree is situated on slightly raised ground, and the spreading branches overhang the boundary. Some deadwood is present.	Sever 1m band of ivy at base of tree to aid future inspections. Crown clean to remove deadwood, and re-inspect. Inspect annually.
T27	Sycamore TPO 1	*Acer pseudoplatanus*	Mature	20-40	B	2	16.4	410	1	6.0	5.5	6.8	4.2	5S	Fair	4.9m	76.1	The tree is leaning east. Understory shrubs and vegetation is present close to the base of the tree. Three small cavities are present on the S side of the main	Tree can be removed as it is not of significant value.

																		stem approximately 5m above the ground. Overall fair structure.	
T28	Hornbeam	*Carpinus betulus*	Young	10-20	C	2	10.3	175	1	4.0	3.7	4.4	2.8	0.6S	Fair	2.1m	13.9	The tree is relatively young with plenty of future growth possible. The tree has low hanging branches, and some understory vegetation is present. The tree is currently too young to be of great significance	Tree is not significant and can be removed.
T29	Hornbeam	*Carpinus betulus*	Young	10-20	C	2	8.2	210	1	2.5	4.8	4.5	3.3	0.5N	Fair	2.5m	20.0	Some deadwood is present. The tree is relatively young with plenty of future growth possible. The tree has low hanging branches, and some understory vegetation is present. The tree is currently too young to be of great significance	Tree is not significant and can be removed.
T30	Lime	*Tilia x europaea* (representative self- set clump of vegetation)	Young/ semi mature	10-20	C	2	11.2	178	1	2.3	1.7	1.8	2.0	0	Poor	2.1	14.3	A tree in a representative clump of self set and understory vegetation. The trees and shrubs are young and are self-set. They are not of high quality or value	
T31	Holly	*Ilex aquifolium*	Early mature	10-20	C	2	8.2	190	1	2.5	3.1	3.5	2.3	1S	Fair	2.3m	16.3	The tree is an understory tree and is supressed by the larger neighbouring trees. Overall no significant issues	

Appendix 2 British Standard BS 5837:2012 Table 1 Cascade chart for Tree Quality Assessment

Trees for Removal			
Category and definition	**Criteria**		
Category U Those in such a condition that cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• 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 or other U category trees (e.g where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. • Trees infected with pathogens of significance to the health and /or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality. *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve*		
Trees to be considered for retention			
Category and definition	**Criteria- sub categories**		
	1 Mainly Arboricultural Values	**2 Mainly landscape values**	**3 Mainly Cultural values**
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual, or those that area essential components of groups, or of formal or semi-formal Arboricultural features (e.g. the dominant and/ or principle trees within an avenue)	Trees, groups or woodlands of particular visual importance and /or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (eg. Veteran trees or woodland pasture)
Category B Trees of moderate quality with an estimated remaining life contribution of at least 20 years	Trees that might be included in the high category but are downgraded because off impaired condition (e.g. presence of remedial defects including unsympathetic management and storm damage), such that they are unlikely to be beyond 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 benefits
Category C Those of low quality and value with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm	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 landscape value, and/or trees offering low or only temporary screening benefit	Trees with no material conservation or other cultural benefits

Appendix 3

Tree Works Schedule

Initial Tree Works Schedule

Tree No.	Species	Recommendations	BS Category
T1	Sycamore	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from the ground and crown clean to remove deadwood as part of general maintenance. Inspect biennially.	B1
T2	Sycamore	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from the ground and crown clean to remove deadwood as part of general maintenance. Inspect biennially.	B2
T3	Beech	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from over the proposed driveway and crown clean to remove deadwood as part of general maintenance. Tip reduction pruning to create 3m clearance away from the roof of the development in order to facilitate construction access. Inspect biennially.	B2
T4	London Plane	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from over the proposed driveway and crown clean to remove deadwood as part of general maintenance. Tip reduction pruning to create 3m clearance from the roof of the development in order to facilitate construction	C2

		access. Inspect biennially.	
T5	London Plane	Sever 1m band of ivy at base of tree to aid future inspections. Crown lift lower branches to create 4m clearance from over the proposed driveway and crown clean to remove deadwood as part of general maintenance. Tip reduction pruning to create 3m clearance away from the roof of the development to facilitate construction access. Inspect biennially	B2
T6	London plane	Clear understory shrubs to aid future inspections. Crown lift to create 4m clearance from over the proposed driveway and tip reduction pruning to create 3m clearance from the roof of the development to facilitate construction access. Inspect biennially	B2
T7	London plane	Clear understory shrubs and sever 1m band of ivy at base of tree to aid future inspections. Crown lift to create 4m clearance from over the proposed driveway to facilitate construction access. Inspect biennially	B2
T8	London Plane	Crown lift pendulous branches over road and over driveway to create 4m clearance from the ground to facilitate construction access. Sever 1m band of ivy at base of tree nd clear vegetation around the base of the tree to aid future inspections. Inspect biennially	B2
T9	Beech	Monitor cavity annually extending into the main	B2

		stem of the tree. Crown lift low hanging branches overhanging the road to create 4m clearance from the road. Inspect biennially.	
T10	Sycamore	Tree has a large cavity on the main stem. Removal is acceptable as the decay will likely progress limiting the trees overall future contribution.	C2
T11	Lime	Remove tree due to decay present.	U
T12	Sycamore	Sever 1m band of ivy at base of tree to aid future inspections. Monitor biennially	B2
T13	Sycamore	Sever 1m band of ivy at base of tree to aid future inspections. Crown clean to remove deadwood. Inspect biennially	C2
T14	Beech	Tree is mature and is very close to property, therefore would be unsuitable if the property were to become occupied and become a high risk target. Therefore removal would be acceptable.	B1
T15	Beech	The significant V-shaped union poses a possible risk of failure. The tree would be unsuitable in such close proximity to an occupied property. Therefore it may not have a long term future and therefore removal would be acceptable.	C1
T16	Horse Chestnut	Clear understory vegetation around the tree to aid future inspections. Crown lift low hanging branches over road to create 4m clearance from the road. Monitor annually for any deterioration in	B2

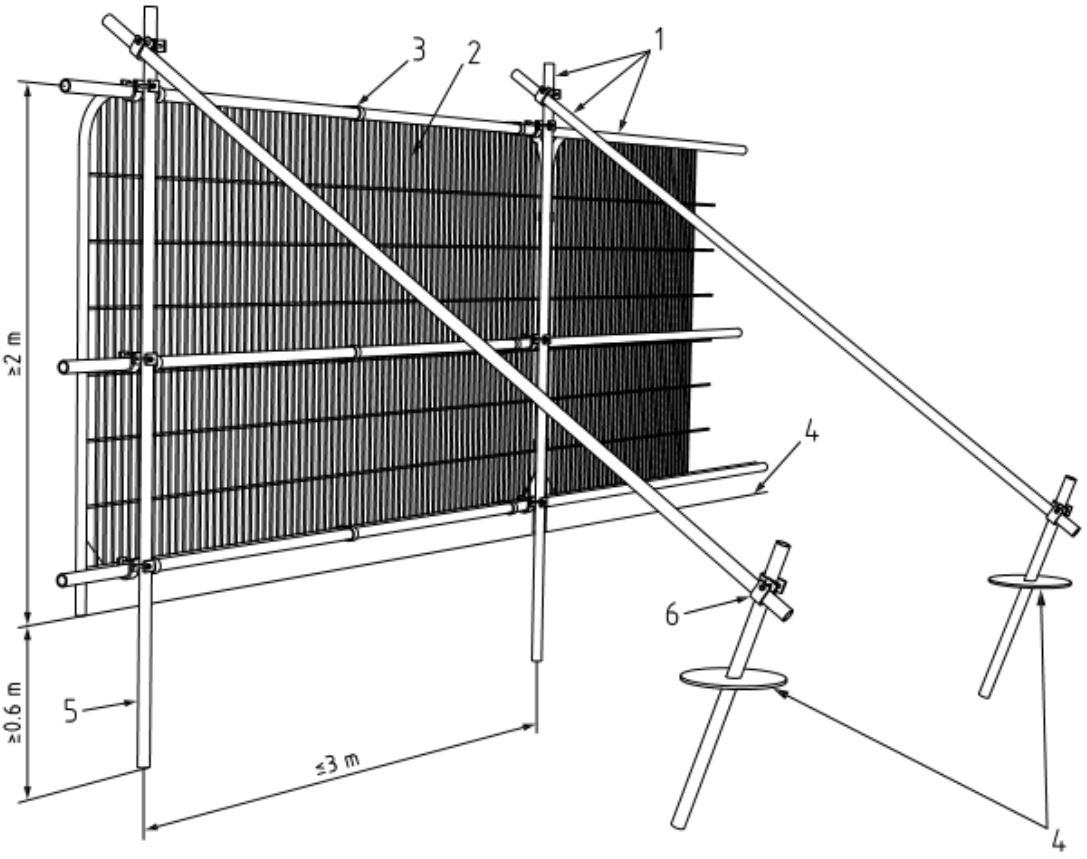
		condition from suspected Horse Chestnut bleeding canker	
T17	Sycamore	Clear understory vegetation around the tree to aid future inspections. Crown lift low hanging branches over road to create 4m clearance from over road. Inspect biennially	B2
T19	Sycamore	Clear understorey vegetation to aid future inspections. Inspect biennially	B2
T20	Sycamore	Sever 1m band of ivy at base of tree to aid future inspection. Re-inspect unions when ivy has been cleared. Inspect annually. Crown lift branches overhanging road to create 4m clearance.	B2
T21	Ash	Sever 1m band of ivy at base of tre and re-inspect tree. Crown lift low hanging branches to create 4m clearance from over the new proposed driveway. Inspect annually	C2
T23	Sycamore	Sever 1m band of ivy at base of tree to aid future inspections. Inspect biennially	B2
T24	Lime	Crown lift low hanging branches over boundary to create 4m clearance from the ground. Inspect biennially	B2
T25	Lime	Sever 1m band of ivy at base of tree and clear understory vegetation around the base of the tree to aid future inspection. Inspect biennially	B2
T26	Sycamore	Sever 1m band of ivy at base of tree to aid future inspection. Crown clean to remove deadwood,	B2

		and re-inspect. Inspect annually.	
T27	Sycamore	Tree can be removed as it is not of significant value.	B2
T28	Hornbeam	Tree is not significant and can be removed.	C2
T29	Hornbeam	Tree is not significant and can be removed	C2

Appendix 4

Tree Protection, Protective Fencing Detail, and Ground Protection Detail

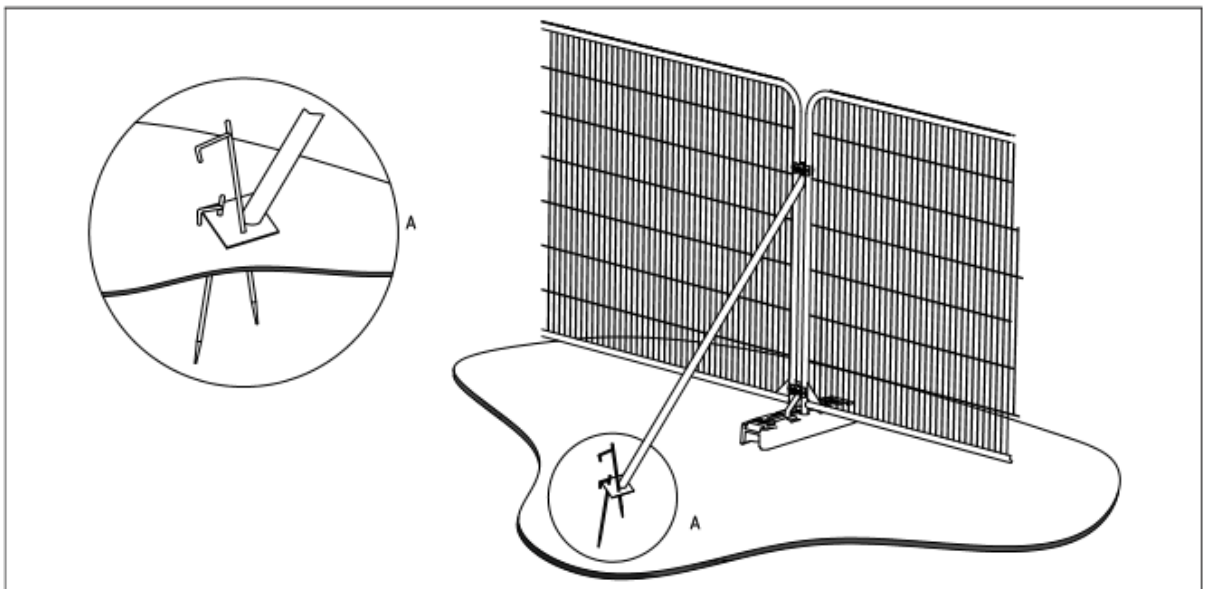
Default specification for protective barrier BS 5837:2012 –Trees in relation to Design, Demolition and Construction



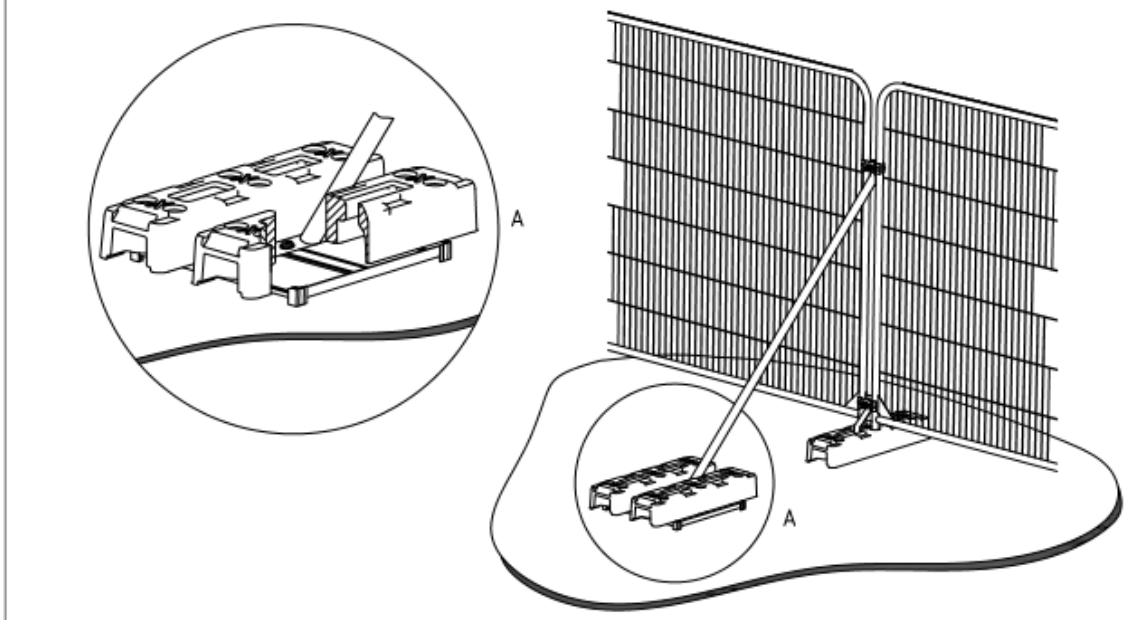
Key

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

Examples of above ground stabilizing systems BS 5837:2012 –Trees in relation to Design, Demolition and Construction



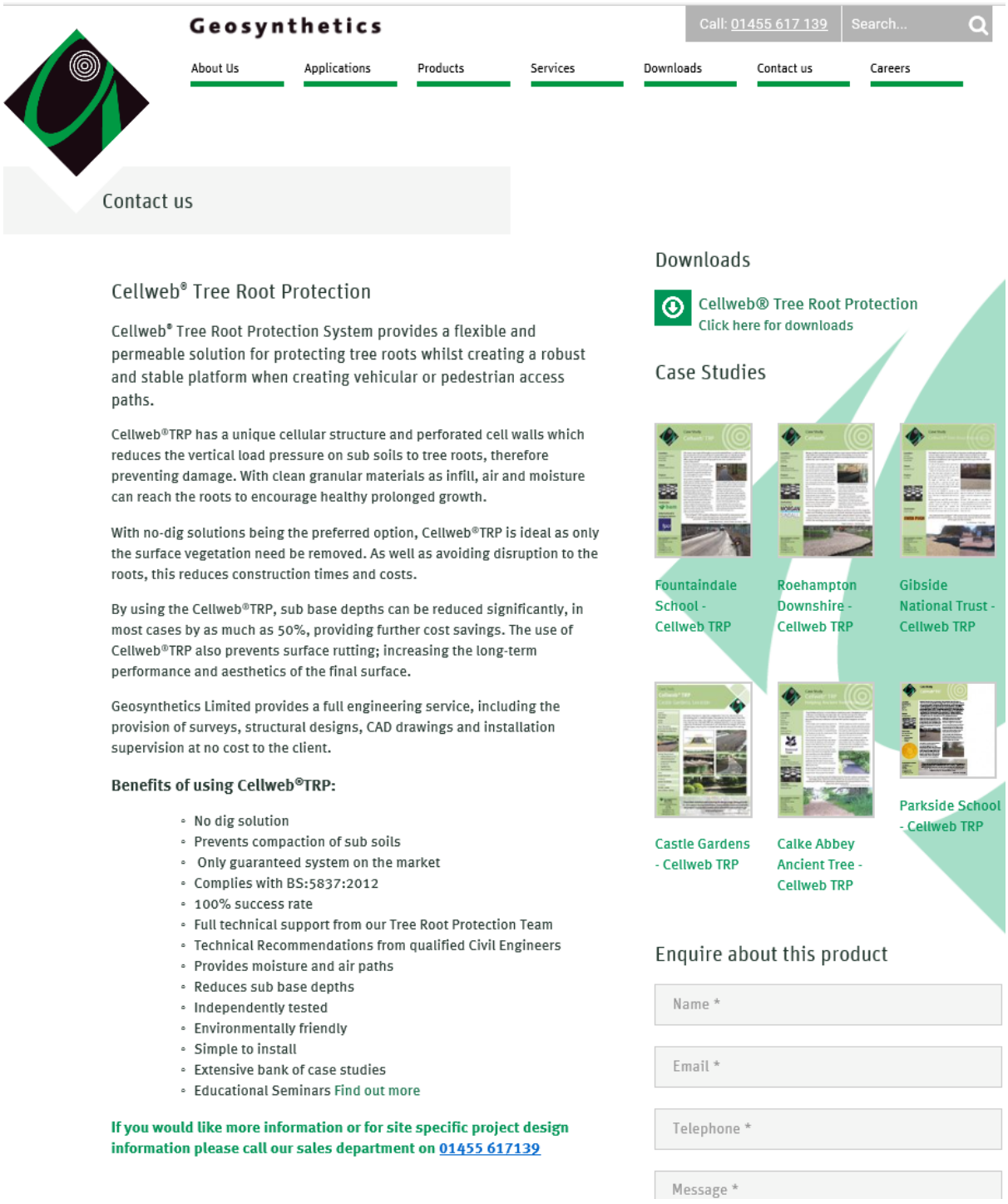
a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Example of Ground Protection for Plant Access and surfaces within RPAs

Ground Protection and effective site access systems can be achieved using products such as Cellweb, specifically designed for protecting ground for areas within RPAs and compliant with BS5837:2012.



http://www.geosyn.co.uk/product/cellweb-tree-root-protection

Construction using No-Dig methods and ground protection (taken from Arboricultural Practice Note 12, *Through the Trees to Development*, The Tree Advice Trust, 2007)

Construction should incorporate two main components:

- A synthetic load spreading material
- A no-fines aggregate sub-base

'Load spreading' materials, are synthetic grids/webs designed to support roads on soft ground by distributing the load of a wheel over a larger area than would normally occur. They may be 2- or 3- dimensional.

When placed on a 2-dimensional grid, appropriate, no-fines granular sub-base material penetrates the mesh, but is unable to pass through it, forming a positive interlock. This interlock between aggregate and grid provides a reinforced platform and efficient load spread into the underlying ground over a wider area than the footprint of the wheel on the surface. A suitable geogrid/aggregate combination constructed with the grid under tension should prevent rutting of the ground beneath construction.

The 3- dimensional load spreading products (Cellular confinement system) creates cells into which the sub base material is placed. Such a construction does not support the sub-base material, it confines the material in discrete cells. Manufactures recommend, therefore, that a geotextile is placed between the ground and the load spreader to prevent the cell- contained mineral material being pressed down into the underlying soil.

A no-dig construction will need to be contained to prevent outward creep under the weight of vehicles. This may be achieved with an edging support provided its construction does not require excavation. A suitable material may be long-life timbers pinned through the load spreader into the underlying soil. This could add strength to the structure because the pressure of vehicles forcing the sub-base downwards and onwards will tend to increase the tension on the grid and any tendency to rutting.

The granular sub base material should have a no 'fines' content which means that even when it is compacted it should be freely draining and will allow oxygen to diffuse into, and damaging gases (e.g. carbon dioxide and methane) out of the soil. The minimum distance from the tree should be 0.5m.

Further information should be sought from the manufacturer.

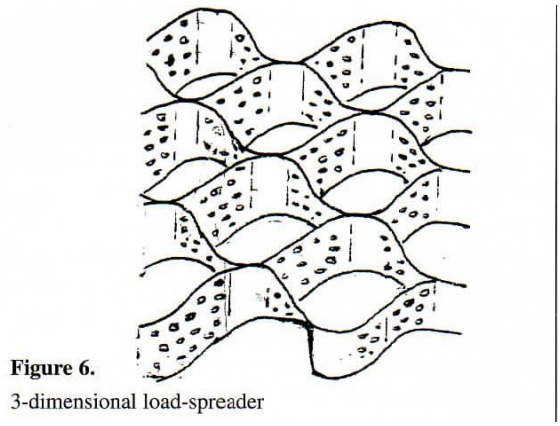


Diagram of 3-dimensional load spreader, from Arboricultural Practice Note 12, (2007)

Appendix 5

Tree Protection Site Notice and Arboricultural Monitoring Schedule

Tree Protection Site Notice





Arboricultural Supervision Schedule

Activity	Arboricultural supervision require, and by whom?	Date action undertaken
Undertaking of suggested tree work	Yes by appointed contractor	
Erection of protective fencing	Yes by Arboriculturist and site supervisor	
Installation of temporary ground protection (if deemed necessary)	Yes by Arboriculturist and site supervisor	
Dismantling of protective measures	Yes by site supervisor	

Appendix 6

Photographs



Photo 1: T1- Sycamore and surrounding understory vegetation.



Photo 2: T2 and T3 (left to right) situated close to the existing building.



Photo 3: Trees T3, T4, T5, T6 situated in a line running along the east border, with the existing building to the right.



Photo 4: T5 and T6 on the east boundary situated close to the existing building. The proposed driveway is to run between the existing building and these trees.



Photo 5: Trees on east border (right) and existing building. The proposed driveway is to run in between.



Photo 6: T8 (situated right of middle) close to current site access from Victoria Road. Branches of T8 overhang access driveway. Understory shrubs also present.



Photo 6: T9 (centre) situated on south border, bordering Victoria Road.



Photo 7: Trees lining south border (left), and T12, T13, and T31 (centre, circled).



Photo 8: T14 (right) and T15 (left), situated in very close proximity to the existing building.



Photo 9: T15 with significant V-shaped union and merged stems.



Photo 10: Trees bordering the south of the site (centre) and trees bordering the SW of the site, bordering Sackville Street (right).



Photo 11: Trees T22 to T27 along the North West border.

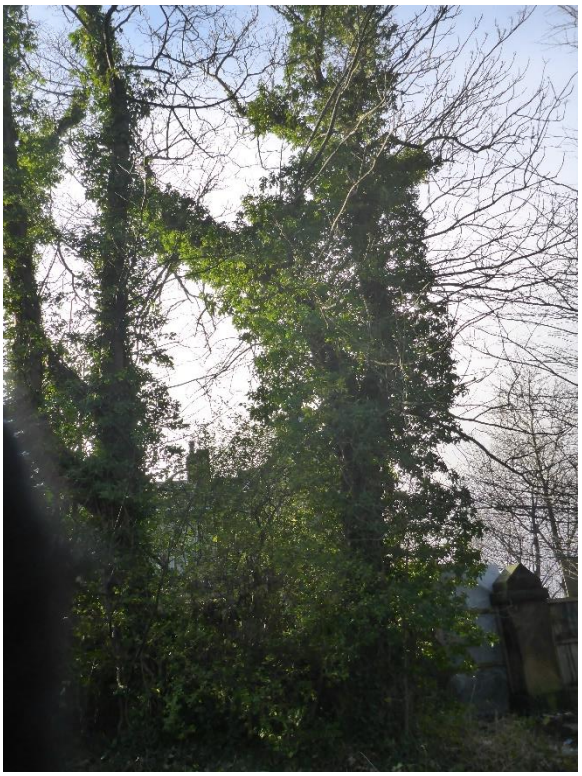


Photo 12: T20 and T21 (left to right), and the new proposed driveway entrance from Sackville Street, right



Photo 13: T29, and new proposed access driveway from Sackville Street, right



Photo 14: Trees lining NW border



Photo 15: T26, covered in ivy



Photo 16: Clump of understory self-set shrub undergrowth, marked as T30.



Photo 17: T26, circled, and understory clump of shrubs and vegetation. Single storey building to right