22 LANCASTER GROVE, LONDON - ARBORICULTURAL IMPACT ASSESSMENT / METHOD STATEMENT

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Contents

Tables

Figures

Appendices

1 INTRODUCTION

RPS was instructed to prepare an Arboricultural Impact Assessment, then a Arboricultural Method Statement and accompanying Tree Protection Plan in relation to proposed development of land at 22 Lancaster Grove, London NW3 4PB. Then following planning approval (Planning Application - 2015/6106/P) have been instructed to provide a statement for the revisions to the building layout and any additional impacts that will result of these changes.

This statement was informed by a tree survey carried out by RPS in December 2013. The results and information gathered from this survey are located in Tables 1 (Tree Survey Data) and Table 2 (Tree Protection Areas).

The purpose of this report is to:

- Assess the proposed tree removal that are required to achieve the proposed development and make recommendations for mitigation where appropriate.
- Assess to what extent the proposed new layout will impact upon the health and vitality of the retained trees on site and make recommendations for mitigation where appropriate.
- Specify measures for the protection of trees throughout development of the site and identify any necessary predevelopment tree works. Provide additional arboricultural information and advice in relation to the protection of trees throughout the development of the site.
- Provide a Tree Protection Plan to detail the proposed protective measures to be taken in respect of the trees during development of the site.

The Tree Protection Plan Figure 03.01 identifies the following:

- Trees to be retained;
- Alignment and design of protective fences;
- Specification for protective fencing and any access pruning required;

The Arboricultural Impact Assessment / Method Statement should be made available to all relevant site operatives prior to and throughout the demolition and construction process, so they understand the scope and importance of the tree protection measures.

This report and survey was carried out by Brian Wallis, Chartered Forester, Chartered Environmentalist, Fellow of the Arboricultural Association and Licentiate Member of the Landscape Institute of RPS Group PLC.

2 SITE INFORMATION

The trees implicated in this assessment are located on and adjacent to land at 22 Lancaster Grove, London.

The site is approximately 0.1 Ha in size and is centred on Ordnance Survey Grid Reference TQ 271 845.

The site is located within a residential area of North London. The site falls inside the administrative boundary of the London Borough of Camden.

The site has boundaries with Lancaster Grove to the north and residential properties to all other boundaries.

Vehicular and pedestrian access point into the site is provided from Lancaster Grove.

It is known that trees are located within Belsize Park Conservation Area. Therefore any work to these trees will require that the Local Planning Authority is given six weeks notification prior to commencement. Unless the works are part of an approved planning application. There are no Tree Preservation orders pertaining to the trees within or directly adjacent to the site (telephone check - Camden Council 11/02/2014).

Tree assessment data has been included in this report as Table 1 to 2 along with the Figure 01.01 - Tree Constraints Plan. These contain all relevant information as regards the trees on site, including tree root protection areas as described in BS5837:2012.

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3 TREE QUALITY ASSESSMENT

Retention Values

All trees inspected were categorised using BS5837:2012 and the attached Tree Constraints Plan (Figure 01.01) shows tree positions, numbers and retention categories. Trees have been recorded as individuals and as groups.

Trees have been surveyed as groups where they can be considered as forming a group as they form cohesive features either aerodynamically (i.e. they form a discrete group feature providing companion), culturally (i.e. they are composed of trees of a similar size, age and species subject to the same management) or visually (i.e. where the value of the trees within the group is as a whole rather than individually).

Where trees have been surveyed as groups the details recorded with respect to condition and retention value intend to represent an average tree within the group; however, on occasion, it must be noted that there will be exceptions within any group that do not conform to the typical character of that group.

The initial stage of a tree survey in accordance to BS5837:2012 looks at the trees on the site in terms of life expectancy and condition. Trees are then categorised according to their retention value.

Category A trees are those that have been assessed as being of a high quality and value; significant amendments to the proposed scheme should be considered in preference to their removal. These trees are shown in Green on the Tree Constraints Plan.

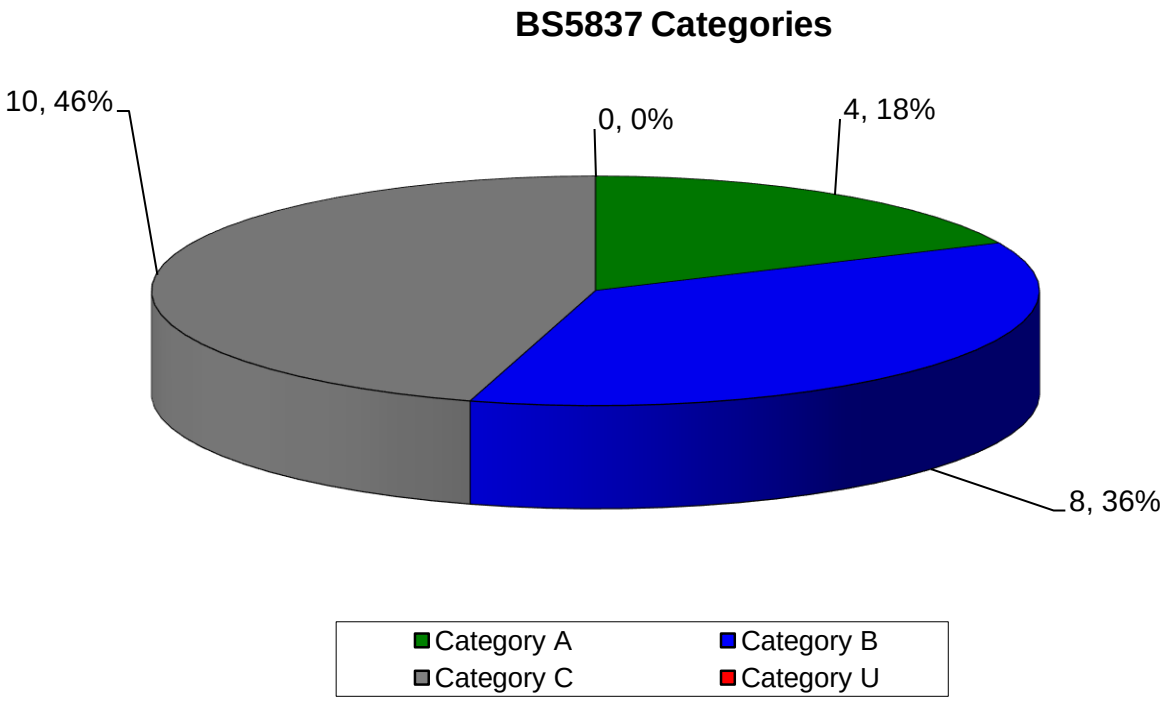
Category B trees are those that have been assessed as being of a moderate quality and value; amendments to the proposed scheme should be considered in preference to their removal. These trees are shown in Blue on the Tree Constraints Plan.

Category C trees are those that have been assessed as being of a low quality and value; the loss of these specimens should not be considered as a constraint to development. These trees are shown in Grey on the Tree Constraints Plan

Category U trees are those that have been assessed as having no retention value; these trees should not be a material consideration in the planning process. These trees are shown in Red on the Tree Constraints Plan.

Category A, B or C trees are those that should be a material consideration in the planning process whilst category U trees are those which would be lost in the short term for reasons connected to their physiological or structural condition and hence they should not be a consideration in the planning process.

The chart below gives a visual representation of the overall distribution of retention value of the individual trees surveyed.



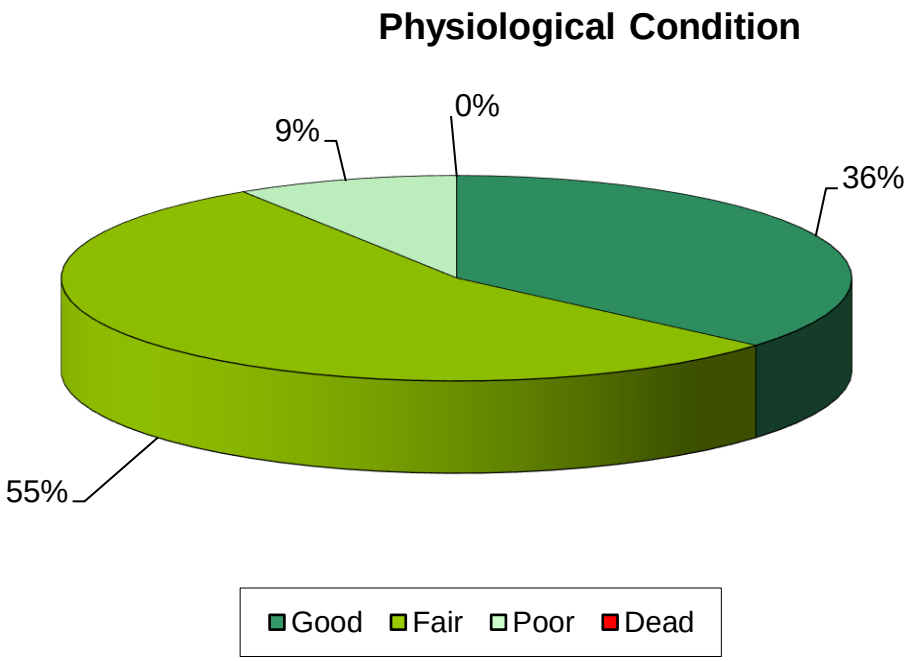
Physiological Condition

Trees considered to be in a good physiological condition are those with crown density and shoot extension growth levels within the expected ranges for their age and species. Generally these trees, subject to being of a suitable structural condition, can be expected to make a lasting contribution to the site. Additionally trees within the good condition class are likely to tolerate changes within their growing environment that occur as a result of development; as such their successful retention will be easier to achieve.

Trees considered to be in a fair physiological condition are those specimens exhibiting lower shoot extension growth and reduced crown density than would typically be expected. These specimens have a lower life expectancy than those within the good condition class and will not tolerate significant changes as a result of development as well as those in the good condition class.

Trees considered to be in a poor physiological condition are those exhibiting crown and shoot dieback and significantly reduced crown density. Trees of a poor physiological condition are not likely to make a lasting contribution to the site and whilst their retention in the short term may be beneficial such retention will only be achievable if the trees are fully protected throughout development as they will not tolerate changes in their growing environment.

The chart below summarises the distribution of tree physiological condition across the site.



Structural Condition

There was variations in the structural condition of the trees surveyed. However individual tree condition is largely consistent with expectations for the age, management and species of the tree. Due to previous management of some of the trees on the site, particularly crown reductions, similar crown management will be a continuing requirement within the site.

The large mature London Plane tree T3 is the largest tree within the site and it has had previous crown reductions as part of its management in the recent past.

T1 and T2 have poor crowns with obvious signs of dieback and poor extension growth.

The group of trees on the southern boundary of the site are a distinctive feature of the site, but within the group suppressed trees of poor form can be found. Two trees (T14 and T17) are particularly poor and it is recommended that they are removed as part of the works although they are unaffected by the development works.

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Age Class Distribution

Trees assessed as being young (Y) in age are those considered to be less than 10 years old. These trees can generally be considered to have the potential for rapid and significant future growth. Whilst these specimens are not likely to make a substantial contribution to the landscape character of the site at present they will, if retained, provide succession for the eventual removal of mature or over-mature trees as a result of declining physiological or structural condition.

Trees assessed as being semi-mature (SM) are those of more than 10 years old but having attained less than 40% of the maximum lifespan expected for the species. These trees will generally make some contribution to the current landscape character and appearance of the site and their retention will provide more immediate succession of mature trees. As with young trees these specimens will have the potential for rapid and significant future growth.

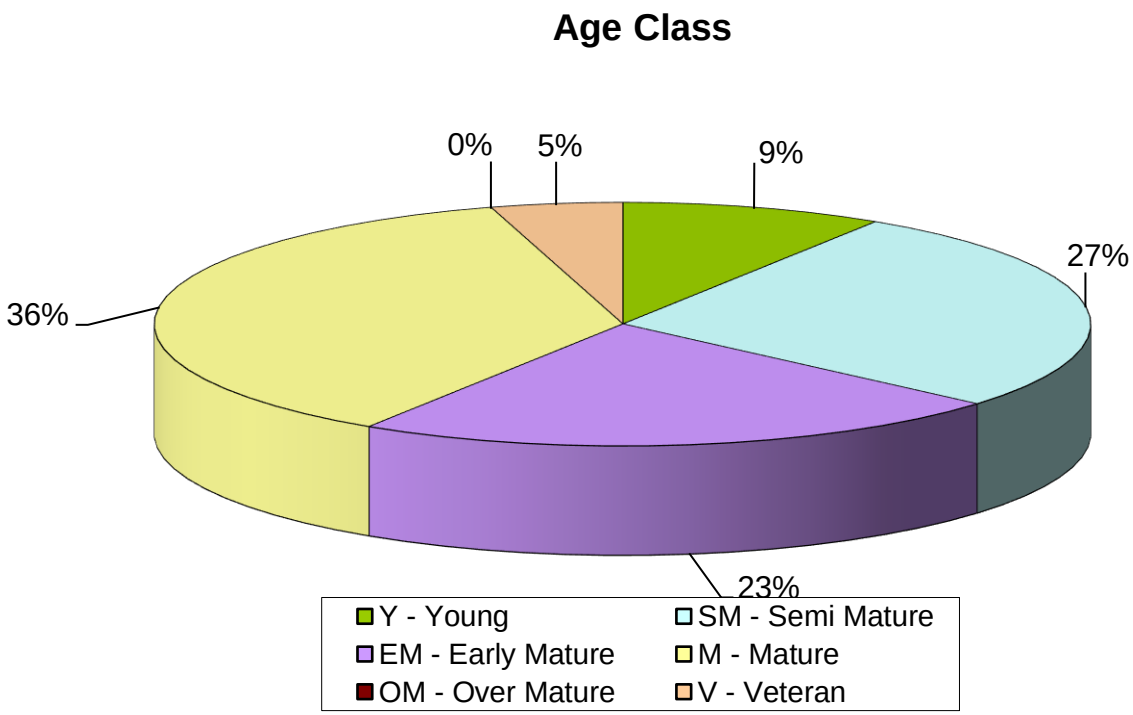
Early-mature trees (EM) are those considered to have reached between 40% and 70% of their ultimate life expectancy. These trees are generally not considered to have a significant potential for future growth though they will increase in size at a slower rate than young and semi-mature trees.

Mature trees (M) are those considered to have reached between 70% and 100% of their species life expectancy. These trees will have little future growth potential and they have generally reached their maximum expected size for the location. These trees will generally make the highest contribution to the landscape character of the site at this time; however a tree stock over dominated by mature trees will require careful management to ensure that continuation of canopy cover can be achieved.

Over-mature trees (OM) are those considered to have existed for longer than typical of their species. They do not have the potential to increase in size and may in fact reduce in size as their crowns begin to break up. These trees will often make a significant contribution to the landscape character of the site and are likely to have ecological value. However the retention of these trees within new development must be carefully planned as they are approaching the end of their useful life expectancy and they will often have structural defects. Where over-mature trees are to be retained in new development it is essential that access is available for their eventual removal.

Veteran trees (V) are those that show features of biological, cultural or aesthetic value that are characteristic of an individual surviving beyond the typical age range for the species. These trees have negligible potential to increase in size. Veteran trees are usually of a high ecological value and they will require sensitive management where they are to be retained in new development. As such it is again essential that they are located in areas where access is available to undertake management operations and where there is a reduced risk of harm occurring from failure of the trees.

The chart below shows the age class distribution of the trees present on site.



Species Distribution

The species recorded during the survey are listed in Appendix D of this report.

Visual Amenity

Some of the trees within the site are of public visual amenity value as they form a distinct feature in the surrounding landscape and have a contribution to the character and appearance of the locality.

4 DEMOLITION/CONSTRUCTION REQUIREMENTS

The development of 22 Lancaster Grove will require the demolition of structures and hard surfaces. It will then require the construction of up graded road access points with associated hard surfaces and construction of the new buildings, including basement excavations, and associated hard and soft landscape features.

The removal of some of the current vegetation will be required. This will be used to create a new formal landscape to the road frontage. Retained trees and shrubs will be used to create a high quality environment for the residents both within and adjacent to the development.

It is intended to carry out development throughout the site, providing new residential accommodation. This will be achieved by the removal/demolition of the current structures and hard surfaces.

Access will be required for equipment to:

- Demolition of existing structures and hard surfaces
- Excavate the basement sections
- Construction of the buildings and structures
- Installation of services and utilities
- Foundation construction will be required including piled foundations
- Access for scaffolding to be erected
- Installation of boundary structures
- Installation of access points
- Development of new landscape features

The construction process will need to be monitored during its progress and this Arboricultural Method Statement should be used as the document provided to guide the construction process.

During the development of the site tree protection will need to be considered for retained trees and this will form part of the Arboricultural Method Statement. All potential pruning works have been identified within the statement (Table 3 indicates trees that may require pruning). Final tree pruning specifications should be provided by a qualified arboriculturalist and completed prior to start of demolition work. A specification to pruning works is provided on the Tree Protection Plan Figure 03.01.

The following sections detail the below and above ground constraints concerning trees that will be encountered during the demolition and construction process at 22 Lancaster Grove, London.

5 BELOW GROUND CONSTRAINTS

Tree roots require moisture and nutrients to grow successfully, if these are not available then they will not be able to colonise the area surrounding the main stem. The tree will form a root system and exploit any water and nutrient resources that are available to them. Roots do not form in hostile environments and the tree will adapt its size and shape if any of these items are in limited supply.

The older trees within the site have been able to establish themselves and have achieved what should be considered a maximum size for their species and location.

All proposed development activities that could directly affect the roots within the site have been considered. Construction method statements should be fully specified before any works adjacent to trees are carried out.

The basement excavations have been designed to impact into the area that has currently been occupied by existing foundations/ built structures and of limited rooting distribution.

Where they are likely to be adjacent to the rootable area supervision by a qualified arboriculturalist should be considered. The specifications for works adjacent to trees should be a combination of current best practice and relevant British Standards relating to demolition and construction adjacent to trees.

Particular reference should be made to the use of piled foundations within the site. Technical specification should be provided by the engineers designing the appropriate foundations and these need to be agreed by the Local Planning Authority prior to installation. An installation methodology should accompany the technical specification detailing where and how the piling rig will work within the site.

6 ABOVE GROUND CONSTRAINTS

The above ground constraints that trees provide are largely concerned with their mass (crown and main stem) and these constraints are usually abated by pruning or removal. Pruning is used to allow access and prevent damage to the tree in a site development. Removal is considered when the tree is in a poor condition and would fail in a reasonable time scale or the development could not be achieved with the tree in its current position and its removal is agreed as part of the planning application. The trees assessed as part of this application will be discussed below and their above ground constraints identified.

The trees material to the planning application are located to the boundaries of the site and adjacent to the development area.

A schedule of trees needing to be considered for access pruning has been provided within Table 1 of this statement. The specification for the required pruning should be compiled once the felling works have been completed and the tree protection fencing has been erected in accordance with the Tree Protection Plans provided. If pruning is required to erect the fencing this should be carried out with the agreement of the site manager and arboricultural specialist. The pruning requirement should also allow access for site vehicles and works equipment to be used adjacent to tree protection fencing and ensure no physical damage to the crowns during demolition and construction occurs.

The building has been designed to also allow for the existing trees form and size to fit the proposed structure and co-exist together.

All crown pruning works should be carried out to the specifications contained within BS3998:2010 Tree Work – Recommendations and the guidance below. They should be carried out sensitively and maintain or improve the crowns balance and form for each individual tree.

Tree Access Pruning Specification

All works shall be carried out by suitably qualified and professional contractors who are clear in the understanding of the specification below and their requirements.

All works shall be carried out using suitable handsaws and these saws should be sharp and in a serviceable condition. The use of chainsaws shall only be used with the agreement of the supervising officer (SO).

All risk assessments shall be carried out by the contractor prior to works commencing and they should be fully satisfied to the conditions and any hazards within the working area. Any concerns should be reported to the SO.

The clearance height should be agreed and included in the schedule of works.

Works beyond this dimension are not to be part of the works unless it involves additional health and safety works to the tree.

The works are designed to provide access to the working area during the construction period and if the access is to be required beyond this period then a tree management programme with the provision for cyclical pruning be agreed.

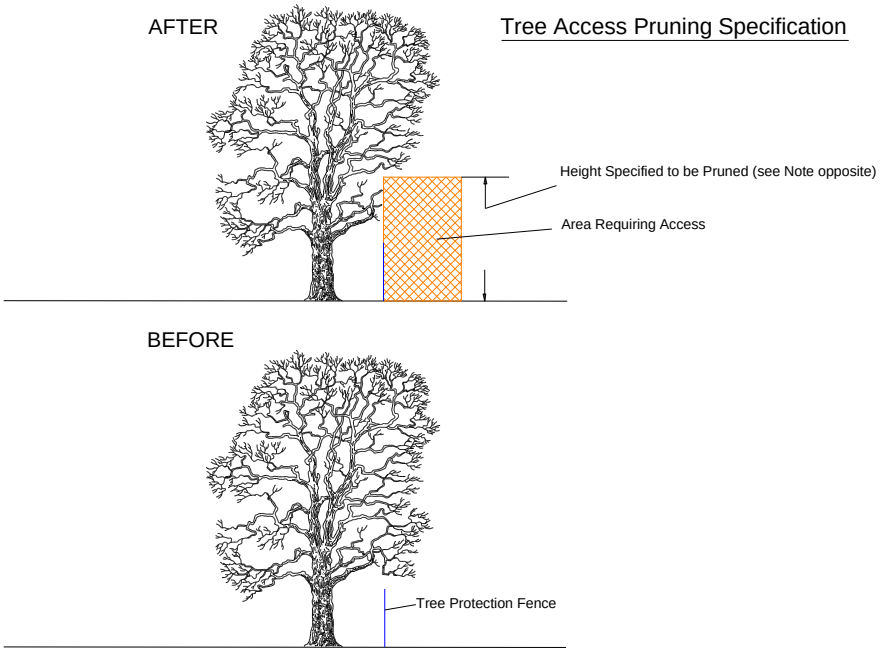
The guidance and main document providing the recommended guidance is BS3998:2010 Tree Work - Recommendations and this should be followed if any doubt exists with the requirements of the work. Particular sections for reference are Section 7 Pruning and related work, and within this

section, 7.2 Minimizing the potentially undesirable effects of pruning, 7.6 Crown lifting, 7.8 Selective pruning and 7.9 Pruning for infrastructure. This is not an exclusive list.

The aim of the pruning should be provide a natural appearance within the crown and should not be to leave a acute side to the crown of the tree. Final pruning cuts should be considered and where possible to natural target pruning points such as branch unions where branch bark ridges can be used to guide the pruning cuts. Where these points are not available the exposed stub should be a small as possible and an assessment of each individual branch taken by the operative before making the cut.

All cuts should be made so that they do not provide future structural issues such as weak forks and loss of structural integrity. If there is any concerns regarding the above then this shall be raised prior to works commencing. Branch reductions should be used to eliminate bark rips and tears; they will not be accepted by the client.

All debris should be removed form site and disposed of in an environmentally sensitive way agreed with the SO.



7 ANALYSIS OF CONSTRAINTS

The constraints that have been identified above are the ones that apply to the trees found at the area associated with the development at 22 Lancaster Grove, London.

The above ground constraints will require professional arboricultural management and specification. Crown lifting and pruning will be required to accommodate some of the fencing and construction process.

Beyond the construction period a programme of regular tree work to reduce the deadwood and control the crown extents will provide adequate management in the future. It would also allow the trees to have their crowns and main stems inspected by the arborist, which would identify structural issues early and reduce the likelihood of major crown failures. This will be the responsibility of the individual tree owners.

The below ground constraints will be offset by engineered foundation design and site management during construction. Respect to the current RPA's within the designed layout and supervision through the construction periods will enable all arboricultural impacts to be fully considered.

The Arboricultural impacts are detailed below and considered specifically for the site and the proposed development.

8 ARBORICULTURAL IMPACT ASSESSMENT - WORKS

Introduction

Trees have finite energy reserves, developed each year throughout the growing season, which are utilised for biological processes such as growth and defence against pests or diseases throughout the following year.

Any development in proximity to trees has the potential to cause harm to those trees unless control measures are identified and acted upon; as such it is essential to consider the relationship between the proposed development and the retained trees to identify what precautions are necessary, proportionate and appropriate.

Development has the potential to impact upon the above ground and below ground parts of trees.

Whilst some damage that can occur, such as physical damage to the trees stems and branches from machinery movements, is clearly visible the impact from other aspects of work common on development sites which can have a significant effect upon the continued health of trees are not always immediately evident.

Damage that is not immediately evident but which can cause long term harm to retained trees includes things such as damage to the soil structure by compaction causing root damage and levels changes altering the water table and affecting moisture availability.

To minimise the potential for harm to occur to retained trees all works should be carried out with regard to the Tree Protection Measures detailed within this report.

In general it can be seen that, by adopting appropriate methods of working, precautionary and protective measures, significant harm to retained trees can be avoided.

In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing will minimise the potential for harm to occur to retained trees.

Brief Description of Proposed Development

The proposed development to the site is the demolition of existing structures and the construction of new residential properties and associated external works, including hard and soft landscaping.

Tree Removal

Six trees have been identified on plans as requiring to be removed to achieve the proposed development are shown on the Tree Retention and Removal Plan – Figures 02.01. The majority the trees required for removal are category C trees (4 – T1, T14, T17 & T18) with the remaining being (2 – T2 & T5) category B.

C category trees are of a temporary amenity value and their removal should not be seen as a constraint to development according to BS5837:2012.

Arboricultural Implications

To ensure that the trees selected for retention can be successfully integrated within the proposed development the following factors have been considered or require consideration.

Root Protection Areas

Root Protection Areas for each tree surveyed have been determined in accordance with BS5837:2012 Section 4.6 Root protection area (RPA) in the Standard and a schedule of Root Protection Areas is attached to this report as Table 2.

Initial Root Protection Areas for the trees were plotted onto the Tree Constraints Plans - (Figure 01.01) and has been used to produce all relevant tree plans in this statement.

Some of the existing built structure and hard surfaces have been constructed within the RPA as plotted on the Tree Constraints Plan and the conditions for root establishment considered within these areas. Due to the size, form, age and strip foundations of the existing building it is clear that this area will not contain substantial root development and has been identified as such.

A small part of the basement excavations will encroach into the RPA (4% of area), this will have minimal impacts and although unfortunate should have little significance on the health of the existing tree.

Existing Canopy Spreads

Where the Root Protection Areas for retained trees do not extend to the edge of existing canopy spreads it is possible that those parts of the trees extending beyond the RPA fencing may sustain damage during construction.

To minimise the potential for harm to occur to retained vegetation a Construction Exclusion Zone (CEZ) will be created, by the erection of protective fencing as detailed on the Tree Protection Plans (Figure 03.01). Where canopies extend beyond the tree protection fencing the tree has been identified in the Table 3 - Works Required as being considered for access pruning or crown lifting to ensure the safe erection of tree protection fencing and damage from construction activities

Level Changes

The effect of level changes across the site will need to be assessed prior to the start of any works. This will prevent harm occurring to retained trees due to level changes. When this occurs within the Construction Exclusion Zone (CEZ) works should be identified and discussed with the Local Authority Tree Officer prior to commencement.

It may be necessary to install retaining structures where levels are to be altered to ensure that the original ground level within the CEZ can be maintained.

Building Foundations

Any structures built on the site should comply with the foundation depths for buildings near or adjacent to trees and allow for the potential size of the trees at maturity. The soil types throughout the site will need investigating and appropriate measures taken.

Appropriate foundation designs should be adopted.

If trees are removed across the site the potential for soil heave should be assessed and foundations designed accordingly. (NHBC Chapter 4.2, 2007)

Part of the site within the recognised RPA will be developed using a suspended floor design using piles to achieve the construction. Pile positions should be considered prior to construction and the impacts on roots and the existing crown investigated. The construction methodology should be presented in a Construction Method Statement provided by the main contractor and should consider the issues highlighted in this statement and this statement should be referenced in the method statement.

Service Runs

All service runs, utilities and similar infrastructure should take note of trees and allow for working methods that will minimise damage to trees by referring to documents such as NJUG Volume 4 - Guidelines for the planning, installation and maintenance of utility services in proximity to trees. (National Joint Utilities Group 2007).

Existing service infrastructure can be used to reduce potential impacts and it is unlikely that there will be any need to encroach into the CEZ. Final confirmation of this should be presented to the Local Authority prior to the construction phase.

9 PRE DEVELOPMENT WORKS – DEMOLITION PHASE

Tree Removal

The tree indicated as to be removed within the boundaries of the development on the Tree Retention and Removal Plan (Figure 02.01) should be felled prior to commencement of development. The stumps will be removed or 'ground out' as part of the pre-commencement works.

An arborist should be present on site during the site clearances to ensure that they comply with the approved works.

Predevelopment Tree Pruning Works

Any specified tree pruning works should be undertaken prior to commencement of the proposed development.

Standard of Work

All tree works should be carried out in accordance with BS3998:2010 Tree Work - Recommendations and latest arboricultural best practice.

All tree work should be carried out by suitably qualified, competent and insured arboricultural contractors.

All green and woody waste generated by the tree works shall be removed from site and disposed of in an environmentally sustainable manner.

Timing of Works

All tree works shall be completed prior to commencement of any construction works on the site.

All works shall be timed to have regard to the phenological cycles of protected species that are associated with trees; notably birds and bats.

Tree Protection Barriers

All tree protection fencing should be erected to its final position during the pre-development periods of construction. Protective fencing shall be erected as shown on the Tree Protection Plan (Figures 03.01). To ensure successful tree protection during this process all operatives should be briefed on the need to pay regard the existing trees and all operations adjacent to trees be properly supervised. This will ensure the works will not affect adversely the trees.

Once the protective barriers are in place they must remain in situ throughout the course of the development until the completion of all building works.

Copies of the Tree Protection Plans shall be placed in the site office for reference by all site staff.

The protective fencing barrier is to be constructed in accordance with the specification detailed at Appendix E.

Signs detailing the purpose of the protective fencing shall be attached to the fencing at 10m intervals. Such signs should be weatherproof and shall be substantially in the form of the specimen provided at Appendix F. Signs must be replaced as necessary should they be removed or become illegible.

Following erection of the protective fencing and prior to commencement of the development it is recommended that an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, is arranged to confirm fencing has been installed in accordance with the Tree Protection Plan and any relevant conditions that may be attached to a grant of planning consent for the development.

10 DEMOLITION/CONSTRUCTION WORKS

Construction Exclusion Zone

The Construction Exclusion Zone (CEZ) as defined by the protective fence line shall be regarded as sacrosanct, and the protective fencing shall not be moved or taken down at any time.

Within the Construction Exclusion Zone there must be No mechanical digging or scraping, No alteration to existing ground levels including soil stripping, No earthworks, No handling or discharge of any chemical substance, concrete washings or of any fuels.

Furthermore, vehicular or pedestrian access and the storage of any materials is prohibited within the Construction Exclusion Zone.

Additionally no materials that may contaminate the soil such as concrete mixings, diesel oil and vehicle washings shall be discharged within 10m of the stem of any tree and no fires shall be lit within 10m of the maximum extent of a trees crown.

Tree Protection Barriers

See Section 9 above.

Site Compounds and Materials Stores

Activities related to the establishment of a temporary site compound have the potential to impact upon retained trees by various means. In particular the storage and mixing of chemicals and materials such as concrete can have a damaging effect on tree health if precautions are not taken.

To prevent harm occurring to trees provision for materials storage, site offices, deliveries and other related activities should be made available in areas away from retained trees.

The offices, parking of site and contractor vehicles, along with secure storage will be provided in various areas away from retained trees.

Monitoring

Following erection of the protective fencing and prior to commencement of the construction phase an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, should be arranged to confirm fencing has been installed in accordance with the Tree Protection Plan (Figure 02.01) and any relevant conditions that may be attached to a grant of planning consent for the development.

Further monitoring visits shall be carried out following implementation of the works on site, ideally on at least a monthly basis.

It is envisaged that following a period of four successive inspections finding no non compliances that the frequency of inspections can be reduced to a bi- monthly basis.

Reporting

Should any arboricultural issues become apparent during the works the site manager should immediately contact the Arboricultural Consultant or the Council's Tree Officer for advice upon how to proceed.

The monitoring of the tree protection fencing should be recorded and any issues reported so that any remedial action can be taken by the main contractor as soon as possible.

An example reporting form is provided within this statement as Appendix G – Arboricultural site register (Example Template).

11 CONCLUSIONS

An arboricultural assessment has been carried out for the re-development of 22 Lancaster Grove, London NW3 4PB. This has been required following planning approval (Planning Application - 2015/6106/P) and recent revisions to the building layout. It identifies any additional impacts that will result of these changes.

The main changes are to the extents of the basement area and this is shown on the Tree Protection Plan (Figure 03.01). It has increased the impacts on the RPA of T3 from 1% to 4%. This is felt to be insignificant an increase.

The development of 22 Lancaster Grove, London will require the removal of a small number of the trees currently located on the site. These removals have been identified and the trees identified for removal are in the majority of limited amenity value (C category retention values when considered within BS5837:2012).

Retained trees will need to be protected and considered during the development processes, particularly the demolition and construction phases. This statement provides information and identifies areas were these processes will impact on the retained trees and provides guidance as to the tree protection measures that will be required.

All works adjacent to retained trees should be carried out with sensitivity to the wellbeing of the trees and be supervised to ensure that any possible damage to the above and below ground parts of the tree are avoided and where impacts cannot be mitigated for then appropriate action is taken to minimise these impacts.

All site staff should be made aware of the requirements of this statement and the importance of trees within the development.

Sensitive target pruning to lift the canopies of existing trees (Table 3 Tree Work) within the site will reduce/eliminate above ground constraints and provide a sensible working area for the construction of the development.

The section below details an Arboricultural Checklist that should be used to ensure that all tree issues are considered throughout the construction process.

Guidelines contained within BS 5837:2012 Trees in Relation to Design, Demolition and Construction should be followed when dealing with trees. Working methods and specifications should be followed to limit potential damage to trees throughout the construction period.

The specific measures for the protection of the retained trees throughout development specified within this report shall be followed throughout the course of the development.

12 ARBORICULTURAL CHECKLIST

Ref	Work Activity	Schedule of Works	Refer	Recommendations
General site works and tree related operations				
01	Pre-start site meeting	Pre-start site meeting with LPA tree officer, site manager, client representative and consultant arboriculture (CA) to agree scope of any works, where required.		
02	Protect trees to be retained	Barriers should be fit for the purpose of excluding construction activity, and should remain rigid and complete. Barriers are to be located in accordance with RPS Tree Protection Plans.	BS 5837:2012 Trees in relation to design, demolition and construction: Figure 2 & 3 RPS Tree Protection Plan Figure 3	Ongoing monitoring by appointed person
03	Protective fencing to be inspected by LPA (if required)	Site manager to give LPA at least 2 working days notice of the erection of the temporary protective fencing.		Appointed person to contact LPA prior to completion of fencing.
04	Maintain the temporary protective fencing	CA to ensure the temporary protective fencing is maintained throughout the entire construction period and record any breach of the tree protection.	BS 5837:2012 Trees in relation to design, demolition and construction Fig:2 & 3 RPS Tree Protection Plan Figure 3	Appointed person responsible for arboricultural protection measures shall monitor fencing **monthly**, recording details
05	Removal of Trees and their arisings	Removal of all trees identified Figure 2 – Tree Retention and Removal Plan, plus arisings off site unless instructed otherwise by the CA. Fires are NOT permitted on the site	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work	Ongoing monitoring by appointed person

Ref	Work Activity	Schedule of Works	Refer	Recommendations
Specific tree and construction works				
06	Removal of deadwood / hanging deadwood	Removal of dead, dying or diseased branch wood, broken branches, or stubs left from previous tree surgery operations together with unwanted objects such as fungal fruit bodies, ivy and / or other climbing plants, nails, redundant cable bracing and wind-blown rubbish from the tree and any such debris from any cavities within the tree.	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work	All tree work should be carried out by a suitably tree qualified tree surgeon, preferably an Arboricultural Association approved contractor.
07	Crown lifting (if required)	Removal of all soft growth and branches or parts thereof which are below or which extend below 4.5 – 5.0m from ground level.	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work	All tree work should be carried out by a suitably tree qualified tree surgeon, preferably an Arboricultural Association approved contractor.
08	Works within the Root Protection Area (RPA) (where required)	Adopt hand dig methods for reducing levels to avoid damage to roots. Where limited root pruning is unavoidable it should be made at a suitable place within the root system, avoiding damage to surrounding tissue. Final pruning cuts shall be made at right angles to the axis of the root. The final cut wound should be smooth and as small as possible, free from ragged torn ends.Where root pruning is required to roots over 25mm in diameter, works should be overseen by a suitably qualified Arboriculturalist. Any root pruning should be completed in accordance with BS 3998:2010. Assessment report produced for the client.	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work APN 12 ‘Through the Trees to Development’ RPS Tree Protection Plan Figure 3	All tree work should be carried out by a suitably tree qualified tree surgeon, preferably an Arboricultural Association approved contractor.

Ref	Work Activity	Schedule of Works	Refer	Recommendations
09	Works within the Root Protection Area (RPA) (if required)	General fencing works should seek to minimise damage to tree roots and the tree canopy. Fencing should be aligned to avoid damage caused by fence post excavations, and to avoid unnecessary branch pruning.	BS 5837:2012 Trees in relation to design, demolition and construction: Section 7 RPS Tree Protection Plan Figure 3	
10	Works within the Root Protection Area (RPA)	No hard surface removal within the Root Protection Area (RPA) shall occur without arboricultural supervision. Tree protection measures will remain in place until work commences. The initial 'breaking out' of hard surfaces shall be carried out by low impact hand held pneumatic tools. Removal of the surface shall occur in strips working from the undisturbed surface, working in a retreating manner away from the retained trees. This will enable any roots exposed to be covered with a good quality top soil to avoid desiccation as the operation progresses and avoid the need for excessive travel on exposed ground. Lightly break up compacted surface with hand tools to aid water penetration. Subsequent removal of arisings / debris shall also be carried out by hand. No reduction in levels of the underlying soil surface shall occur.	BS 5837:2012 Trees in relation to design, demolition and construction: Section 7 RPS Tree Protection Plan Figure 3	Ongoing monitoring by appointed person
11	Works within the RPA	All existing soft surfaces within retained RPA areas shall be protected from further compact via suitable ground protection. The use of scaffold boards laid over compression resistant materials such as woodchip should be explored.	BS 5837:2012 Trees in relation to design, demolition and construction: Section 6.2.3.3	Ongoing monitoring by appointed person
12	New surfacing works with Root	All proposed surfaces within RPA areas shall be completed in a 'no dig' style, where existing soil	BS 5837:2012 Trees in relation to design, demolition and construction: Section 7	Engagement of a engineer will be

Ref	Work Activity	Schedule of Works	Refer	Recommendations
	Protection Areas (RPA)	levels are retained and no positive soil excavation shall occur at all. New surfacing works shall look to reuse existing hard surfaces and their sub-base layers within the new construction. Where existing surfaces do not exist the use of suitable permeable, load distribution systems shall be employed such as 'Cellweb' (or similar and equal system)	Tree Work APN 12 'Through the Trees to Development' RPS Tree Protection Plan Figure 3	required
13	Works within the Root Protection Area (RPA)	The underlying soil shall be levelled by the addition of good quality top soil to BS3882:2007 (typically 150mm depth maximum). Hand tools only shall be used for any levelling works which will not disturb the underlying soil.	BS3882:2007 - The British Standard for Topsoil	Ongoing monitoring by appointed person
14	Soft landscape works within the Root Protection Area (RPA) (Where required)	Heavy mechanical soil cultivation techniques are not to be carried out within the RPA. Any cultivation should be carried out by hand or pedestrian controlled light machinery to minimise damage to tree roots. Existing ground levels within the RPA should be maintained.	BS 5837:2012 Trees in relation to design, demolition and construction: Section 8 RPS Tree Protection Plan Figure3	

Tables

Table 1: Tree Survey Data

Key to Inspection Report Form

Species	Genus and variety
Height	Measured Clinometer Reading or Estimated Height in Metres
Girth (dbh @ 1.5m)	Diameter measured in cms, or estimated, Where multi stemmed below 1.5m the diameter is taken as that just above the root flare
Spread (m)	Canopy height estimated in metres above ground level
Canopy height (m)	Crown Spread, radius estimated in metres
Physiological Condition	Good, Fair, Poor, Dead
Age Class	Y – Young MA – Maturing (Middle Aged) M – Mature OM - Overmature V – Veteran
Useful Life Expectancy (years)	10, 10-20, 20-40, 40+
BS Categorization	See Cascade Appendices 2

Table 1: Tree Data Schedule

Tree No.	Species	Diameter (mm)*	Height	Crown Spread N	S	E	W	Crown Height above Ground	First Major Branch Direction	Branch Height above Ground	Age Class	Vigour	Life Expectancy	Structural Condition/Comments	BS5837 Category
1	Acer pseudoplatanus	350	12	3	5	3	4	4	South	3.0	EM	Poor	10-20	Deadwood in the crown, Signs of decline, Pruning wounds to Crown, Wound cavities formed in crown, In raised bed, Hard surfaces within RPA, Previous crown reduction to 5m	C1
2	Acer pseudoplatanus	260	10	3	2	3	5	2	South	2.5	EM	Fair	10-20	Bifurcated at base, Large pruning wound at base, Minor Deadwood in the crown Growing adjacent to brick wall, Hard surfaces within RPA	C1
3	Platanus x hispanica	870	29	10	6	7	6	3	East	5.5	M	Good	40+	Pruning wounds to Crown and main stem, Vigorous regrowth, Callused wounds on main stem Previous crown reduction to 15m, Previously pollarded at 5m, Hard surfaces within RPA, Growing adjacent to brick	A2
4	Platanus x hispanica	630	29	4	7	7	6	3	West	3.0	M	Good	20-40	Pruning wounds to crown and main stem, Included stem unions (western stem union of concern Previous crown reduction to 15m, Growing adjacent to brick wall	B2
5	Platanus x hispanica	380	19	2	6	6	4	3	West	3.5	M	Good	20-40	Heavily suppressed crown and form, Pruning wounds to crown and main stem Previous crown reduction, Growing adjacent to brick wall	B2
6 #	Ilex aquifolium	200	8	4	3	3	3	1.5	South	1.0	SM	Good	40+	Crossing Branches Off site, not on topographical survey, Growing adjacent to brick wall	A1

* Where the tree is multi-stemmed the conventions within BS5837:2012 are applied
Tree Number # - indicates estimated values recorded by the Arboriculturalist

Tree No.	Species	Diameter (mm)*	Height	Crown Spread N	S	E	W	Crown Height above Ground	First Major Branch Direction	Branch Height above Ground	Age Class	Vigour	Life Expectancy	Structural Condition/Comments	BS5837 Category
7	Platanus x hispanica	530	22	6	5	6	6	3	North	4.0	M	Good	40+	Bifurcated at 3m, Pruning wounds to Crown, Nails in main stem Previous crown reduction, Leaning south, Growing adjacent to brick wall	A1
8	Platanus x hispanica	730	22	2	8	7	2	5	South	7.0	M	Good	40+	Bifurcated at 3m, Pruning wounds to Crown Previous crown reduction, Lean south, Growing adjacent to brick wall	A1
9 #	Chamaecyparis awsoniana	100	5	1	1	1	1	0.5			Y	Fair	40+	Suppressed Restricted inspection due to vegetation	C2
10	Prunus avium.	260	16	5	4	2	3	2	South	2.0	EM	Good	20-40	Pruning wounds to main stem Growing adjacent to brick wall	B2
11	Pinus sylvestris	370	16	3	3	4	2	1.5	North	1.5	EM	Good	20-40	Growing adjacent to brick wall	B2
12	Sorbus aucuparia	180	8	4	2	3	1	1.5	South	1.5	SM	Fair	10-20	Multi stemmed at 1.5m, Pruning wounds to main stem, decay in main stem Growing adjacent to brick wall	C2
13	Gleditisia triacanthose	240	10	7	3	3	5	2	North	1.0	M	Fair	10-20	Poor twisted form Evergreen Clematis growing in crown	C2

Tree No.	Species	Diameter (mm)*	Height	Crown Spread N	S	E	W	Crown Height above Ground	First Major Branch Direction	Branch Height above Ground	Age Class	Vigour	Life Expectancy	Structural Condition/Comments	BS5837 Category
14	Sorbus aucuparia	120	7	3	2	1	2	1	North	1.0	SM	Fair	20-40	Suppressed, Pruning wounds to main stem	C2
15	Robinia pseudoacacia	270	14	6	1	4	4	3	West	3.0	EM	Fair	10-20	Pruning wounds to crown and main stem, Previous branch failures, Splits in branches Growing adjacent to brick wall	C2
16	Acer platanoides	260	7	3	2	2	2	3	North	2.0	SM	Fair	20-40	Pruning wounds to crown and main stem Recent crown reduction to 7m	B2
17	Cupressus sp.	90	5	1	1	2	2	0			SM	Poor	10-20	Multi stemmed at base, starting to collapse	C2
18	Cryptomeria japonica Elegans'	210	4	1	2	2	2	0	North	1.5	M	Fair	10-20	Twisted form	C1
19	Acer pseudoplatanus	280	12	4	4	3	3	5	South	4.5	SM	Fair	20-40	Pruning wounds to main stem Off site, in highway footway	B2
20	Aesculus hippocastanum	60	4	1	1	2	1	1.5	East	1.5	Y	Fair	10-20	Stem wounds Off site, in highway footway	C1

Tree No.	Species	Diameter (mm)*	Height	Crown Spread N	S	E	W	Crown Height above Ground	First Major Branch Direction	Branch Height above Ground	Age Class	Vigour	Life Expectancy	Structural Condition/Comments	BS5837 Category
21	Acer pseudoplatanus	460	18	6	5	6	5	5	East	6.0	M	Fair	20-40	Deadwood in the crown, Previous branch failures Off site, in highway footway	B1
22	Platanus x hispanica	1000	25	8	7	6	6	5	West	4.0	V	Fair	10-20	Major recent limb failures creating unbalanced open crown, Pruning wounds to crown and main stem Previous crown reduction, Off site, in highway footway	C3

* Where the tree is multi-stemmed the conventions within BS5837:2012 are applied
Tree Number # - indicates estimated values recorded by the Arboriculturalist

Table 2: Root Protection Areas

Tree No.	Species	BS5837 Category	RPA Radius (m)	RPA Area (m2)	RPA Square Side Length (m)
17	Cupressus sp.	C2	1.08	3.7	1.9
18	Cryptomeria japonica 'Elegans'	C1	2.52	20	4.5
19	Acer pseudoplatanus	B2	3.36	35.5	6
20	Aesculus hippocastanum	C1	0.72	1.6	1.3
21	Acer pseudoplatanus	B1	5.52	95.7	9.8
22	Platanus x hispanica	C3	12	452.4	21.3

Table 2: Tree Root Protection Areas

Tree No.	Species	BS5837 Category	RPA Radius (m)	RPA Area (m2)	RPA Square Side Length (m)
1	Acer pseudoplatanus	C1	4.2	55.4	7.4
2	Acer pseudoplatanus	C1	3.12	30.6	5.5
3	Platanus x hispanica	A2	10.44	342.4	18.5
4	Platanus x hispanica	B2	7.56	179.6	13.4
5	Platanus x hispanica	B2	4.56	65.3	8.1
6	Ilex aquifolium	A1	2.4	18.1	4.3
7	Platanus x hispanica	A1	6.36	127.1	11.3
8	Platanus x hispanica	A1	8.76	241.1	15.5
9	Chamaecyparis lawsoniana	C2	1.2	4.5	2.1
10	Prunus avium.	B2	3.12	30.6	5.5
11	Pinus sylvestris	B2	4.44	61.9	7.9
12	Sorbus aucuparia	C2	2.16	14.7	3.8
13	Gleditisia triacanthose	C2	2.88	26.1	5.1
14	Sorbus aucuparia	C2	1.44	6.5	2.5
15	Robinia pseudoacacia	C2	3.24	33	5.7
16	Acer platanoides	B2	3.12	30.6	5.5

Table 3: Tree Work

Tree Works

Tree Felling Requirements –

All removals should be cross referenced to the Tree Retention and Removal Plan – Figure 02.01

Individual Trees to be removed

T 1, T2, T5, T14, T17, & T18

Tree Pruning Works

(*All pruning works to be specified at the time of Tree Protection Fencing erection by Consultant Arboriculturalist*).

Individual Tree

T3, T4 & T13

Figures

Appendix A

Methodology

General

Trees were inspected from ground level during a site visit. All data was recorded electronically within a ESRI ArcPad project and then upon return to the office it was imported into an MS Access database. Individual tree numbers and locations were plotted by eye on to a drawing at the time of the survey. Tree positions were then related to a Topographical survey of the site provided, where not shown on the topographical survey tree positions have been plotted by eye only and require confirmation. Colour coded versions of the drawings form part of this report. (Figure 1).

The data recorded includes:

- Height - data gathered using a Suunto optical clinometer PM - 5/1520. Where access to the tree was not possible the Heights were estimated.
- Diameter - measurements taken at 1.5 metres above ground level (or where multiple stems exist complying with requirements for BS5837).
- Tree crown spread – estimated measurement of the four cardinal points to provide information to be used with the arboricultural constraints plan
- Tree Crown Clearance – crown height above ground level
- Tree Condition - judged visually using the guidelines produced in the report. The condition is indicated with the appropriate colour on the map found in the report. (see Figure 1)
- Age class - estimated from an examination of the tree in question.

Age Classification

The following classification is employed:

Y - Young:	Saplings and young trees under 10 years of age
SM – Semi-Mature:	Trees older than 10 years but less than 40% of the life expectancy of their species.

EM – Early-Mature:	Trees between 40% and 70% of the life expectancy of their species.
M - Mature:	Trees between 70% and 100 of the life expectancy of their species.
OM - Overmature:	Trees considered to be beyond the normal life expectancy of their species.
V – Veteran:	Trees that show features of biological, cultural or aesthetic value that are characteristic of an individual surviving beyond the typical age range for the species.

Estimated Remaining Contribution in Years

The estimated remaining contribution in years is an estimate based on currently known factors of the possible remaining life of the tree as an asset. Clearly, it is impossible to predict changes in condition which may occur in the future and this reflects what is considered reasonable under existing circumstances. The following classification is employed:

Death or removal is likely within less than 10 years
Death or removal is likely within 10+ years.
Death or removal is likely within 20+ years.
Death or removal is likely beyond 40 years
The estimated remaining contribution in years will be dependent on the interaction of the typical longevity of the species, its current age and condition with prevailing environmental factors. The estimated remaining contribution in years also dependent on future tree management that can extend useful life in some instances.

Tree Condition.

The tree survey assessed the individual condition of all trees identified on the site. The assessment of condition is based on a visual and professional view.

The categories considered for Physiological Condition are good, fair, poor and dead.

Structural Condition is also commented on and this will include such items of presence of decay and physical defects.

Trees are living organisms and their condition can change rapidly in response to environmental variables. Condition remarks refer to the date of survey and cannot be assumed to remain unchanged. While there is no such thing as a safe tree, regular inspection of trees is recommended to reduce the foreseeable risks associated with trees. There is currently no published guidance from the UK insurance industry on the frequency of tree inspections. In the

German courts a bi-annual routine inspection is normally expected for older street trees, giving an indication of the rapidity of change in condition that can occur.

Preliminary Management Recommendations

Recommendations are given where it is felt by the arborist that further investigations are required due to suspected defects and work recommendations for pre construction tree work.

Tree Categorisation Using BS 5837 Methodology

The trees surveyed were categorised using the method explained in BS5837:2012. This method categorizes individual trees, groups and woodlands in a systematic way. Each tree, group or woodland is identified on an attached plan.

Groups are identified as those trees forming a single arboricultural feature with trees that provide companion shelter, are avenues or screens or cultural.

Initially the surveyor will determine if the tree should be regarded as a U category tree. U category trees are those that are low value trees that have little future due to physiological and structural condition.

Other trees are graded A, B or C. The initial category should reflex the trees value in making an important contribution to the amenity of the site over a period of time. The higher the category the longer the perceived time period.

A sub category is included 1, 2 or 3. This sub category reflects the type of value the surveyor feels the tree presents in regards its value to 1 – arboricultural, 2 – landscape, 3 – cultural or conservation.

The cascade chart used is included as Appendix 3 of this report.

Appendix B

The Tree Constraints Plan

The Tree Constraints Plan (Figure 1) is designed to show the influence that the trees have upon the site by virtue of their size and position. The plan seeks to act as a design tool that shows both the above and below ground constraints presented by the trees.

The information provided within this section of the report is to assist in the interpretation of the Tree Constraints Plan and aims to ensure that those trees selected for retention can be successfully integrated within the proposed development.

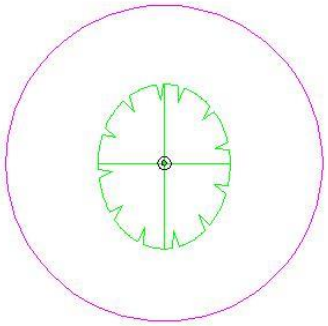
It should be noted that some of the tree positions shown on the plan have been plotted by eye to an Ordnance Survey base map and as such should be considered to be of a provisional nature.

Below Ground Constraints

Root Protection Areas

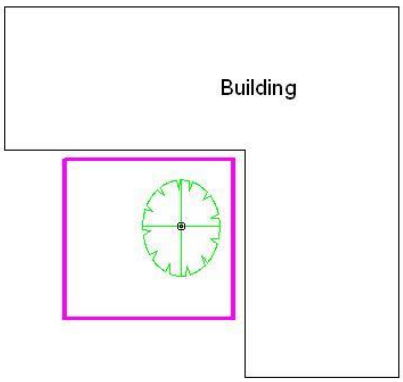
Root Protection Areas for each tree and group of trees surveyed have been determined in accordance with BS5837:2012 and a schedule of Root Protection Areas is attached to this report as Table 2.

As shown below Root Protection Areas (RPA's) for the trees, where no significant constraints to root development are considered to be present, have been plotted onto the Tree Constraints Plan as circles, with the tree located centrally, extending to encompass the area of ground, and thus the rootable soil volume, required for protection.



Where tree root spread is considered to have been influenced by site conditions the trees RPA's have been plotted to the Tree Constraints Plan as a polygon. The plotted polygon is of the same area as it would be as a circle and its shape reflects an arboricultural assessment of likely root distribution.

An example of a polygonal RPA, considered appropriate due to the presence of a building in close proximity to a tree, is shown below.

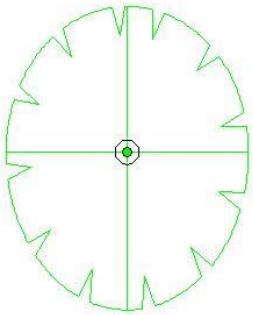


Where possible all development, including new hard landscaping, shall be situated outside of the retained trees designated Root Protection Areas.

Above Ground Constraints

Existing Canopy Spreads

The existing canopy spreads of the trees on site are shown on the Tree Constraints Plan as depicted below.



The current spread of the tree is a constraint due to its dominance, size and movement in strong winds.

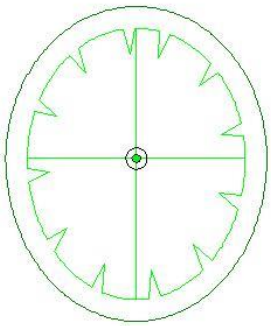
It will typically be unacceptable to design any built development within the current spread of a tree.

Where built development is proposed in close proximity to existing trees consideration should be given to the amount of working space required to allow its construction.

Future Tree Growth

Some of the trees surveyed are not yet mature and they have the potential for future growth. Where these are to be retained consideration to their ultimate crown spread should be given as future branch growth may result in interference with proposed development, damage to branches and the need for a tree pruning regime.

To facilitate assessment of future tree growth maximum expected canopy spreads have been marked on the Tree Constraints Plan (Figure 1) as shown below.



The area of mature tree spread is estimated by the arboriculturist and is their best judgement of mature crown spread based on experience and with regard to the current tree growth observed on the site.

Within the area of maximum branch spread construction activities should be restricted for the long-term health and vigour of the trees.

In this respect it is considered that within the area of maximum branch the construction of utility buildings, such as single storey garages or sheds and the installation of hard surfaces would generally be an appropriate form of construction, however should car parking be proposed beneath the ultimate spread of trees the likelihood of fruit fall, leaf litter or sap exudate causing a nuisance must be considered.

In addition it is important to consider the likelihood of damage to trees or structures that may be caused by continuous whipping of branches in windy conditions. In such circumstances branches may have to be repeatedly cut back which will introduce wounds in the tree and may spoil its form or shape. In general terms trees should not be retained upon the basis that their ultimate branch spread can be significantly controlled by periodic pruning.

Canopy Height / Clearance

The height and growth direction of the lowest branch of each tree is recorded in the Tree Data Schedule contained within this report as Table 1. Additionally the vertical clearance of the trees canopy above ground level is recorded within the Tree Data Schedule.

The two figures can be used to inform the extent to which a trees crown may be at risk of damage during development as a result of vehicular or plant movements within the site and to assess the need for additional protective measures to be implemented to protect low branches.

In particular it should also be noted that where the Root Protection Areas for retained trees do not extend to the edge of existing canopy spreads it is possible that those parts of the trees extending beyond the RPA fencing may sustain damage during construction.

Where this occurs there are two primary options available to manage and minimise the potential for damage to tree canopies to occur during development and these may be used singularly or in combination.

The first option is to create a Construction Exclusion Zone (CEZ), by the erection of protective fencing, around the full extent of the trees. The second is to undertake pre-development pruning works to the trees to reduce the potential for branch damage to occur.

Shading

It should be appreciated during the design of the development that trees can cause shading and obstruction of daylight and sunlight. It should be recognised that the extent of shading likely will vary with tree species, canopy shape and size, foliage density, time of year and sun elevation and that such shading will often be seasonal and diffuse.

Shading has been shown on the constraints plan, but this is a very basic shade pattern and it should not be considered as a definitive pattern. Shade and it affects/benefits to residential buildings should be considered by the designers within the overall site appraisal for the building layout.

Appendix C

BS5837 Cascade Chart for Tree Quality Assessment

Table 1	Cascade chart for tree quality assessment			
Category and definition	**Criteria (including subcategories where appropriate)**			**Identification on plan**
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	□ Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U 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; see **4.5.7**.*			Dark Red
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
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 are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light Green
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	Mid Blue
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	Grey

Appendix D

Botanical and Common Names of Trees on Site

Botanical Name	**Common Name**
Acer platanoides	Norway Maple
Acer pseudoplatanus	Sycamore
Aesculus hippocastanum	Horse Chestnut
Chamaecyparis lawsoniana	Lawson Cypress
Cryptomeria japonica 'Elegans'	Japanese Red Cedar
Cupressus sp.	Cypress in variety
Gleditsia tricanthos	Honey Locust
Ilex aquifolium	Holly
Pinus sylvestris	Scots Pine
Platanus x hispanica	London Plane
Prunus avium	Cherry
Robinia pseudoacacia	False Acacia
Sorbus aucuparia	Rowan

Appendix E

Tree Protection Barriers

Root Protection Area Barrier Details

Protective Barrier Specifications

Since trees are living organisms which interact with their immediate environment any changes made to their surroundings may have a bearing on that trees future. Developing a site will undoubtedly place any trees within close proximity under some level of stress, which could predispose them to infection. The aim of this method statement is to limit the amount of stress induced by introducing protection measures.

The most effective way of offering protection is by erecting protective barriers set at a distance from the tree stem using the methods given within BS 5837: 2012 Trees in Relation to Design, Demolition and Construction. Barriers should be braced and constructed to resist impacts; see figures 1 & 2 below for barrier specifications. Barriers can be of an alternative specification to that within the BS5837:2012 provided it is approved by the Local Planning Authority Tree Officer.

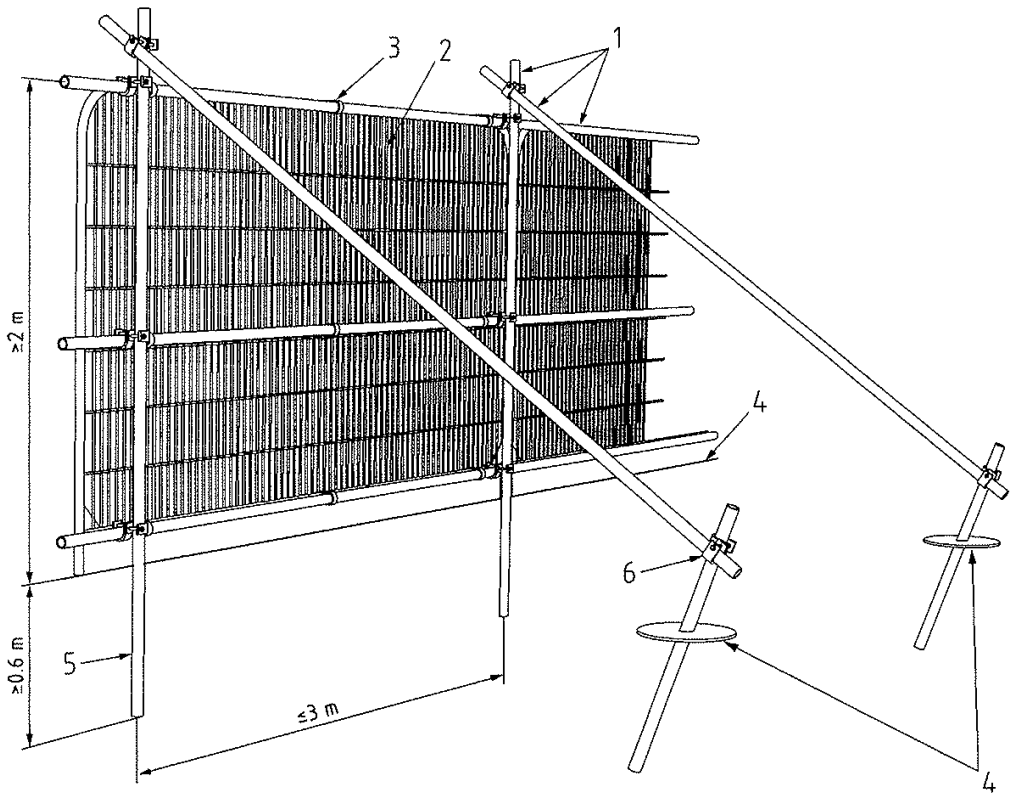
Barriers should be erected before any works commence on site with the exception of recommended tree work. Areas of retained and future structure planting should be similarly protected.

All personnel should be made aware of the protected areas and instructed to keep them free of materials, waste and excess soil. Soil disturbance should be prohibited and travel of any kind, including foot traffic should also be excluded within the root protection area (RPA) unless previously agreed and adequate ground protection has been installed. Where foot traffic is agreed within the RPA, single thickness scaffold boards laid over a compressible material on a geotextile, or supported by scaffold should suffice. Where vehicular access through the RPA is agreed an engineer should be consulted to design adequate ground protection methods.

Suggested Barrier Specification (as per BS5837: 2012)

Figure 1

Figure 2 **Default specification for protective barrier**

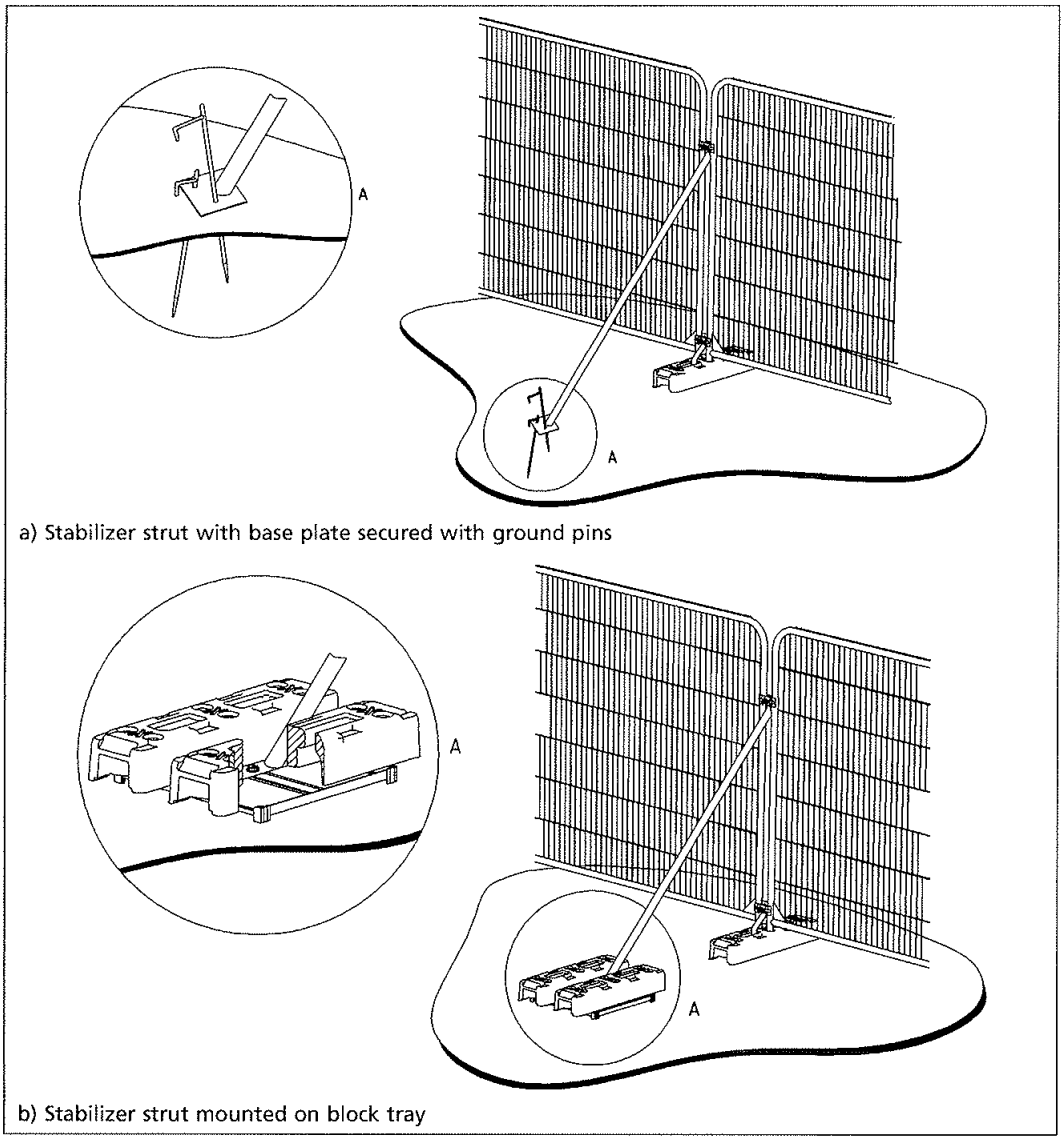


Key

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

Figure 2.

Figure 3 **Examples of above-ground stabilizing systems**



Appendix F

Construction Exclusion Signage - Example

PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.

TREE PROTECTION AREA

KEEP OUT !

(TOWN & COUNTRY PLANNING ACT 1990)

TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.

CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION

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

Appendix G

Arboricultural Site Register– Example Template

ARBORICULTURAL SITE REPORT

PROJECT: *XXX, XX Street, XXX Town*	**SITE CONTACT:** *Mr XXX*	**REPORT NO:** *001*
INSPECTION COMPLETED BY: *Mr XXX*	**DATE AND TIME:** *XXX*	**SHEET:** *X OF X*

12.1 ITEM	LOCATION	NOTES / RECOMMENDATIONS	ACTION
1	*E.g. Adjacent to T999, north of building*	*E.g. Damaged fence, materials spilled into RPA, further inspection requirements, damage to tree*	*E.g. Reinstate fencing, make good levels with topsoil*
2			
3			

CIRCULATION:

Mr XXX

Mr XXX

Appendix H

Arboricultural Glossary

Abiotic Factors - Nonliving factors of the environment, including temperature & wind.

Age-class - A general classification of the tree into either - young, semi-mature/maturing, mature, over-mature, or senescent.

Apical Bud/Shoot – The apical bud, also known as the leading shoot, is responsible for shoot extension and is dominant.

Apical Dominance – A singular, leading shoot remains dominant.

Arboreal - In connection with, or in relation to, trees.

Arboriculturalist – Person who has, through relevant education, training and experience, gained recognised qualifications and expertise in the field of trees in relation to construction.

Arboricultural Implications Assessment (AIA) – Study, undertaken by an arboriculturalist, to identify, evaluate and possibly mitigate the extent of direct and indirect impacts on existing trees that may arise as a result of the implementation of any site layout proposal.

Arboricultural Method Statement (AMS) – Methodology for the implementation of any aspect of development that has the potential to result in the loss of or damage to a tree. Note The AMS is likely to include details of an on-site tree protection monitoring regime.

Biotic factors - Living factors. For example, animals and pathogens.

Bottle Butt – Term used to describe shape of stem base, usually associated with an internal defect – refer to 'Reaction Wood' below.

Branch union/junction - The point at which a branch joins a larger stem. Can be a point of weakness, especially in certain species.

Cambium - A lateral meristem (see below) in vascular plants located just beneath the bark responsible for secondary growth, e.g. production of annual growth rings.

Canker – A clearly defined area of dead and sunken or malformed bark, caused by bacteria or fungi. Can have a bearing on structural integrity of infected limb(s) depending on size and location.

Chlorosis/Chlorotic – Abnormal yellow or yellow-green coloration of usually green leaves. Essentially a reduction of chlorophyll levels often as a result disease or nutrient deficiency.

Co-dominant stems - A growth characteristic, where two or more stems of similar size grow from the same point. Can create an inherent weakness.

Compaction - The compressing & hardening of soil around tree root systems, due to vehicular/pedestrian use etc. Loss of pore space between soil granules limits water movement and gaseous exchange, and inhibits root growth.

Competent person – Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached

Note 1 A competent person understands the hazards and the methods to be implemented to eliminate or reduce the risks that can arise. For example, when on site, a competent person is able to recognise at all times whether it is safe to proceed.

Note 2 A competent person is able to advise on the best means by which the recommendations of this British Standard may be implemented.

Condition – Assessment based on a visual and professional view giving consideration to many factors such as tree health, structural integrity and suitability of its position.

Construction Exclusion Zone – Area based on the RPA (in m²), identified by an arboriculturalist, to be protected by development, including demolition and construction work, by the use of barriers and/or ground protection fit for purpose to ensure the successful long-term retention of a tree.

Coppice - The method of managing trees by cutting the stems at between 1.0 inch and 1.0 foot from the ground level on a regular cycle, the cut stumps of the trees or shrubs are allowed to re-grow many new stems.

Crown spread - Gives distances between extreme limits of the crown and the stem, usually along the four compass points. Helps to show crown symmetry.

Crown Reduction – The removal of branch ends to reduce the extreme limits of a trees branch spread and height.

Crown Thin – The removal of selected branches within the crown to thin the internal branch structure.

D.B.H. - 'Diameter at Breast Height', an industry standard to gauge tree stem size and development. Within arboriculture, breast height is taken to be 1.5m above ground level.

Dieback - The reduction in crown vigour and extension growth progressing to death of distal parts; often associated with decline.

Epicormic/adventitious growth - New growth from dormant buds that can often form tenuous attachments. Although some species readily form such shoots, it can be an indication of stress.

Feathered Whip – Size of tree for planting, usually ranging from 1.25m to 2.5m in height.

Form - A general assessment of the shape and position of the tree within its' environment.

Frass – Debris such as bore dust left by wood boring insects.

Hanger – Term used to describe a branch that has become detached and is being supported by other branches. Can be a hazard to persons and property below.

Hazard Beam – After the loss of a distal part, a limb concentrates growth upwards creating adverse end weights that can render the limb susceptible to failure.

Heavy Standard – Size of tree for planting, usually above 3.5m in height.

Included bark – Growth characteristic usually caused when two or more stems/branches growing in close proximity 'fuse' together entrapping the bark from when the parts were separate in the middle, creating a structural weakness.

Meristem - The undifferentiated plant tissue from which new cells are formed, such as that at the tip of a stem or root.

Meristematic Disorder – A growth disorder caused by a disruption of the meristem (see above) from any of a number of biotic factors (see above). Manifests as growths such as 'Witches Brooms' & 'Galls'.

Necrosis/Necrotic – Death of tissues usually characterised by a blackening in colour.

Occlusion/Occluded – Normally used to describe the overgrowth of a wound. Also, immoveable foreign objects in contact with a tree part can become encased or 'occluded' by the tree as it grows incrementally.

Pathogen - An agent that causes disease, especially a living microorganism such as a bacterium or fungus.

Plasticity index - The table used to calibrate the shrinkability of a clay soil.

Pollard – The removal and subsequent regular re-removal of the crown of a tree above animal browsing height. Can be an effective method of controlling the size of trees in urban areas. This is ideally begun in the trees early stages and maintained throughout its life.

Reaction wood - Essentially additional wood laid down by the tree to compensate for structural defects such as cavities.

Ring barking/Girdling – the removal of bark around the entire circumference of a stem or branch, causing the death of all distal parts.

Root Protection Area (RPA) – Layout design tool indicating the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree, shown in plan form in m^2.

Saprophyte – An organism which exists on dead plant material.

Scaffold branches - The main structural branches within the crown.

Services – Any above ground and piped and/or ducted underground infrastructure including water main, electricity supply, gas supply, fibre optic utilities, telecommunications cabling, storm and foul water drainage, including temporary storage for run-off, pumping stations, interceptors and other allied buried structures.

Shrinkable clay – Clay soil which alters in volume depending on moisture content. Property sited on shrinkable clay can suffer subsidence damage due to soil desiccation; this can be due to the water uptake of nearby vegetation, including trees.

Special engineering – design of a structure with the physiological requirements of trees as the priority.

Standard – Size of tree for planting, usually ranging from 2m to 3.5m in height.

Structure – Man-made object, such as a building, carriageway, path, wall, services, and built and excavated earthworks.

Transplant – (1) size of tree for planting, usually ranges from 0.2m to 0.9m in height (2) the relocation of a tree or shrub including a given portion of the root system.

Tree Constraints Plan (TCP) – Plan prepared by an arboriculturalist for the purposes of layout design showing the RPA and representing the effect that the mature height and spread of retained trees will have on layouts through shade, dominance, etc.

Tree protection plan – scale drawing prepared by an arboriculturalist showing the finalised layout proposals, tree retention and tree and landscape protection measures detailed within the arboricultural method statement (AMS), which can be shown graphically.

U.L.E – 'Useful Life Expectancy' is an estimate based on currently known factors of the possible remaining life of the tree as an asset.

Veteran tree – Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

Vigour - A general classification, as to the present and future potential growth and development of a tree. A comment regarding the health status of the tree specific to its species.

Water Demand - A generic classification of the water demand of specific species as outlined by the NHBC (National House Building Council).

Whip – Size of tree for planting, usually ranging from 1m to 1.75m in height.