Arboricultural Report & Method Statement

for planning purposes
at

16 Daleham Gardens
London
NW3 5DA

on behalf of

Mr Matthew Bellamy

produced by

Crown Consultants Ltd

Crown
Arboricultural
Consultants

Dashboard

This report present the results of a tree survey to British Standard 5837 (2005). It is designed to accompany a planning application for development proposals at 16 Daleham Gardens. Guidance is given within the Appendices to help the reader interpret our findings. The trees surveyed are described in Section 3 and their locations are plotted on the plans within Appendix 6.

This section of the report provides an overview and summary of our findings. The report author will gladly assist with any queries that may arise. His contact details can be found within the footer sections throughout the report.

Tree Protection Status

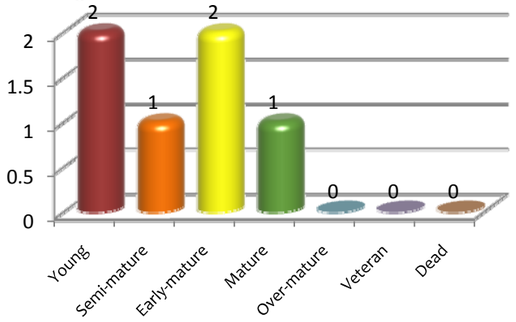
We are informed that:

- The site is within Fitzjohn Netherhall conservation area.
- There are no TPO's affecting trees within the site.

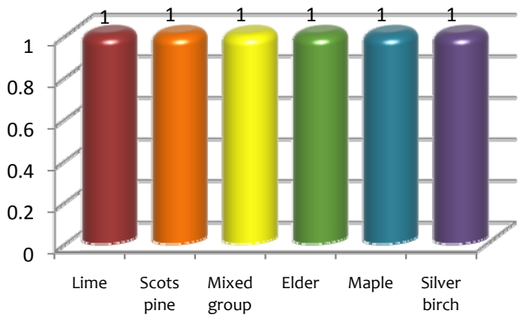
See Section 4 for further details.

Trees surveyed as individual specimens: 4
groups: 2
hedges: 0
shrubs: 0
woodlands: 0

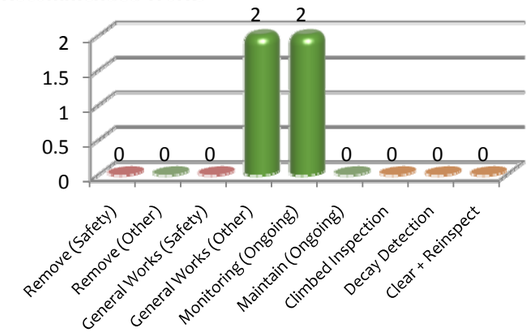
Age Distribution



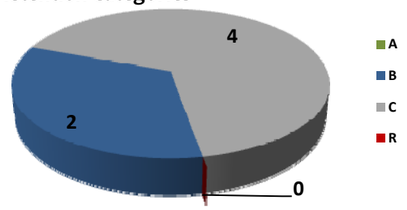
Species Diversity



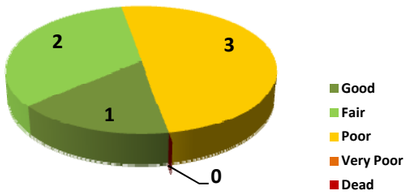
Recommended Works



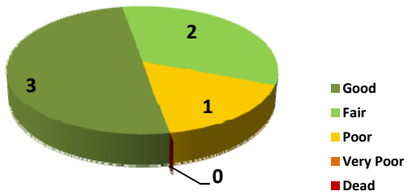
Retention Categories



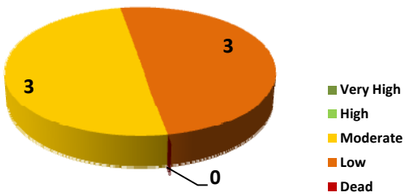
Structural Condition



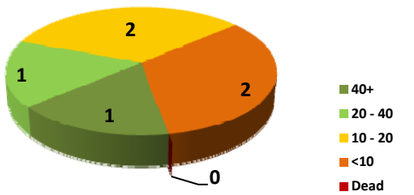
Physiological Condition



Amenity Values



Life Expectancy

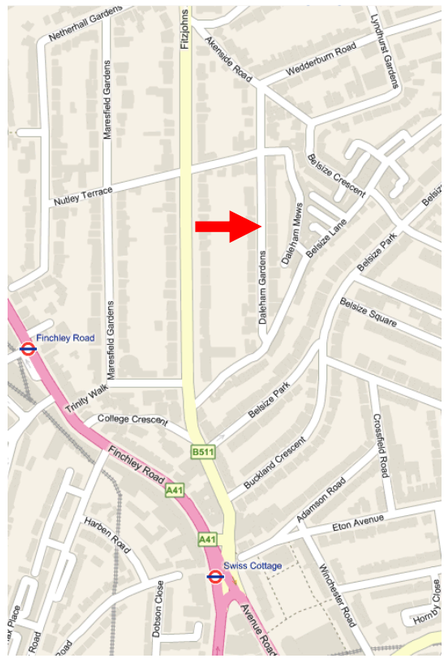


Executive Summary.

- The condition of all trees on site has been assessed and a Retention Category allocated for each tree. Tree locations, canopy spreads, shade constraints and Root Protection Areas are plotted on a Tree Constraints Plan within Appendix 6. A Method Statement detailing tree protection measures has also been included in this report.
- It is proposed to demolish the existing garage and construct a new two storey extension towards the rear/south of the property along with a small single storey extension to the rear of the property. Floor levels are to be reduced within the rear part of the property and part of the rear garden is to be excavated to provide access from the house. A terrace is to be constructed at a higher level with access into the rear garden via a metal stair.
- In order to facilitate this it is proposed to remove four trees from within the rear garden. These are two low quality pollarded limes, a silver birch and a small maple.
- Paving and foundations for the stairs are to be located within the Root Protection Area of one tree. Excavation for these shall be kept shallow to minimise root disturbance.
- All excavation shall occur outside of Root Protection Areas.
- All retained trees are to be protected throughout the construction phase by temporary fencing and ground protection measures. These are illustrated on the Tree Constraints Plan in Appendix 6.

These points are further discussed in sections 4 and 5.

Site Location: 16 Daleham Gardens,



Contact Details

Local Authority:	London Borough of Camden	Tel.	020 79745616
Contact:	Rebecca Kelly - Customer Services		
Architect:	Xul Architecture		
Report Author:	Ivan Button (Crown Consultants Ltd).	Tel.	01422 316660

Contents

1. Introduction

1.1. Instructions and References

1.1.1. Crown Consultants were instructed by Mr Matthew Bellamy of 16 Daleham Gardens to undertake an Arboricultural Survey to British Standard 5837: 2005 guidelines, at the same address and produce our findings in a report. We have since been instructed to produce an arboricultural Method Statement specifying tree protection measures.

1.1.2. Our earlier report dated 16th February 2011(ref 08475) contained an error in that the maple T5 was incorrectly plotted. The earlier report should be superseded with this current report (ref 08457/B, dated 23/02/11) which correctly plots T5.

1.1.3. A résumé of my qualifications and experience are included within Appendix 3.

1.2. Scope and Purpose of the Report

1.2.1. This report is designed to accompany a planning application for development proposals at the above site. Its purpose is to assist and inform the planning process according to guidelines laid out in BS 5837 (2005).

1.2.2. This report is based on the findings of a survey carried out from ground level. No climbed inspections or specialist decay detection were undertaken. Only trees with a stem diameter over 75mm were included, which lie within the site boundary or relatively close to it.

1.2.3. Where appropriate, potentially hazardous trees have been highlighted and appropriate recommendations made. However, this report should not be seen as a substitute for a full *Safety Survey* or *Management Plan* which are specifically designed to minimise risk and liability associated with responsibility for trees.

1.3. Report Format

1.3.1. The main body of the report contains predominantly site specific information. Generic information can be found in the Appendix and Section 5 to help the reader interpret the plans which can be found in Appendix 6.

2. Site Overview

2.1. Location

2.1.1. The site lies within a moderately populated residential area. The co-ordinates are, 51°32'55.05"N 0°10'25.91"W the OS reference is: TQ 2671884884 and the altitude is 73m above sea level.

2.1.2. Our survey was limited to trees within the rear garden and adjacent to it. There is a low espalier lime hedge along the front garden boundary though this is not included within the detailed survey as it is located away from the proposals.

2.2. Site Use

2.2.1. The site comprises a detached house and rear garden. A garage is situated towards the front / south side of the property. Vehicular access exists from the adjacent road, Daleham Gardens.

2.3. Topography

2.3.1. The rear garden is at a lower level than the front garden and is approximately flat with no abrupt level changes. There exists a high wall on the eastern boundary which separates the property from a row of terraced houses. The predominant surface is grassed lawn with areas of flagging.

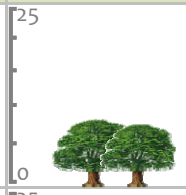
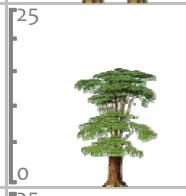
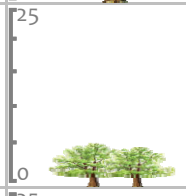
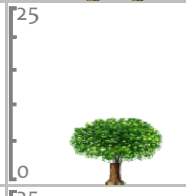
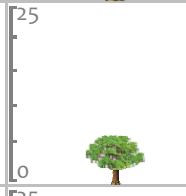
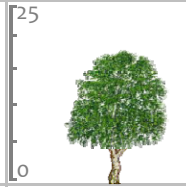
3. Tree Data Schedule

The following pages contain information gathered for each tree during the survey conducted on 15th February 2010.

The Schedule includes scaled tree images based on measurements recorded for stem diameter, crown spread, crown height and overall height. Their purpose is to indicate, at a glance, the relative dimensions of each tree.

Observations and recommendations are made independently of development proposals. Where trees are subsequently recommended for removal to facilitate the development the corresponding reference number is highlighted in grey.

The reader should also refer to the appendices in order to correctly interpret the tree data.

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W / N / E / S	Scaled Tree Diagram (m)	Notes	Recommendations: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category
G1	Early-Mature **Lime** Tilia sp.	av 7.5	av 2.5	av 35	av 3 4.5 1 4 each		Position: Adjacent southt boundary, overhanging the boundary. Form: Single and twin-stemmed, vertical with poorly formed crowns. History: Previously topped at 3m and fused together; multiple pruning wounds. **Defects:** **Poor specimens with ivy on one stem.**	Crown clean & monitor. Moderate	1	Moderate Fair Poor	Low 10-20 C -
T2	Semi-Mature **Scots Pine** Pinus sylvestris.	16	4	av 39	3 3.5 2.5 3		Position: Adjacent south boundary, overhanging the boundary. Form: Single stemmed and vertical with a slight kink and a balanced crown. History: No evidence of significant pruning. **Defects:** **No significant defects.**	No action required. n/a	3	High Good Fair	Moderate 40+ B
G3	Young **Mixed Group**	av 4	av 1	av 19	av 3 5 3 2 each		Position: Small garden specimens, overhanging the boundary. Form: Occasional pruning wounds due to crown lifting, healing well. History: No evidence of significant pruning. **Defects:** **No significant defects observed.** Other: Poorly formed specimens.	No action required. n/a	1	Low Poor Poor	Low <10 C -
T4	Early-Mature **Elder** Sambucus nigra.	8	3	30 @ Base	5 2 4 3		Position: Situated on third party land, overhanging the boundary. Form: Twin-stemmed at ground level with a balanced crown. History: Occasional pruning wounds due to crown lifting (healing slowly). **Defects:** **Minor deadwood to lower crown.** Other: Typical elder form.	No action required. n/a	1.5	Moderate Fair Poor	Moderate <10 C
T5	Young **Maple** Acer sp.	6	2	11	2 2 2 2		Position: Adjacent north boundary. Form: Single stemmed and vertical . History: No evidence of significant pruning. **Defects:** **No significant defects.**	No action required. n/a	3	High Good Fair	Low 10-20 C
T6	Mature **Silver Birch** Betula pendula.	18	5	av 36	4.5 4 4 4		Position: Adjacent north boundary, overhanging the boundary significantly. Form: Single stemmed with a slight lean and a well-formed crown. History: No evidence of significant pruning. **Defects:** **No significant defects.**	Reduce canopy over both properties. Low	3	High Good Good	Moderate 20-40 B-

4. Vegetation Overview

4.1.1. The trees were generally considered to be in good condition with the exception of the lime trees within G1 which have previously been topped and are considered to be poor quality specimens. It is proposed to remove these trees in order to facilitate the development.

4.1.2. The birch tree, T6 has been planted too close to the subject property and would require ongoing crown reduction if it were to be retained. It is proposed to remove this tree in order to facilitate the development.

4.1.3. The Scots pine, T2, is the largest and most significant tree within the rear garden. It is proposed to retain this tree and the proposals have been designed to avoid the constraints it poses. Excavations for the lower patio area lie beyond its Root Protection Area.

4.1.4. Foundations for the proposed metal staircase are to be wide and shallow in order to minimise root disturbance.

4.1.5. The proposed upper patio area shall be constructed to existing ground levels in order to avoid significantly impacting on the roots of T2.

4.1.6. T5 is a small Retention Category C tree which will require removal to facilitate the proposals.

4.1.7. Other vegetation within the rear garden is smaller and shrubby, and is located away from the proposals.

4.2. Tree Protection Status– Site Specific

4.2.1. On 5th January 2011, we were informed, by Rebecca Kelly in Customer Services of London Borough of Camden that:

- The site is within Fitzjohn Netherhall Conservation Area.
- There are no Tree Preservation Orders affecting trees within the site.

4.3. Tree Protection – General Notes

4.3.1. Heavy fines exist for carrying out unauthorised works to protected trees so we advise that further checks are made in case new Orders have been created since the time of writing this report.

4.3.2. Where trees are located in a Conservation Area, works are not permitted without first giving the local authority 6 weeks notice of intention. During this time the local authority may elect to create a Tree Preservation Order or to inform the applicant that they have no objection to the proposed works. If the local authority does not respond within 6 weeks, then the intended work may be undertaken.

5. Method Statement

This section of the report specifies which trees are to be removed along with the tree protection measures required minimise the impact on the trees that are to be retained. The methodology should be agreed by the local authority tree officer and building contractor before construction commences.

All personnel working on the site should be made aware of any sections appertaining to their work. This includes short term contractors and persons responsible for deliveries and installation of services.

A copy of this Method Statement should be available on-site at all times.

The Tree Protection Plan in Appendix 6 accompanies this section of the report.

5.1. Overview of the Development Proposals

5.1.1. It is proposed to construct a two-storey extension to the side of the property which incorporates a garage to replace the existing pre-fabricated garage towards the property front. A small single storey extension is also proposed into the rear garden (the 'sun room').

5.1.2. It is also proposed to reduce the floor levels of the lower-ground floor towards the rear of the property by approximately 600mm. The rear garden immediately adjacent to the property is also to be lowered a similar amount and paved in order to maintain access into the rear garden. This 'lower patio' shall extend approximately 6m into the rear garden. Access up to the existing garden levels shall be via steps. The lower patio shall be located outside the Root Protection Areas of retained trees.

5.1.3. The area immediately beyond this shall also be paved (the upper patio) though ground levels are to be retained approximately as existing, so any impacts on retained trees shall be minimal.

5.1.4. Along the length of the rear elevation a small terrace shall be installed above the height of the sun room. Access from the terrace into the rear garden shall be via a new staircase down to the upper patio.

5.1.5. Other minor refurbishment works are not relevant to this arboricultural report.

5.2. Timing of Operations

5.2.1. Activity within the site shall be phased according to the following schedule:

- **Phase 1.** Specified tree removal.
- **Phase 2.** Installation of the tree protection fencing and ground protection measures.
- **Phase 3.** Demolition of existing garage, construction of side and rear extensions, installation of upper and lower patios, installation of terrace and new staircase, reduction of floor levels.
- **Phase 4.** Removal of protective fencing. Undertaking of further landscaping operations and minor refurbishment. No heavy construction activity to occur.

Pre-Construction Phase

5.3. Tree Works

5.3.1. The following table specifies the tree works which will be required prior to the erection of protective fencing:

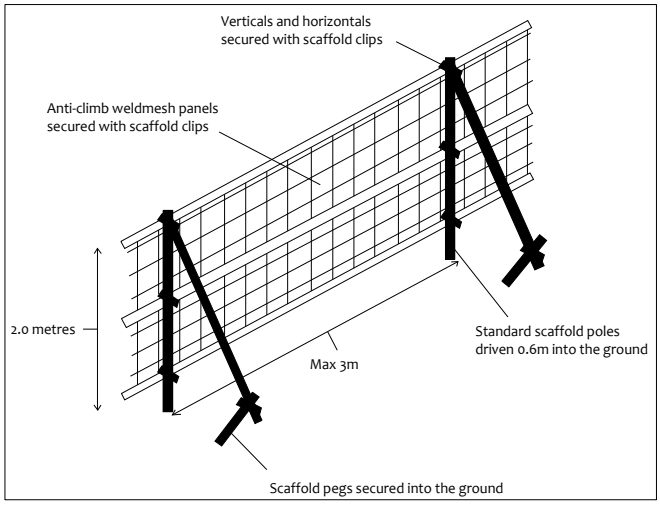
Tree Reference	Action Required
G1, T5, T6	Fell to ground level.

5.4. Tree Protection Fencing

5.4.1. Fencing needs to be installed according to the positions indicated on the Tree Protection Plan (TPP) within Appendix 6. A sturdy *In-Ground System, or Back-Stay System,* shall be installed where indicated by a solid purple line as specified below:

5.4.2. The In-Ground System

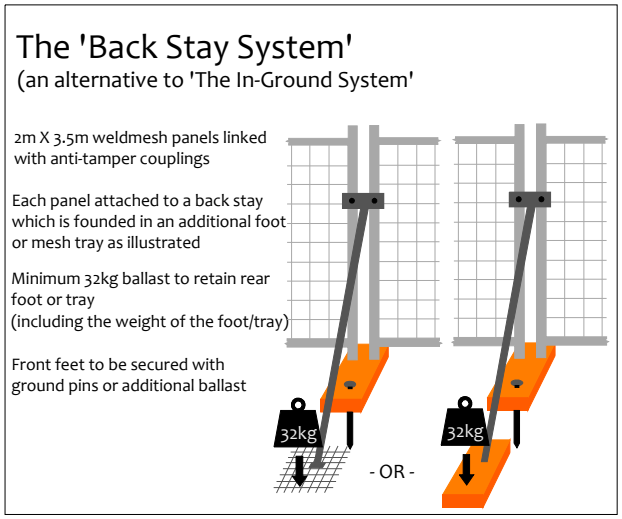
5.4.3. This system involves driving scaffold poles into the ground, onto which are affixed horizontal scaffold poles and diagonal bracing struts. Anti-climb weldmesh panels are secured to this scaffold framework using standard scaffold clips. The system is illustrated in the diagram to the right and is based on BS 5837 guidelines. This kind of system is robust enough to withstand occasional knocks by plant machinery.



5.4.4. The Back-Stay System

5.4.5. This system is robust and may be installed as an alternative to the In-Ground System. It is also more practical over hard surfaces.

5.4.6. Within this system, each anti-climb panel (minimum height 2m) is attached to a diagonal back stay connected to an additional foot or tray with additional ballast. The total weight of the foot/tray plus ballast should total not less than 32kg.



5.4.7. The panel should be secured in the edge holes of the front foot and one foot per two panels should be further secured using ground pins. This system will withstand occasional knocks by machinery and is not easily relocated.

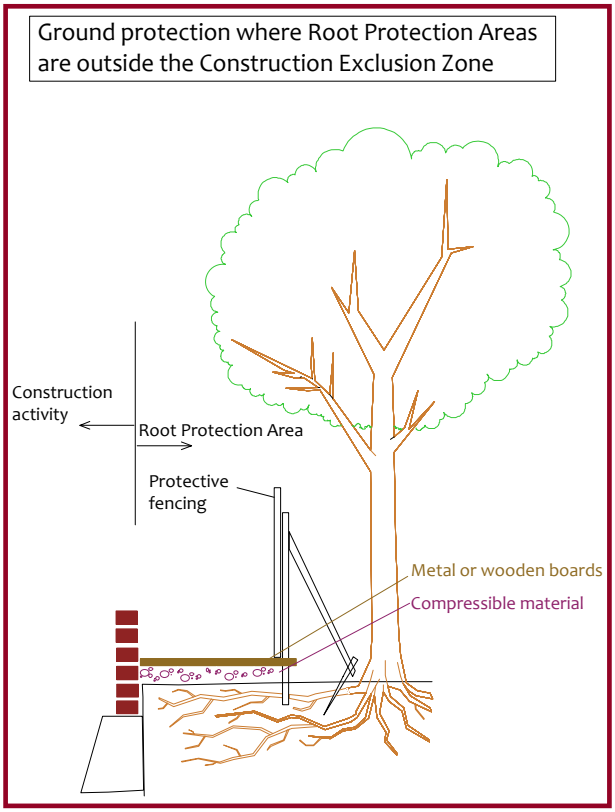
5.5. Limitations on Construction Activity

5.5.1. The Tree Protection Plan indicates a zone where all construction activity shall be forbidden (area shaded purple). Around this area, notices will be attached to the fencing displaying the words "*Construction Exclusion Zone*" and listing forbidden activities (see Section 5.8).

5.5.2. Also indicated are *Restricted Activity Zones* where limitations apply to construction activity as detailed in Sections 5.9 – 5.10.

5.6. Ground Protection Measures

5.6.1. Within Restricted Zone A (shaded orange on the Tree Protection Plan), ground protection measures shall need to be installed. The purpose of the ground protection is to prevent soil compaction and contamination where it is not practicable to fence off Root Protection Areas.



5.6.2. In this area, at least 100mm of a compressible material (e.g. woodchip) shall be evenly distributed. Its purpose is to spread any load placed upon it uniformly over a wide area of ground beneath. Above this, 25mm wooden boards or 12mm road plates shall be secured.

5.6.3. These ground protection measures shall be timetabled before commencement of demolition and construction activity and before the arrival of plant machinery or materials. They shall remain in place until all heavy construction activity is complete or until they are due to be replaced with new hard surfacing.

5.7. Pre-Commencement Inspection

5.7.1. Once the above works are completed, the *appointed arborist* (see Section 6.2) shall be invited to inspect the protection measures.

5.7.2. No work shall commence until the protection measures satisfy the specifications within this report. The local authority shall be informed that this is the case according to the *Inspection and Reporting Schedule* within Section 6.

Construction Phase

5.8. Construction Exclusion Zone

5.8.1. The fenced off area shall be treated as a *Construction Exclusion Zone* and the following restrictions shall apply:

- No construction activity whatsoever must occur within this area.
- No tree works, other than those specified in this report.
- No alterations of ground levels or conditions.
- No chemicals or cement washings.
- No excavation.
- No temporary structures.
- No storage of soil, rubble or other materials.
- No vehicles or machinery to be used or parked.
- No fixtures (lighting, signs etc) to be attached to trees.
- No fires within 10 metres of the canopies of any tree or hedge.

5.9. Restricted Activity Zone A

5.9.1. Within this zone (see Tree Protection Plan) pedestrian access will be required to facilitate construction.

5.9.2. The following restrictions shall apply:

- No building works shall be permitted.
- Ground protection measures shall be installed as specified in Section 5.6. And shall remain in place throughout the entire construction phase.
- Ground levels to remain as existing (maximum 100mm alterations).
- No spoil shall be stored.
- Storage of materials shall be limited to that which is required for the task in hand. Heavy materials that require storage for more than two days shall be stored outside the Restricted Zone.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.
- No machinery in excess of 3m tall shall operate in this area.

5.10. Restricted Activity Zone B

5.10.1. Within this zone (shaded blue on the Tree Protection Plan) it is proposed to install paving and foundations for the new staircase. Excavations are proposed alongside the Root Protection Area of T2 in order to install the retaining wall separating the upper and lower patios.

5.10.2. The following restrictions shall apply:

- A shallow pad foundation shall be utilised for the staircase. Excavation shall be limited to a maximum depth of 150mm and shall be undertaken using hand tools only. The stair foundation shall not be located within 2m from the stem base of T2.
- Excavation for paving for the upper patio shall also not exceed 150mm.
- Excavation for the retaining wall separating the upper and lower patios shall be undertaken using hand tools only in the presence of the appointed arborist. The wall shall be built close to the rear edge of the foundations and the earth beyond this shall remain undisturbed as much as possible.

- Roots in excess of 25mm which are unearthed are to be retained intact if possible and covered with wet sacking whilst exposed.
- All roots in excess of 10mm which cannot be retained shall be neatly pruned with secateurs.

5.11. Use of Heavy Plant

5.11.1. All machinery operatives are to be made aware of the Construction Exclusion Zone and Restricted Zones.

5.11.2. All machinery operatives are to respect these zones and ensure that no damage occurs to trees due to the careless use of machinery.

5.12. Siting of Cabins and Storage of Materials

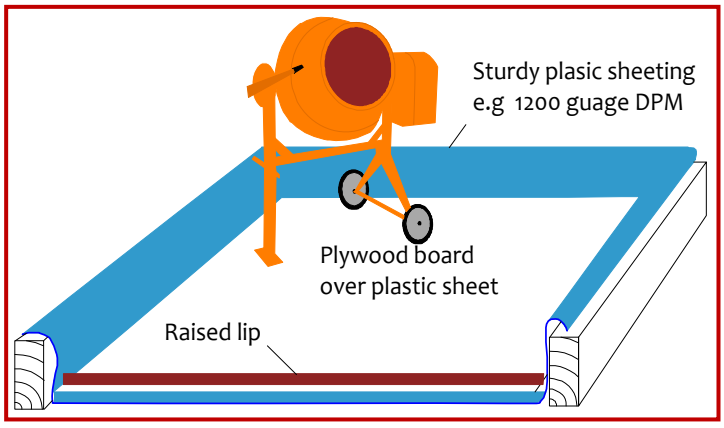
5.12.1. Cabins and heavy building materials may be located or stored anywhere outside of the Construction Exclusion Zone and Restricted Activity Zones.

5.12.2. Any proposal to install cabins or materials within Restricted Zones or Exclusion Zones shall be agreed in writing with the local authority prior to installation.

5.13. Pedestrian Paving

5.13.1. Any pedestrian paving or patios that may be installed over Root Protection Areas, as part of a post construction landscaping scheme, shall be constructed in a manner sympathetic to tree roots. Excavation shall be limited to 100mm. Paving with a thickness of 50mm bedded on mortar, or sand, bearing directly onto the ground, with a finished surface level with existing ground levels will be acceptable. No retaining kerbs shall be used.

5.14. Hazardous Materials



5.14.1. All mixing of cement based materials is to take place outside the Construction Exclusion Zone and Restricted Zones. Provision shall be made to ensure that the mixing area is contained so that no water run-off enters the Root Protection Area of any trees (see diagram for example). Mixers and barrows shall be cleaned within this area.

5.14.2. Cleaning water shall be removed from site.

5.14.3. All other chemicals hazardous to tree health, including petrol and diesel, are to be stored in suitable containers as specified by current COSHH Regulations, and kept away from Root Protection Areas.

Post-Construction Phase

5.15. Removal of Fencing

5.15.1. This will be done after all major construction work is complete. Vehicular access will not be permitted within the Root Protection Areas.

5.15.2. The local authority tree officer shall be made aware that the fencing is to be removed.

5.16. Landscaping

5.16.1. No machinery used within landscaping operations is to operate within the Root Protection Areas of retained trees.

5.17. Tree Works

5.17.1. It is anticipated that no remedial works will be required if the Arboricultural Method Statement is implemented since the trees shall be well protected. However, the trees shall be inspected after completion of all major construction activity as indicated in the Inspection Schedule within Section 6, in case any unforeseen damage has occurred and remedial works are required.

6. Inspection and Reporting

6.1. General

6.1.1. In order to ensure that the trees are adequately protected it shall be necessary to periodically monitor the works. This will be done by the appointed arborist (see Section

6.1.2. 6.2 below) who will provide the tree officer with a copy of the inspection details. At each stage of inspection the tree officer will be invited to attend.

6.1.3. The following inspection schedule shall be kept on site and available to interested parties at all times.

Inspection	Attendees	Comments
Pre-Construction Meeting To occur after tree works are completed and fences and ground protection measures are installed, but before commencement of any other activity, including demolition or soil stripping	Site manager and appointed arborist to attend. Tree officer to be invited	Tree protection fencing locations & specification checked. Additional ground protection measures checked. Further protection measures / restrictions agreed
Soil stripping, excavation for foundations in Restricted Zone B	Site manager and appointed arborist to attend. Tree officer to be invited	Entire operation to be overseen
Post-Construction Meeting Post major construction activity but prior to removal of fencing & landscaping operations	Site manager and appointed arborist to attend. Tree officer to be invited	Retained trees inspected. Further landscaping operations and restrictions to be agreed

6.2. The Appointed Arborist

6.2.1. The appointed arborist must be acceptable to the local authority. He / she must have a good understanding of the project requirements and be suitably qualified to understand the hazards associated with development near to trees.

6.2.2. The appointed arborist should work closely with the site manager and shall have the authority to insist upon work stoppage until resolution of any major issues arising which could be detrimental to the health of protected or important trees.

6.2.3. The appointed arborist must keep the local authority updated at each of the stages within the inspection schedule and will report any unexpected issues arising throughout the project which could impact on trees.

6.2.4. Crown Consultants are able to offer these services or to nominate suitably qualified persons.

7. Signature

This report represents a true and factual account of the trees at

16 Daleham Gardens
London
NW3 5DA

Signed

.....

Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

on behalf of

Crown Consultants Ltd

Dated

23rd February 2011

Arboricultural

Consultants

Appendix 1: Understanding BS 5837: 2005

Aimed predominantly at arboriculturalists, architects, developers and planners, this Standard offers a balanced approach to harmonising development with existing trees. It acknowledges the positive contribution trees may offer to a site, as well as the negative aspects of retaining inappropriate trees. The stresses that development may place on existing trees are recognised, and guidance is offered regarding solutions. The Standard suggests a three stage approach:

A1.1 Stage 1: Initial Survey and Report

This identifies the existing trees and allocates to each a ***Retention Category*** which takes into account amenity value, condition and realistic life expectancy. The categories are allocated independently of development proposals. Our interpretation of the retention categories is explained below:

A1.1.1 Retention Categories

A Category: Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

B Category: Trees of moderate quality and amenity. Usually mature trees, or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

C Category: Trees of low quality and amenity. The removal of these trees should generally be seen as acceptable in order to facilitate development.

R Category: Trees whose structural condition is such that they should be removed if development is to proceed.

A1.1.2 Occasionally trees are borderline and do not fall neatly into one of the categories A, B or C. In such cases we apply a superscript ($^{+/-}$) such that:

C^{+} Indicates borderline C/B, though Category C is deemed to be the most appropriate.

B^{-} Indicates borderline C/B, though Category B is deemed to be the most appropriate.

A1.1.3 The British Standard suggests that each of the A, B and C categories may be further subdivided (A1, A2, A3, B1, B2, B3 etc) such that subcategory 1 denotes mainly arboricultural values, subcategory 2 denotes mainly landscape values and subcategory 3 denotes mainly cultural values (including conservation). Multiple subcategories may be used.

Our experience suggests that these subdivisions lack clarity and can confuse the reader. Within this report subcategories are **not** denoted. Where appropriate, the use of phrases such as '*Part of a formal group*', or '*Has a high ecological value*', or '*Offers good screening to the site*' are incorporated into the observation section of the Tree Data Schedule. We believe this conveys all relevant landscape and cultural information without unnecessary confusion. Any person wishing clarification regarding subcategories of any trees surveyed should contact the author.

A1.1.4 Tree Constraints Plan (TCP). This indicates the position, crown spread, retention category and root protection area (RPA) of each tree and is used to inform where development may proceed without causing damage to trees.

The RPA marked on the TCP is the area within which the majority of roots are expected to lie. No significant detrimental effects are expected if the RPA can be completely avoided. The Standard suggests a simple formula whereby "radius of RPA" = "12 x stem diameter". This is modified (according to the Standard) to take into account specific factors which influence rooting activity, e.g. underground structures. In exceptional circumstances it may be acceptable to make incursions into the RPA, though this should be discussed with an arboriculturalist and may ultimately lead to the refusal of planning consent.

The British Standard suggests that shading should be indicated on the TCP, denoted as a circle-segment drawn northwest to due-east with a radius equal to the height of the tree. We deem this to be misleading since it does not reflect true shading patterns which vary dramatically according to tree form, time of year and time of day. For these reasons we do not generally illustrate shade constraints according to this formula, though if requested we will provide them.

A1.2 Stage 2: Arboricultural Impact Assessment

This type of report identifies and evaluates the impact that development may have on existing trees and vice versa.

A1.3 Stage 3: Arboricultural Method Statement

This type of report indicates the necessary methodology required to protect trees from potential damage during the development process. Typical issues addressed are direct damage to trunk and branches, by cranes or other equipment, damage to roots caused by installation of underground services or foundations, and the use of chemicals which are hazardous to tree health, e.g. cement.

One of the primary concerns of this type of report is soil compaction caused by traffic passing over tree rooting areas. This is easily overlooked by developers, though it prevents roots from accessing oxygen and may lead to a significant deterioration in tree health.

A *Method Statement* is often requested by local authorities during the latter stages in the planning process and may be enforceable as part of the planning conditions. It is essential that a realistic proposal is put forward which balances tree protection requirements with the practicalities of construction or demolition.

Appendix 2: Survey Methodology

A2.1 A ground level visual survey was carried out using the *Visual Tree Assessment* technique described by Mattheck and Broeler (1994) and endorsed by the Arboricultural Association (LANTRA Professional Tree Inspection course, 2007).

A2.2 Structural condition is assessed by inspecting the stem and scaffold branches from all angles looking for weak branch junctions or symptoms of decay. Particular attention is paid to the stem-base. Cavities are explored using a metal probe in order to assess the extent of any decay. If this is not possible further inspection is recommended in the form of a climbed inspection or using specialist decay detection equipment.

A2.3 The physiological condition is assessed by inspecting the stem, branches and foliage for symptoms of disease. The overall vigour of the tree is also taken into account.

A2.4 Where the condition of a tree is deemed to be unacceptable, recommendations are made according to a scale of priority in order to reduce the liability of the owner. The position of the tree and its potential targets are taken into account.

A2.5 Measurements are obtained using a diameter tape, clinometer, distometer and loggers tape. Where this is not practical measurements are estimated.

A2.6 Some trees are surveyed as groups, though this is avoided close to areas likely to be developed.

A2.7 Finally, a *Retention Category* was allocated as described in Appendix 1.1.1.

Appendix 3: Author's Qualifications

Qualifications & Experience of Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

Construction

Between 1983 and 1990 Ivan worked within the construction industry and received training in a broad range of practical building skills and general construction principles. In 1989 Ivan obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales in 1990. Ivan returned to work within the construction industry and expanded his understanding of construction principals.

Arboriculture

In 1996 Ivan obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then trained as an Arboricultural Consultant before establishing a tree surgery and landscaping business in 1998. In 2005 Ivan commenced full time employment with a leading Arboricultural Association approved consultancy and soon adopted a senior role responsible for five consultants.

Ivan is now the Director and Principal Consultant of Crown Consultants Ltd.

Ivan has produced numerous Arboricultural Reports for the purposes of Development, Safety, Management, Mortgage, Subsidence, Mitigation and Litigation.

He is accredited as a LANTRA *Professional Tree Inspector*. A qualification produced in association with the Arboricultural Association and generally recognised as appropriate for all levels of tree inspection.

He obtained a foundation degree in arboriculture at the University of Lancashire, which he passed with distinction.

He is a member of the Consulting Arborist Society and is listed within their areas of professional expertise for QTRA and as an expert witness.

Ivan is a professional member of the Arboricultural Association and the International Society of Arboriculture.

He is a licensed Quantified Tree Risk Assessment user.

Ivan has undertaken professional expert witness training accredited by the University of Cardiff and is registered as a Sweet and Maxwell Checked Expert Witness 2008.

Ivan currently acts as Local Authority Tree Officer for Barnsley Metropolitan Borough Council.

Appendix 4: Explanation of Tree Data and Glossary

This section explains the terms used in the **Tree Data Schedule** within Section 3.

A4.1 General Observations

A4.1.1 **Numbering System:** Each item of vegetation has its own unique number prefixed by a letter such that T1=Tree 1, G2=Group 2, H3=Hedge 3 and W4=Woodland 4, S5=Shrub 5.

A4.1.2 **Age Categories:**

Young	Usually less than 10 years old.
Semi-Mature	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
Early-Mature	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
Mature	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
Veteran	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
Over Mature	As for veteran except management is not considered worthwhile.

A4.1.3 **Species:** Common names and Latin names are given.

A4.1.4 **Height:** Measured from ground level to the top of the crown.

A4.1.5 **Stem Diameter:** Taken at 1.5m above ground level where possible. On multi-stemmed trees this measurement may be taken at ground level, though usually an indication of the number of stems and average diameter is given, e.g. 3 x 30cm.

A4.1.6 **Crown Height:** Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.

A4.1.7 **Tree Diagram:** This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.

A4.1.8 **Crown Spread:** Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.

A4.1.9 **Observations:** If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.

A4.1.10 **Recommendations:** Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.

A4.1.11 **Priority Scale:** Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:

Urgent	To be carried out as soon as possible.
Very High	To be carried out within 1 month.
High	To be carried out within 3 months.
Moderate	To be carried out within 1 year.
Low	To be carried out within 3 years.

A4.1.12 **Inspection Frequency:** An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.

A4.1.13 **Vigour:** An indication of growth rate and the tree's ability to cope with stresses:

High	Having above average vigour.
Moderate	Having average vigour.
Low	Having below average vigour.
Very Low	Tree is struggling to survive and may be dying.

A4.1.14 **Physiological Condition:**

Good	Healthy and with no symptoms of significant disease.
Fair	Disease present or vigour is impaired.
Poor	Significant disease present or vigour is extremely low.
Very Poor	Tree is dying.

A4.1.15 **Structural Condition:**

Good	Having no significant structural defects.
Fair	Some defects observed though no high priority works are required.
Poor	Significant defects found. Tree requires monitoring or remedial works.
Very Poor	Major defects which will usually require significant remedial works or tree removal.

A4.1.16 **Amenity Value:**

Very High	Exceptional specimen, observable by a large number of people.
High	Attractive specimen, observable by a significant number of people.
Moderate	One of the above factors is not applicable.
Low	Unattractive specimen or largely hidden from view.

A4.1.17 **Life Expectancy:** The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).

A4.1.18 **Retention Category:** These are explained in detail in Appendix 1.

A4.2 Evaluation of Defects

A4.2.1 Cavities, wounds, deadwood etc are all evaluated as follows:

Major	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
Significant	A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
Minor	A defect that is not likely to compromise the tree's structural integrity.

General Glossary

Adaptive growth	In tree biomechanics, the process whereby wood formation is influenced both in quantity and quality by the action of gravitational forces and mechanical stresses on the cambial zone.
Aerobic	Conditions in which oxygen is freely available, or to biomechanical processes that depend on the presence of oxygen.
Anaerobic	A condition marked by the absence of oxygen; Generally such areas are unsuitable for normal life and growth of plant tissues. These sites tend to be populated by bacteria capable of surviving low oxygen conditions often associated with Slime Flux.
Arboriculture	The culture and management of trees as groups and individuals primarily for amenity and other non-forestry purposes.
Arborist	A person possessing the technical competence through experience and related training to provide management of trees or other woody plants in a landscape setting. Generally involved with the development or management of trees for visual amenity or land management rather than the growth of trees for product or profit.
Barrier zone	A layer within an annual increment of wood which contains abnormal xylem cells, laid down by the cambium in response to wounding or other trauma.
Body language	In trees, the outward display of growth responses and or deformation in response to mechanical stress.
Bole	Or Trunk, the main stem of a tree below its first major branch.
Bracket	A type of fruiting body produced by various fungal species, plate like to hoof like in shape and often a one sided attachment to the wood or bark.
Branch bark ridge	A ridged area located at the union of a branch to a trunk or stem.
Branch Collar	Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigour or begins to die, the collar usually becomes more pronounced and completely encircles the branch.
Brown Rot	Form of decay where cellulose is degraded, while lignin is only modified.
Buttress Root	Roots that emerge from the base of the tree stem, normally large and well developed that rapidly reduce in diameter to create the Root Plate this offers structural support for the tree. Buttress roots divide rapidly forming the connection between the stem and the transport roots.
Cabling Bracing	Installing cables within the crown of a tree to prevent collapse.
Callus	Undifferentiated cells often formed at the edges of recent injuries. This tissue quickly becomes differentiated, forming cells of the type characteristic of that position on the tree (e.g. forming wood, bark, roots, etc.) see wound response tissue.
Cambium	A thin layer of actively growing and dividing cells, located between the xylem (sapwood) and bark of a plant; the part responsible for radial growth of a tree stem or branch.
Canopy	The topmost layer of twigs and foliage in a woodland, tree or group of trees.
Canker	A localised area of dead bark and cambium on a stem or branch, caused by fungal or bacterial organisms, characterised by woundwood development on the periphery. This may be annual or perennial.
Cavity	An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
Chlorotic	Also Chlorosis. A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.
Clinometer	Devices that measures vertical angles, and provides direct height measurements of objects by triangulation.
Co-dominant stems/trunk	Are forked branches or trunks of nearly the same size in diameter and lacking a normal branch union.
Compacted soils	Soils in which the air-space (oxygen space) has been reduced or eliminated, reducing water infiltration and percolation, reducing root presence and inhibiting new root development.
Compartmentalisation	The physiological process that creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms.
Compression Failure	Localized buckling of fibres and other longitudinal elements produced by compression of wood along the grain; compression failures sometimes develop in standing trees.
Compression Strength	The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees using special drilling devices
Compression Wood	Abnormal wood formed on the lower side of branches and curved stems, with physical properties different from normal wood.
Conservation Area	In Great Britain, designated areas of architectural or historical interest, in which there are special procedures for planning applications. Additionally tree works cannot generally be undertaken without prior notification (Currently 6 weeks) to the relevant local planning authority. See also Tree Preservation Orders.
Core Sample	A sample of wood extracted from a trunk or branch, using an increment borer tool. The resulting core can be analysed for characteristics of growth, wood strength, structure, decay, and for species identification.
Crotch	The union of two or more branches; the auxiliary zone between branches.
Crown	The upper canopy of a tree, including upper trunk, scaffold branches, secondary branches, stems and leaves.
Crown lifting / raising	Crown Lift The removal of the lowest branches, usually to a given height. It allows more residual light and greater clearance underneath for vehicles etc.
Crown reduction	The reduction of a tree's height or spread while preserving its natural shape.
Crown thinning	The removal of some of the density of a tree's crown, usually 5-25% allowing more light through its canopy and reducing wind resistance.
Deadwood (noun)	Deadwood is often present within the crown or on the stems of trees. It may be an indication of ill health, however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).
Deadwood (verb)	The removal of dead branches from a tree's canopy, usually of a specified size (in diameter).
Decay	Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
Decay Detection	The assessment of decay within a tree has been traditionally difficult, but recent advances have made it possible to achieve accurate representations of the internal section of a tree in both 2D and 3D, removing doubt over the condition of the tree and allowing accurate management decisions.
Decurrent	In trees a, system of branching in which the crown is borne on a number of major widely spreading limbs of similar size. In fungi relates to toadstools whose gills run down the stem and leaves and other plant organs, which extend down the stem.
Defect	In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.
Defoliation	The losing of plants foliage.

Dieback	**Progressive death of buds, twigs and branch tissues, on individual limbs resulting in Deadwood, or throughout the canopy, extreme cases can result in Stag Heading.**
Dripline	**A projected line on the ground that corresponds to the spread of branches in the canopy; the farthest spread of branches.**
Epicormic shoots	**Fast growing, weakly attached shoots/branches that often grow as a response to stress factors upon a tree or branch removal.**
Excurrent	**In trees, a system of branching that a single leader remains dominant, through the control of lateral branches.**
Failure	**In connection with tree hazards, a partial or total fracture within the wood tissue or loss of cohesion between roots and soil. (In total failure affected parts will snap or tear away completely, Partial failure there is a crack or deformation, which results in an altered distribution of mechanical stress.**
Feeder Roots	**Fine fibrous Water and nutrient absorbing roots located in the outer root system.**
Flush-Cut	**In trees and shrubs, a pruning cut close to the parent stem, which removes the branch bark ridge.**
Foliage	**The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.**
Formative pruning	**The trimming of a tree to remove weaknesses and irregularities which may lead to problems. The formative pruning operation is aimed at reducing the potential for future weaknesses or problems within the tree's crown.**
Gall	**An abnormal, disorganized growth of plant tissues, caused by parasitic or infectious organisms such as insects, fungi, bacteria, or viruses.**
Girdling	**In woody plants, any form of damage that destroys the bark and / or the Cambium all the way around the stem, branch or root, normally resulting in death of the damaged section.**
Girdling Root	**In woody plants, a root that grows across the buttress, or across other roots, eventually causing constriction of the radial growth.**
Growth Increment	**The incremental growth added as new annual ring develops each season over existing wood. This is seen as (growth) rings in cross-sections of wood.**
Hazard beam	**An upwardly curved branch in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).**
Heartwood	**Inner non functioning tissues that provide structural support to trunk.**
Heave	**In relation to shrinkable clay soils, expansion due to rewetting of a volume of soil previously subjected to the removal or water by plant / trees following felling or root severance. Also in relation to root growth, the lifting of pavements and other structures by radial expansion. Also in relation to tree stability, the lifting of one side of a wind rocked root plate.**
Herbicide	**A chemical compound that causes the death of a plant.**
Included Bark	**Bark that becomes embedded in a crotch between branch and trunk or between co-dominant stems, usually found in narrow or tight crotches, and causes a weak structure.**
Increment Borer	**A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments.**
Leader	**The primary terminal shoot or trunk of a tree.**
Limb	**A large lateral branch growing from the main trunk or from another larger branch.**
Lion Tailing	**Often the result of poor pruning practices; the main leader or branches are largely devoid of side branches, growth is restricted to the end of branches and is likely to suffer damage through end loading.**
Lopping	**In trees, a general term that related to the removal of branches from a tree.**
Monitoring	**Due to the relative life span of trees in relation to our own, long-term monitoring provides a valuable insight to the health of trees, identifying decline and or stabilisation and or improvement.**
Mulch	**A material laid over the root system of a tree to help conserve moisture within the soil. Additionally it may help control the development of weeds close to the tree.**
Mycelium	**A mass of growing filaments (hyphae) formed by fungi.**
Mycorrhizae	**The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.**
Natural Pruning	**The shedding of a branch or twig that has died back naturally and has become decayed at or near its base.**
Necrosis	**The failure and subsequent death of a branch, leader or tree.**
Negligence	**A failure to take reasonable action to deal with a hazard to prevent damage to property or person.**
Nutrient	**Substances that are absorbed by living organisms for the maintenance of internal processes.**
Occluding tissue	**The general tern of wood, cambium and bark that develop around the site of a wound on a woody plant**
Pathogen	**A microorganism that causes diseases within another organism.**
Phloem	**The principle conductive tissue that the products of Photosynthesis are transported around the plant**
Photosynthesis	**The process were light energy is used to create energy (Carbohydrate) for use within the plant.**
Pollard	**A term for a pollarded tree.**
Pollard head	**The swollen section of branch / stem that forms behind the pollarding cut.**
Pollarding	**The complete or partial removal of the crown of a young tree so as to encourage the development of numerous branches either for amenity or historically as fodder, repeated management is required cyclically to maintain the feature**
Prune or Pruning	**Selective removal of woody plant parts of any size, using saws, Loppers, Secateurs, or other pruning tools.**
Reaction Wood	**Wood with distinctive anatomical characteristics, formed in parts of leaning or crooked stems and in branches to provide additional strength / support. In hardwoods, tension wood usually forms. In conifers, compression wood is usually found.**
Reaction Zone	**A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.**
Re-grading	**The raising or lowering of a soil profile from its original grade.**
Rejuvenation pruning	**Where historically or environmentally important trees are to be retained, their life spans can be significantly extended through the adoption of particular pruning regimes.**
Rejuvenation root treatment	**Management of the root zone can have a significant positive effect upon the health of trees. Physical, mechanical and biological approaches are available and can be prescribed in accordance within the constraints of individual sites.**
Remedial pruning	**The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.**
Resistograph	**Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.**
Rib	**In tree body language, a long narrow, axial protuberance which often over lays a crack.**
Ring Barking	**Artificial Girdling of the stem, to result in the death of a tree. May be used in habitat creation were the retention of dead standing trees is required.**
Rod Bracing / Bolting	**Traditionally, this has relied upon the Installation of steel rods or bolts through the stems or limbs, to reduce twisting or splitting of the wood. The installation of such features does require legal interpretation.**
Root Barriers	**Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.**

Root Collar	**The basal area of the tree; transition zone from trunk to root. Also sometimes called trunk flare.**
Root Plate	**The primary support area for the tree; an area of the root system close to the base that structurally anchors the tree to the soil.**
Root Rot	**Either a general term for decay within the wood of the lower stem / buttress roots, or a disease in which the fine roots are killed.**
Root System	**The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.**
Root Zone	**The area and volume of soil around the tree in which roots are expected. May extend to three or more times the branch spread of the tree, or several times the height of the tree.**
Sail Area	**That area or the tree subjected to wind load.**
Sanitation	**In plant disease control, the removal of material that could a source of infection by a pathogen. Removal of diseased plant parts, such as fallen leaves and twigs, and pruning of dead and diseased branches. Diseased parts should be burned or buried under soil or active compost.**
Sapwood	**Xylem wood tissue, usually light in colour, representing the outer growth rings of the wood. Usually living, reactive wood tissue, in a healthy tree. See heartwood**
Scaffold limbs / scaffold Branches	**The branches that from the main network framework of the crown of a tree.**
Senescent	**A decline in growth and vigour due to age or stress factors.**
Shrub	**A woody plat that branches at or close to the ground level and so does not have a single stem.**
Slime Flux	**Relating to a toxic condition from the spreading of bacteria or their products from a source of infection; characterized by malodorous gases, or salt deposits upon the bark. If these products enter the sap stream, localised vessel necrosis can result, usually associated with anaerobic conditions.**
Soft Rot	**A kind of wood decay, were a fungi degrades cellulose within the cell wall, without causing overall degradation.**
Soil Compaction	**The compression of soil, causing a reduction of pore space and an increase in the density of the soil. Air is squeezed out and nutrients become locked. Tree roots cannot grow in compacted soil.**
Soil Profile	**The characteristics of a soil as regards to relative depth; the changes in soil texture and composition that occur with depth.**
Soil Texture	**The classification of the constituent particles of soil; includes sand, silt and clay particles. Directly related to soil porosity, permeability, and aeration.**
Sonic Decay Detection	**Non invasive method whereby sound waves are passed through the tree and the speed is measured. Slow speeds indicate decay and a tomography picture representing the inner stem is produced.**
Stag Heading	**In a tree, a state of dieback were dead branches protrude beyond the current living crown.**
Stress	**In plant physiology, conditions were one or more physiological functions Are not working within normal parameters.**
Stump Grinding	**The removal of a tree stump using a specialist grinding machine.**
Subsidence	**In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.**
Sucker	**Same as sprout.**
Suppressed	**Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.**
Systemic	**Affecting the whole plant or organism. A systemic compound is carried throughout the entire plant to all parts through the vascular system.**
Target	**Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.**
Target Pruning	**The pruning of a branch were the wound affects only branch material, often result in a target shaped wound.**
Tension Wood	**Reaction wood typically formed on the upper side of limbs or curved stems; characterized by lack of cell wall lignifications (higher ratios of cellulose to lignin).**
Tight Union / Tight Crotch	**Also, narrow crotch. A crotch with a narrow angle between branches, often having included bark.**
Tomography	**The comparison of sound or stress waves through the tree allows the creation of a 2D or 3D representation of the internal structure of a stem or branch section and highlights areas of damage. Virtually non-injurious.**
Topography	**The configuration of surface features, including the vertical and horizontal relationships of the ground and other features.**
Topping	**Cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay and structural weakness within the crown.**
Tree	**A woody plant that typically has a single stem, at maturity has a height of a least 4 metres and a stem diameter at breast height of at least 75mm.**
Tree Preservation Order	**In Great Britain, an order made by the local planning authority, were consent must be gained before undertaking all but exempt works to a tree.**
Trunk Flare	**The basal area of the trunk that flares or widens, and merges with the main roots. See root collar**
Veteran Tree	**Veteran trees are often found in large parks or estates and commonly affected by extensive decay or have been subject to extensive works. These trees are retained for historical importance and often pose greater risk than normal, which is generally justified. They need careful management and often propping or bracing to support them, some require fencing to limit access.**
Vigour	**Active, healthy growth of plants: ability to respond to stress factors.**
Visual Tree Assessment (VTA)	**An assessment of the mechanical condition of trees based upon their 'body language'. Trees are dynamic and respond to faults / decay / environmental factors in various ways, these responses can be indicative of structural integrity.**
Wetwood	**An infection caused by bacteria living inside the plant tissues. The bacteria ferment the plant fluids, resulting in death of nearby cells, and often causing exudations of fluid from the bark, often referred to as a Slime Flux.**
White Rot	**A kind if wood decay were a fungi attacks the lignin within the wood matrix**
Wind loading	**Forces placed upon tree canopy, branches, trunk and roots of a tree under windy conditions.**
Wind Throw	**The failure of a tree due to wind loading.**
Witches Broom	**A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.**
Wood	**Secondary Xylem; the main structural support and water conducting tissue of trees and shrubs.**
Wound Response Tissue	**Also Occluding Tissue, Wound Wood or Callus. Differentiated wood tissue that grows around the margins of a wound or injury.**
Wound Wood	**Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound**
Xylem	**Plant tissues with special function of translocation of water and dissolved nutrients.**

Appendix 5: Further Information

Building Near Trees – General

National Joint Utilities Group publication # 10 (1995), *Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees. Downloadable at www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf*

NHBC Standards Chapter 4.2., *Trees and Buildings.*

Horticulture LINK project 212. (*University of Cambridge,* 2004), *Controlling Water Use of Trees to Alleviate Subsidence Risk.*

Tree Planting and aftercare

See www.trees.org.uk/leaflets.php# for downloadable leaflets on selecting a garden tree, planting, aftercare and veteran tree management.

British Standards

BS 5837: 2005. Trees in Relation to Construction – Recommendations.
Bs 3998: 1989. Recommendations for Tree Work.
BS 3936: 1992. Nursery Stock. Part 1: Specification for Trees and Shrubs.
BS 3936: 1992. Nursery Stock. Part 10: Specification for Groundcover Plants.
BS 4043: 1989. Transplanting Root-balled Trees.
BS 8004: 1986. Foundations.
BS 8103: 1995. Structural design of Low-Rise Buildings.
BS 8206: 1992. Lighting for Buildings.
BS 3882: 2007. Topsoil.
BS 4428: 1989. General Landscaping Operations (excluding hard surfaces).

Permission to do Works to Protected Trees / Tree Law

Forestry Commission (Edinburgh, 2003), *Tree Felling – Getting Permission.* Country Services Division - Forestry Commission. Downloadable at www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/$FILE/wgsfell.pdf

Transport and the Regions (Department of the Environment, 2000), *Tree Preservation Orders, A Guide to the Law and Good Practice*. Downloadable at www.communities.gov.uk/publications/planningandbuilding/tposguide

C. Mynors, *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, London, 2002)

Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

Lighting Levels

P.J. Littlefair, *B.R.E. 209: Site layout planning for daylight and sunlight A guide to good practice.* B.R.E. Bookshop, London.

British Standards Institution. Code of practice for day lighting. *British Standard* BS 8206: Part 2 (1992).

Chartered Institution of Building Services Engineers. *Applications manual: Window Design* (London, 1987).

NBA Tectonics. A study of passive solar housing estate layout. *ETSU Report* S-1126. Harwell, Energy Technology Support Unit (1988).

I.P. Duncan; D. Hawkes, Passive solar design in non-domestic buildings. *ETSU Report* S-1110. Harwell, Energy Technology.

P. J. Littlefair, Measuring Daylight, *BRE Information Paper 23/93 f3.50.* (Advises on measuring daylight under the real sky or an artificial sky, allowing for the changing nature of sky light).

High Hedges

Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

Tree Specific Websites

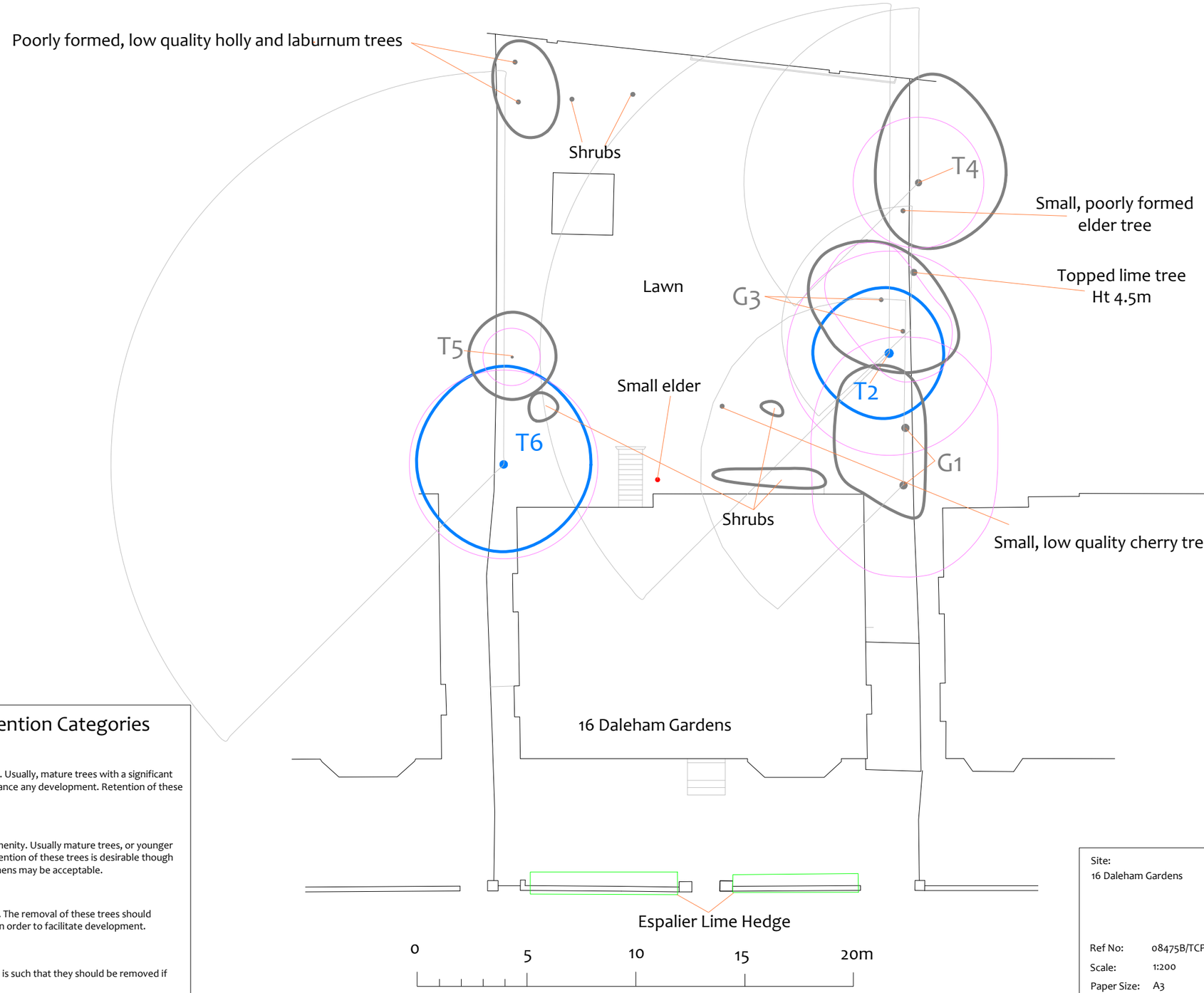
www.crowntrees.co.uk	Crown Consultants site containing useful information
www.trees.org.uk	Arboricultural Association
www.rfs.co.uk	Royal Forestry Society of England, Wales and N. Ireland
www.treehelp.Info	The Tree Advice Trust
www.woodland-trust.org.uk	The Woodland Trust
www.treecouncil.org.uk	The Tree Council

Appendix 6: Site Plan

The plan(s) referred to within the report follow this page.

Appendix 6: CCL Arboricultural Report Ref 08475/B

Tree Constraints Plan
(Existing Layout)



BS 5837 Retention Categories

Category A:
Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

Category B:
Trees of moderate quality and amenity. Usually mature trees, or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

Category C:
Trees of low quality and amenity. The removal of these trees should generally be seen as acceptable in order to facilitate development.

Category R:
Trees whose structural condition is such that they should be removed if development is to proceed.

Site:
16 Daleham Gardens

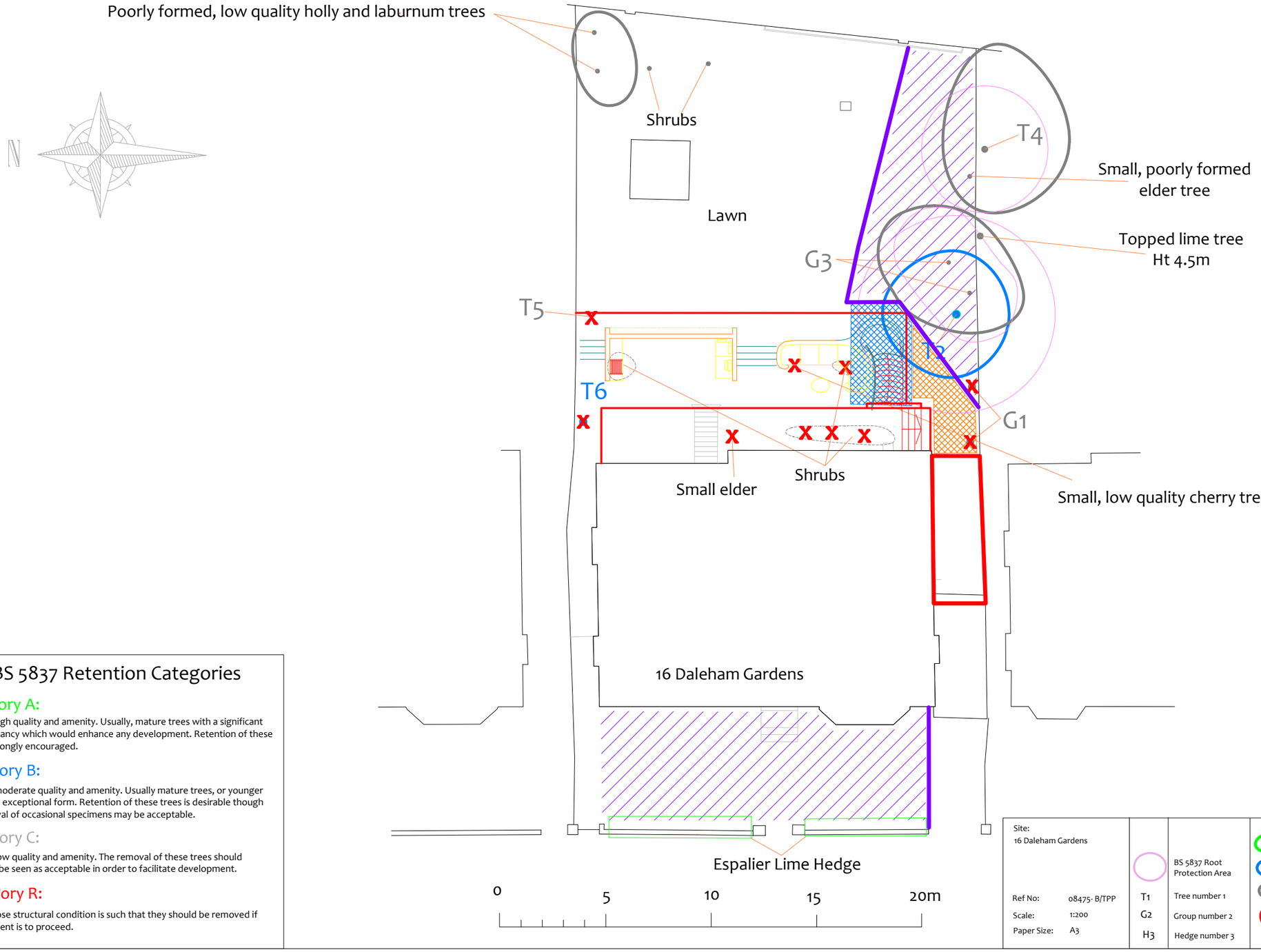
Ref No: 08475B/TCP
Scale: 1:200
Paper Size: A3

	BS 5837 Shade Pattern
	BS 5837 Root Protection Area
T1	Tree number 1
G2	Group number 2
H3	Hedge number 3

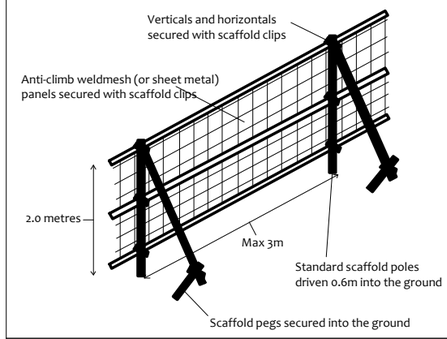
Stem & canopy of Category A tree
Stem & canopy of Category B tree
Stem & canopy of Category C tree
Stem & canopy of Category R tree

Appendix 6: CCL Arboricultural Report Ref 08475/B

Tree Protection Plan



Tree Protection Fencing
The 'In-Ground' System



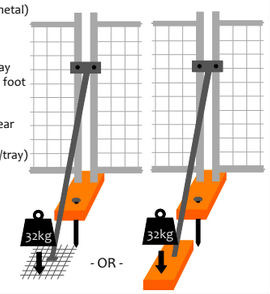
The 'Back Stay System'
(an alternative to 'The In-Ground System'

2m X 3.5m weldmesh (or sheet metal) panels linked with anti-tamper couplings

Each panel attached to a back stay which is founded in an additional foot or mesh tray as illustrated

Minimum 32kg ballast to retain rear foot or tray (including the weight of the foot/tray)

Front feet to be secured with ground pins or additional ballast



Construction Exclusion Zone

Within this area the following restrictions shall apply:

No excavation or land regrading whatsoever.
No storage of materials, rubble, soil or spoil.
No fires within the exclusion zone or within 10m of any tree canopy.
No site cabins or other temporary structures.
No discaharge of polluted water, cement or chemicals of any kind.
No use of any machinery, or passage or parking of vehicles.
No tree works without council consent.

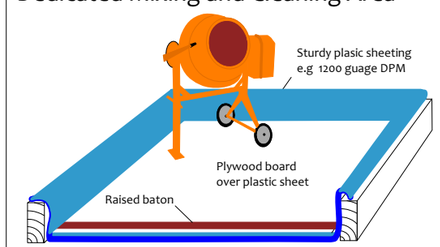
Restricted Activity Zones
A and B

A

B

Within these zones construction activity is restricted. Restrictions are detailed within the accompanying Method Statement Report (Sections 5.9 and 5.10)

Dedicated Mixing and Cleaning Area



BS 5837 Retention Categories

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Category R:
Trees whose structural condition is such that they should be removed if development is to proceed.

Site: 16 Daleham Gardens			BS 5837 Root Protection Area		Stem & canopy of Category A tree		Fixed protective fencing The 'In-Ground System' or the 'Backstay System' To remain in place for all construction activity
					Stem & canopy of Category B tree		
Ref No:	08475- B/TPP	T1	Tree number 1		Stem & canopy of Category C tree		
Scale:	1:200	G2	Group number 2		Stem & canopy of Category R tree	A B	Restricted Activity Zones
Paper Size:	A3	H3	Hedge number 3				