Kettering Buccleuch Academy

Arboricultural Report

October 2010

Wilmott Dixon Construction Ltd.

Chantry House, High Street, Coleshill, Birmingham, B46 3BP
## Issue and revision record

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Originator</th>
<th>Checker</th>
<th>Approver</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1st October 2010</td>
<td>Rhys Lennon</td>
<td>Charles Peeler</td>
<td>Mark Johnston</td>
<td>For Issue</td>
</tr>
<tr>
<td>B</td>
<td>30th December 2010</td>
<td>Rhys Lennon</td>
<td>Charles Peeler</td>
<td>Mark Johnston</td>
<td>For Issue</td>
</tr>
</tbody>
</table>

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.
## Executive Summary

1. Introduction
   - Terms of Reference
   - Scope of Work and Tree Assessment Methodology
   - Limitations of Survey

2. Tree Summary
   - Main Campus
   - Access Road
   - Playing Fields
   - Overview

3. Implications for Proposal
   - Trees and Construction
   - Protection of Root Protection Area (RPA)
   - Tree Protection Orders (TPO) and Conservation Areas (CA)
   - Proposed actions for the trees associated with the scheme

4. Recommendations – preventing damage to retained trees
   - Tree Protection during Construction
   - Tree Works
   - Root Protection
   - Storage of Materials
   - Sequence of Activities
   - Contactors Compliance
   - Arboricultural Inspection

5. Conclusion

### Appendices

- Appendix A. Tree Constraints and Tree Protection Plan
- Appendix B. Key to Tree Survey Schedule
- Appendix C. Tree Survey Schedule
- Appendix D. Root Protection Area Calculations
- Appendix E. TPO and CA Information
- Appendix F. Temporary Protective Fencing
- Appendix G. Example signs to be erected on Temporary Protective Fencing
- Appendix H. Glossary
- Appendix I. References
Executive Summary

Mott MacDonald Ltd has been commissioned by Willmott Construction Ltd to undertake an arboricultural survey to support the detailed design phase of this scheme. The survey and associated report has been undertaken in accordance with BS 5837:2005 Trees in Relation to Construction—Recommendations which is designed to give ‘recommendations and guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees, including shrubs, hedges and hedgerows, with structures’.

This survey is not, nor should be taken to be, a full or thorough assessment of the health and safety of trees on or adjacent to the site and therefore it is recommended that detailed tree inspections are undertaken on a regular basis with the express purpose of complying with the land owner’s duty of care and satisfying health and safety requirements.

Kettering Borough Council confirmed that no trees within the grounds of Kettering Buccleuch Academy and the associated Weekley Glebe playing fields are subject to Tree Preservation Order status. Similarly, the site does not fall within a Conservation Area.

This report is based on the existing detailed design at the time of writing. Refer to Section 3 for details of the trees likely to be impacted and recommendations in relation to the existing agreed layout.

Of the fifteen individual trees identified for removal, three have been assessed as requiring removal irrespective of any development proposals. A further eleven have been identified as trees of low quality and value or limited long-term potential and the final tree to be removed has been assessed as a tree of moderate quality and value whose retention is desirable if practicable.

Of the four groups of trees, one group (Area B) will require felling to facilitate construction. Two groups (Areas A and C) may require a limited number of trees located on the periphery of each group to be felled to accommodate the development and/or tie in with the landscape design for the scheme. It is recommended that the scheme in these locations is marked out on completion of the final design with the trees required for removal marked by a qualified arboriculturalist. The final group (T740 to T756) is to be retained and protected by temporary protective fencing during the works.

No trees of high quality and value whose retention is most desirable have been identified for removal. Installation and maintenance of temporary protective fencing is required in accordance with BS 5837:2005. The proposed location for this fencing is shown in Appendix A.
1. Introduction

1.1 Terms of Reference

Mott MacDonald Ltd has been appointed by Willmott Dixon Ltd to undertake an arboricultural survey of Kettering Buccleuch Academy in accordance with Kettering Buccleuch Academy Ecology and Arboricultural Offer of Services letter and fee proposal dated July 2010. The site is located at Weekley Glebe Road, Kettering, Northamptonshire, NN16 9NS (Grid Reference: OS X (Eastings) 487765 OS Y (Northings) 280094) and currently occupied by the Montagu School. The purpose of the report is to inform ongoing design work as part of the Partnerships for Schools (PfS) Academy programme, whereby the school will be entirely rebuilt as an academy.

The following drawings showing the existing site and proposed development have been provided by Willmott Dixon Ltd. These have been used as a basis for the Tree Constraints Plan contained in Appendix A:
- Drawing ref: 11233-OA Montagu and Weekley Glebe.dwg
- Drawing ref: D1864 working V1 100826.dwg

1.2 Scope of Work and Tree Assessment Methodology

The tree survey was carried out by a Mott MacDonald qualified Arboriculturalist on 14th September 2010 to assess the quality and value of the principal trees in or adjacent to the site footprint. The survey was undertaken in accordance with current national standards, in particular the guidelines set out in ‘BS 5837:2005 Trees in Relation to Construction-Recommendations’. The tree data contained within the Tree Survey Schedule was recorded by a visual survey from ground level and no invasive tree inspection measures were employed.

The objective of this report is to provide a balanced judgement of the site to allow the development to be integrated with the trees in this location. The assessment process categorises the trees onsite to select the trees appropriate for retention, reviews the options for incorporating these trees within the developed landscape and provides a methodology for tree protection during construction. The survey provides comment on the general quality of the trees but does not constitute a full or thorough assessment of the health and safety of trees on or adjacent to the site.

The recommended actions for the existing trees have been stated in Section 3 with the full Tree Survey Schedule and categorisation of the trees in their existing context stated in Appendix C. The Root Protection Area (RPA) calculations are stated in Appendix D.

The following information was recorded for each tree in accordance with BS 5837:2005:
- Common and botanical name, and height with a clinometer where possible. “(Est)” is stated against all estimated figures;
- Stem diameter shown in millimetres in accordance with paragraph 4.2.6 (d) of BS 5837: 2005 (Trees in Relation to Construction - Recommendations). The stem diameters of single stemmed trees were measured at 1.5 metres above ground level and multi-stemmed trees measured immediately above the root flare unless otherwise stated in the tree schedule;
- Crown radii, measured approximately at each of the four cardinal points, to the closest 0.5 metres. Where it was not possible to measure a dimension, due to the proximity of site boundaries or physical
obstructions, an estimated figure has been included and this is denoted as 
“(Est)”. For trees in groups, 
only mean crown diameters have been recorded;

- The approximate height of the crown clearance above the adjacent ground level in metres. The origin
  (O) relates to the join between the main trunk and the lowest branch and part (P) relates to the lowest
  part of the crown (e.g. branch tips);

- Physiological (P) and Structural (S) condition labelled as either ‘Good’, ‘Fair’, ‘Poor’ or ‘Dead’, to provide
  an indication of the general health and vitality of each tree or tree group. Where the condition has been
  stated as ‘Good’ no further qualification has been added. Where condition has been identified as ‘Fair’
  or ‘Poor’, additional information has been added to qualify this classification. All other observations and
  supplementary information regarding the trees (i.e. not directly linked to condition assessment) have
  been entered within the ‘Comments and/or Recommendations’ column;

- Retention category labelled as A, B, C or R in accordance with paragraph 4.3.1 and Table 1 of BS 5837.
  This gives an indication as to each tree's arboricultural, landscape and cultural value and significance,
  and also its suitability for retention in the context of the proposed redevelopment of the site. The sub-
  categories (1 - Arboricultural values; 2 - Landscape values and 3 - Cultural values, including
  conservation) are only included where considered necessary to clarify why a tree has been assigned to
  a particular retention category. These categorisation criteria are summarised below:

  A: Trees of high quality and value whose retention is most desirable (suggested minimum
     contribution 40 years);

  B: Trees of moderate quality and value whose retention is desirable if practicable (suggested
     minimum contribution 20 years);

  C: Trees of low quality and value or limited long-term potential, which could be retained if not
     in conflict with development proposals or young trees with a stem diameter of less than
     150 mm (suggested minimum contribution 10 years);

  R: Trees requiring removal irrespective of any development proposals due to significant
     structural defects, irreversible decline or with a very short-term life expectancy of less than
     10 years; and,

- Age class recorded as:

  Y: Young trees aged less than 1st third of their life expectancy;

  MA: Middle aged trees within 2nd third of their life expectancy;

  M: Mature trees aged within final third of their life expectancy;

  OM: Over-mature - declining or moribund trees of low vigour;

  V: Veteran trees - specimens exhibiting 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;

- Preliminary management recommendations relating to the surveyor’s observations, and/or in
  anticipation of the site becoming a working area and a proposed development site, within the
  ‘Comments and/or Recommendations’ column; and,
The Root Protection Area (RPA) calculated in accordance with paragraph 5.2.2 and Table 2 of BS 5837 and labelled as the “Root Protection Radius” centred on the tree and an overall ‘root protection area’ (m²).

1.3 Limitations of Survey

The survey only encompassed the trees likely to be affected by the proposed development (refer to Appendix A for extent of site).

This report is not, nor should be taken to be, a full or thorough assessment of the health and safety of trees on or adjacent to the site. It is recommended that a full tree survey should be undertaken on a regular basis to satisfy health and safety requirements.

The conclusions detailed in this report relate to the conditions found at the time of the survey. Any significant alteration to the site that may affect the trees present or have a bearing on the planning implications (including level changes, hydrological changes, extreme climatic conditions or other site works) will necessitate a re-assessment of the trees and the site.
2. Tree Summary

The trees associated with this site can be split into three distinct areas: the main campus, the access road and the playing fields.

2.1 Main Campus

The trees in this location are predominately young and comprise of a range of species including Rowan (*Sorbus aucuparia*), Ash (*Fraxinus excelsior*), Birch (*Betula pendula*) and Cherry (*Prunus spp.*). The majority of these trees have been assessed as Category C trees (sub-category 1) i.e. trees of low quality and value providing only a limited contribution to the landscape. A number of trees have been classified as Category R i.e. recommended for removal irrespective of any proposed development. However, a number of other trees contained within the main campus have not been included in the schedule for a number of reasons including limited girth (only trees above 75mm diameter are recorded in accordance with BS 5837:2005) and their limited contribution in arboricultural terms i.e. a number of these trees are of a limited size and contained within small planters and or flower beds. The outline of these trees is shown in light grey on the Tree Constraints Plan for reference only.

Photo 2.1: View looking south towards main entrance gate (Trees T735 and 734)

2.2 Access Road

The access road that enters the site is bordered on the southern side by an effective avenue of 17 Swedish Whitebeam (*Sorbus intermedia*) trees. The trees are young i.e. within the first third of their life expectancy, are spaced at approximately 5m centres and have attained broadly similar heights with balanced crowns.

A large percentage of the trees have been assessed as being of ‘good’ physiological condition and ‘good’ structural condition. They have been assessed as Category B as they create a desirable landscape feature and provide effective screening between the adjacent housing associated with Weekley Glebe Road and the playing fields/access road.
2.3 Playing Fields

Weekley Glebe Playing fields are bordered on all sides by linear belts of trees. For the purposes of this survey the areas of trees have been split into three areas (Area A, Area B and Area C). The species mix and age structure of these areas are broadly similar i.e. containing a broad mix of native trees and shrubs ranging from young to early middle aged. These linear belts provide an effective boundary feature and some definition to this amenity resource.

These areas have been allowed to develop without a great deal of management intervention and have reached a stage where management operations are required to ensure longevity of this landscape feature. A large percentage of the trees have been assessed as being of ‘good’ physiological condition and ‘fair’ structural condition. Without intervention the ‘fair’ assessment for structural condition is likely to become ‘poor’ as the trees currently do not have adequate space to develop into healthy and balanced trees.

Photo 2.3: View from central area of grass to south west corner of playing fields (Area B and Area A)
2.4 Overview

Of the 16 individual trees and 4 groups surveyed, the following categories were assigned in accordance with BS 5837:2005 (Table 1 – Cascade chart for tree quality assessment):

Table 2.1: Summary of BS 5837:2005 tree categories assigned to the surveyed trees

<table>
<thead>
<tr>
<th>Tree Category</th>
<th>Description</th>
<th>Number surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A</td>
<td>Trees of high quality and value</td>
<td>1 individual tree</td>
</tr>
<tr>
<td>Category B</td>
<td>Trees of moderate quality and value</td>
<td>1 individual tree + 2 groups</td>
</tr>
<tr>
<td>Category C</td>
<td>Trees of low quality and value</td>
<td>11 individual trees + 2 groups</td>
</tr>
<tr>
<td>Category R</td>
<td>Trees for removal</td>
<td>3 individual trees</td>
</tr>
</tbody>
</table>
3. Implications for Proposal

3.1 Scheme Design

The proposed site layout (Ref Figure 3.1) includes large scale re-development of the existing site. The proposal includes construction of the following main elements:

- All weather pitch;
- Additional car parking;
- Bike storage;
- School Buildings;
- Soft Landscape and Tree Planting;
- Service Yard; and,
- External Sports Provision.
3.2 Protection of Root Protection Area (RPA)

Working anywhere in the vicinity to trees is likely to cause some root damage due to the fact that in the order of 80% of the roots of any tree will occur within the upper 600mm of the soil. Roots will spread out for a considerable distance from a tree and may be encountered at a distance beyond the canopy spread of a tree. Where construction activities are proposed within the rooting zone of trees, the potential for significant damage exists.

Table 2 of BS 5837:2005 prescribes a methodology for the calculation of a Root Protection Area (RPA). The RPA represents the minimum area that should be retained undisturbed around a tree or trees for the avoidance of an unacceptable degree of root disturbance. The required RPA of a tree is calculated, and typically plotted as a circle (or where appropriate as a square of equivalent area) to determine constraints or the location of protective fencing. The actual shape of this area may then be adjusted to take account of local topography or any existing site features that may serve as restrictions to ‘normal’ root development.

3.3 Tree Protection Orders (TPO) and Conservation Areas (CA)

The Town and Country Planning Act recognises the importance of trees by requiring Local Planning Authorities (LPA) to make appropriate provision for the planting and preservation of trees. The primary measures which provide protection to trees are Tree Preservation Orders (TPOs) and Conservation Area (CA) status. Where present, these measures determine that either, notification to the LPA (CA designations) or consent from the LPA (TPO designations) is required for any works that may affect trees or tree groups.

Kettering Borough Council confirmed that this site and associated playing fields do not fall within a Conservation Area or contain any trees subject to TPOs. Please refer to Appendix E for record of telephone conversation with Kettering Borough Council.

3.4 Proposed actions for the trees associated with the scheme

In considering the current detailed design for the scheme the following tables detail specific recommended actions to ensure effective integration between the natural and built environment.

Table 3.1: Summary of recommended actions in relation to trees shown on drawing ref MMD-275367-ARB-01-DR-001

<table>
<thead>
<tr>
<th>Tree Ref</th>
<th>Species</th>
<th>TPO</th>
<th>CA</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>725</td>
<td>Cherry</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>726</td>
<td>Apple</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>727</td>
<td>Rowan</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>728</td>
<td>Ash</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>729</td>
<td>Cherry</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>730</td>
<td>Maple</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>731</td>
<td>Ash</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>Tree Ref</td>
<td>Species</td>
<td>TPO</td>
<td>CA</td>
<td>Recommended Action</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>732</td>
<td>Alder</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>733</td>
<td>Cherry</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>734</td>
<td>Rowan</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>735</td>
<td>Purple Leaved Sycamore</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>736</td>
<td>Swedish Whitebeaem</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>737</td>
<td>Ash</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>738</td>
<td>Alder</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>739</td>
<td>Silver Birch</td>
<td>No</td>
<td>No</td>
<td>Fell tree to facilitate construction - direct conflict between design footprint and tree location.</td>
</tr>
<tr>
<td>740 to 756</td>
<td>Swedish Whitebeaem</td>
<td>No</td>
<td>No</td>
<td>Retain trees – protect during construction in accordance with BS5837:2005. Refer to Appendix A.</td>
</tr>
<tr>
<td>757</td>
<td>Poplar</td>
<td>No</td>
<td>No</td>
<td>Retain tree – protect during construction in accordance with BS5837:2005. Refer to Appendix A.</td>
</tr>
<tr>
<td>Area A</td>
<td>Mixed</td>
<td>No</td>
<td>No</td>
<td>A limited number of trees may require removal to facilitate construction and/or landscape design for this scheme. It is recommended that the scheme in these locations is marked out on completion of the final design with the trees required for removal marked by a qualified arboriculturalist.</td>
</tr>
<tr>
<td>Area B</td>
<td>Mixed</td>
<td>No</td>
<td>No</td>
<td>Fell trees to facilitate construction - direct conflict between design footprint and tree location</td>
</tr>
<tr>
<td>Area C</td>
<td>Mixed</td>
<td>No</td>
<td>No</td>
<td>A limited number of trees may require removal to facilitate construction and/or landscape design for this scheme. It is recommended that the scheme in these locations is marked out on completion of the final design with the trees required for removal marked by a qualified arboriculturalist.</td>
</tr>
</tbody>
</table>
4. Recommendations – preventing damage to retained trees

4.1 Risk to trees from general construction activities

Trees can be easily damaged by construction processes, with both the tree roots and the main structure of a tree susceptible to a range of impacts. Root damage can affect the anchorage and stability of the tree, as well as preventing or inhibiting the absorption of water and nutrients. Damage to the trunk and branches leaves the tree more exposed to disease and decay.

Activities that can cause damage to tree roots include:
- Trenches;
- Alterations in soil level;
- Non-porous surfaces;
- Compaction of soil;
- Changes in soil hydrology;
- Root exposure;
- Soil pollution (i.e. oil spill, incorrect application of herbicide and/or other chemicals); and
- Fires.

Activities that can cause damage to tree trunks and branches include:
- Pressure from materials stored against trunks;
- Physical impact from plant and equipment;
- Incorrect pruning;
- Exposure of bark or leaves to chemicals; and,
- Damage to bark from mowers and strimmers.

4.2 Recommended Tree Protection during Construction

Before any works on site, the trees T740 to 756 and T757 (Refer to Appendix A) must be protected to guard against accidental damage during all operations. Protection should be provided by means of a robust fence set up after the completion of any tree surgery operations but prior to any other site operations. This protective fencing should be installed in full accordance with Chapter 9 of BS5837:2005, and should comprise of a robust post and rail frame work, braced to resist impact supporting mesh panels. This is best achieved by the use of scaffold poles to form a post and rail frame work, braced at 3m intervals and faced with anti-climb wire mesh panels (refer to Appendix F).

It is advised that, prior to the erection of these fences, a site meeting is held, to involve the Contractor, the Local Authority Tree Officer and the Client’s arboriculturalist, to agree the precise specification and line to be used. This opportunity should also be taken to brief the Contractor of the necessity of ensuring that all site operatives guard against damaging the fence or entering the land beyond.

Such tree protective fencing must be retained and maintained throughout the duration of site works until the onset of final landscape works. The area enclosed by the tree protection fencing must be considered inviolable and no operations should take place on the tree side of the fence. If entry or works within the RPA is necessary then the arboriculturalist must be contacted first for advice.
4.3 **Tree Works**

All tree works should comply with any restrictions imposed by the local Planning Authority and any covenants or by-laws relevant to this site. All tree works must be carried out in accordance with BS 3998:1989 Recommendations for Tree Work and current arboricultural best practice. It should be noted that the contractor will be responsible under the Wildlife and Countryside Act 1981, and the Habitat Regulations 1994, and the Countryside Rights of Way Act 2000, to take all reasonable action to identify the presence of protected species including nesting birds, bats, dormice, and reptiles in the works area/surroundings, and comply fully with the law in relation to impacts associated with any instructed works.

All tree work should be carried out during the dormant season between October and March and in accordance with BS 3998:1989 Recommendations for Tree Work and current best arboricultural practice in relation to bats and trees. A tree works methodology must be produced by the Contractor to accord with any recommendations contained within the Mott MacDonald Ecology and Bat Reports that are currently being produced for this scheme.

4.4 **Root Protection**

It is anticipated that no works shall be necessary within the Root Protection Areas of trees to be retained. However, due to the nature of the typical rooting zone it is likely that finer roots beyond the RPAs of some trees may be affected by construction processes. The following guidance should be followed to reduce the impact of the scheme:

- Where roots are encountered every effort should be made to avoid severance or damage to root bark.
- Any roots over 25mm in diameter or bundles of several smaller roots, must be protected to avoid drying or extremes of temperature. This is best achieved by immediately covering with damp hessian or similar material.
- Should roots be severed they must be trimmed back using a sharp tool (carpenters’ saw, secateurs or loppers), then protected as above.
- Infill around exposed or severed roots should comprise clean, moist, sharp sand (not ‘builders’ sand) and good quality top soil. This fill should be gently firmed but must not be compacted hard. Backfilling must not be unreasonably delayed.
- Soil levels around the base of retained trees are to be retained as existing.
- Below ground services are to be routed outside the RPA of all trees to be retained.
- Where excavations are approved by the arboriculturist within an RPA, work is to be carried out in accordance with National Joint Utility Guidelines (NJUG 4) for the planning, installation and maintenance of utility apparatus in proximity to trees.
- Clear signage to be displayed to advise site workers of the purpose and restrictions implied by the protective fencing (examples of these have been included in Appendix F).
- The Site Agent or Manager is to be instructed to advise all site workers at their induction of the purpose and restrictions implied by the protective fencing. The Site Agent or Manager is to be responsible for the day to day prevention/exclusion of all actions and operations in the vicinity of protected trees that are likely to cause damage to retained or protected trees e.g. fires, use of cranes and excavators, use of hot bitumen etc.
- No dumping, storage of materials or access within the RPA is to be permitted.
- No fires are to be permitted within 15m of any tree to be retained.
- Installation of any future above ground services should be undertaken in consultation with an arboriculturist and routed to avoid conflict with retained trees taking account of the anticipated tree height and crown spread.
4.5 **Storage of Materials**

Storage of materials is to be accommodated away from all trees either on an appropriate area of hard standing or delivered on a “just in time basis” i.e. for same day use.

4.6 **Sequence of Activities**

To ensure adequate protection for the trees the following order of activities should be followed:

- Undertake tree surgery works (subject to such ownership and Local Planning Authority consents as may be appropriate);
- Erect tree protective fencing in accordance with attached plans and specifications and as may have been amended and agreed in writing with the Local Planning Authority;
- Inform Local Planning Authority Tree Officer that tree protective fence has been erected;
- Brief all site operatives, visitors and sub-contractors on the presence of tree protective fencing and the need to ensure that all operations remain wholly outside the protected areas as part of site induction procedures;
- Main site operations – construction phase; and,
- Removal of temporary protective fencing (once all site operations have ceased).

During the main site operations the following rules shall be adhered to:

- Retain and maintain tree protective fencing as erected during the full duration of the building works. No works to take place on the tree side of the fence with the sole exception of Client access for rounds maintenance purposes – e.g. grass cutting etc.;
- Tree roots exposed by excavation which extend beyond the protected areas are to be pruned properly using secateurs or a sharp saw. Exposed roots shall be covered by moist Hessian until they are reburied using a good quality top soil or top soil and sharp sand mix; and
- No signs, notices, cables or other objects shall be fixed to any part of any retained tree.

4.7 **Contactors Compliance**

The proximity of the trees for retention in relation to the work area will require the contractor’s strict compliance and cooperation with all aspects of the recommended tree protection measures and methodology to ensure satisfactory long term coexistence between the trees and the development.

4.8 **Arboricultural Inspection**

On completion of the development, an arboriculturalist should look for signs of intolerance to the change in conditions and the effect of the development and any accidental damage to retained trees to identify the need for further tree works in addition to those originally specified at the beginning of the project.

Following completion of the construction activity, this site should be subject to detailed Arboricultural Inspections to identify any Health and Safety issues with the tree stock and to prescribe remedial action as appropriate. (Note: previous management and/or surveys in relation to the health and safety of trees on this site have not been taken into account as part of this report).
5. Conclusion

Of the fifteen individual trees identified for removal, three have been assessed as requiring removal irrespective of any development proposals. A further eleven have been identified as trees of low quality and value or limited long-term potential and the final tree to be removed has been assessed as a tree of moderate quality and value whose retention is desirable if practicable.

Of the four groups of trees, one group (Area B) will require felling to facilitate construction. Two groups (Areas A and C) may require a limited number of trees located on the periphery of each group to be felled to accommodate the development and/or tie in with the landscape design for the scheme. The final group (T740 to T756) is to be retained and protected by temporary protective fencing during the works.

No trees of high quality and value whose retention is most desirable have been identified for removal.

No trees assessed as part of this scheme were subject to TPOs or Conservation Area status at the time of survey.

No works are anticipated within the Root Protection Areas of trees for retention.
Appendices

Appendix A. Tree Constraints and Tree Protection Plan ................................................................. 17
Appendix B. Key to Tree Survey Schedule ....................................................................................... 19
Appendix C. Tree Survey Schedule .................................................................................................. 20
Appendix D. Root Protection Area Calculations .............................................................................. 22
Appendix E. TPO and CA Information ............................................................................................. 23
Appendix F. Temporary Protective Fencing ...................................................................................... 24
Appendix G. Example signs to be erected on Temporary Protective Fencing ................................. 25
Appendix H. Glossary ....................................................................................................................... 26
Appendix I. References .................................................................................................................... 27
Appendix A. Tree Constraints and Tree Protection Plan
1. To be read in conjunction with the Tree Survey Schedule contained within the Kettering Buccleuch Academy Arboricultural Report.

2. Refer to drawing no. D1664 working v1-100836.png for proposed site layout.
### Appendix B. Key to Tree Survey Schedule

<table>
<thead>
<tr>
<th>Column Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Reference</td>
<td>Unique number, identifying each tree on the accompanying plan.</td>
</tr>
<tr>
<td>Species</td>
<td>Tree species giving vernacular and full botanical name.</td>
</tr>
<tr>
<td>Height</td>
<td>Estimated tree top height expressed in metres.</td>
</tr>
<tr>
<td>Branch Bored</td>
<td>Tree canopy extent taken from centre of tree trunk to edge of general canopy line along the four principal points of the compass. Note the distance is to the general canopy line in certain cases and that an exceptional or isolated branch may extend beyond stated figure.</td>
</tr>
<tr>
<td>Stem Diameter</td>
<td>Tree trunk diameter measured at 1.5m above ground level (on sloping ground, above highest ground level or immediately above root flare for buttressed trees). Expressed in millimeters. (est.) dimension estimated. (Av.) - average or max maximum dimension used in groups.</td>
</tr>
<tr>
<td>Height of Lowest Branch</td>
<td>Height in metres of the first main branch above ground level; O = origin of branch, P = part of branch (optional points provided for each measurement).</td>
</tr>
<tr>
<td>Age Class</td>
<td>Estimated life expectancy assessed in accordance with figures provided in Arboricultural Association Leaflet No. 4 Tree Management.</td>
</tr>
<tr>
<td></td>
<td>Y = Young: within first third of normal life expectancy.</td>
</tr>
<tr>
<td></td>
<td>MA = Mature: within second third of normal life expectancy.</td>
</tr>
<tr>
<td></td>
<td>M = Mature: within final third of normal life expectancy.</td>
</tr>
<tr>
<td></td>
<td>V = Veteran: exhibiting features of biological, cultural or aesthetic value characteristic of individuals surviving beyond typical age range.</td>
</tr>
<tr>
<td>Condition Physiological (P)</td>
<td>Good growth and condition found as expected for the species in relation to age/location.</td>
</tr>
<tr>
<td></td>
<td>F = Fair growth and condition neither good nor poor.</td>
</tr>
<tr>
<td></td>
<td>P = Poor growth and condition notably below what could ordinarily be expected.</td>
</tr>
<tr>
<td>Condition Structural (S)</td>
<td>Poor structure, no evidence of physical or structural defects.</td>
</tr>
<tr>
<td></td>
<td>F = Fair structure, presence of some physical or structural defects e.g. minor acute fork, crossing branches, minor suppression etc.</td>
</tr>
<tr>
<td></td>
<td>P = Poor structure, presence of significant structural/physical defects e.g. significant acute fork, major wound, heavy suppression etc.</td>
</tr>
<tr>
<td>Preliminary Management Recommendations Comments</td>
<td>Initial recommendations for management in existing context e.g. further investigation of suspected defects that require more detailed assessment and potential for wildlife habitat, or other general comments.</td>
</tr>
</tbody>
</table>

#### Tree Categorisation

Tree categorisation as defined by Table 1 - Cascade chart for tree quality assessment of British Standard 5837:2005. Decisions regarding which trees are to be retained should be influenced by their retention categories as suggested below.

- **A**: Trees of high quality and value, > 40 years contribution remaining; marked light green on plan. Category sub-divided as follows:
  1. Particularly good example; essential component of group e.g. in avenue;
  2. Screening value, particular visual importance;
  3. Significant conservation, historical, commemorative or other value (includes veteran or woodland trees).

- **B**: Trees of moderate quality and value with a significant life expectancy, > 25 years contribution remaining; marked mid-green on plan. Category sub-divided as follows:
  1. Trees that may be of impaired condition in relation to trees in category above;
  2. Trees present in numbering groups attracting higher collective rating; minor to site, of limited visual impact to locality;

- **C**: Minor amendments to any proposed development should be considered before removing these trees.

- **D**: Trees of low quality and value, > 15 years contribution remaining; marked dark grey on plan. Category sub-divided as follows:
  1. Trees not qualifying in higher categories;
  2. Trees within groups of low landscape value, having limited economic value;
  3. Trees with very limited conservation or other cultural benefits.

The removal of some of these trees should be considered acceptable if required to facilitate any proposed development.

- **R**: Trees for removal; those in such a condition that are dead, dying, dangerous, severely suppressed or where any existing value would be lost within 10 years; marked dark red on plan.

These trees should be removed or replaced in such a way as to make them sale where they have high ecological value or benefits.
## Appendix C. Tree Survey Schedule

<table>
<thead>
<tr>
<th>Tag Number</th>
<th>Single/Group</th>
<th>No. in Group</th>
<th>Species</th>
<th>Height (m)</th>
<th>Stem Diameter</th>
<th>Branch Spread (Radius - m)</th>
<th>Crown Clearance (m)</th>
<th>Age Class</th>
<th>Physiological Condition</th>
<th>Structural Condition</th>
<th>Comments / Management Recommendations</th>
<th>Life Expectancy</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>725</td>
<td>Single</td>
<td>n/a</td>
<td>Cherry Prunus spp.</td>
<td>8.8</td>
<td>177</td>
<td>4 0.5 2 3 1.2 (W)</td>
<td>Y</td>
<td>Good</td>
<td>Fair</td>
<td>Good</td>
<td>Suppressed on E by hawthorn hedge Recommend - remove supporting stake and tie</td>
<td>20 to 40</td>
<td>C 1</td>
</tr>
<tr>
<td>726</td>
<td>Single</td>
<td>n/a</td>
<td>Apple Malus spp.</td>
<td>6 (est)</td>
<td>142</td>
<td>1 1.5 1 0.5 0.75 (av)</td>
<td>Y</td>
<td>Good</td>
<td>Good</td>
<td>Tall upright specimen; strimmer damage at base</td>
<td>20 to 40</td>
<td>C 1</td>
<td></td>
</tr>
<tr>
<td>727</td>
<td>Single</td>
<td>n/a</td>
<td>Rowan (ms) Sorbus aucuparia</td>
<td>3.5 (est)</td>
<td>131 (rf)</td>
<td>1 1 1 1 Ground Level</td>
<td>Y</td>
<td>Good</td>
<td>Good</td>
<td></td>
<td>20 to 40</td>
<td>C 1</td>
<td></td>
</tr>
<tr>
<td>728</td>
<td>Single</td>
<td>n/a</td>
<td>Ash (ms) Fraxinus spp.</td>
<td>8.5</td>
<td>363</td>
<td>3 3 3 3 1 (E and W)</td>
<td>Y</td>
<td>Fair</td>
<td>Good</td>
<td>Dieback in branch tips (upper crown on E)</td>
<td>10 to 20</td>
<td>C 1</td>
<td></td>
</tr>
<tr>
<td>729</td>
<td>Single</td>
<td>n/a</td>
<td>Cherry Prunus spp</td>
<td>5.5 (est)</td>
<td>154</td>
<td>4 4 4 1 1.8 (E)</td>
<td>Y</td>
<td>Good</td>
<td>Fair</td>
<td>Crown leaning to north</td>
<td>20 to 40</td>
<td>C 1</td>
<td></td>
</tr>
<tr>
<td>730</td>
<td>Single</td>
<td>n/a</td>
<td>Acer spp.</td>
<td>7 (est)</td>
<td>197</td>
<td>3 2.5 2 2 1.8</td>
<td>Y</td>
<td>Good</td>
<td>Good</td>
<td>Stem diameter measured at 0.75</td>
<td>20 to 40</td>
<td>C 1</td>
<td></td>
</tr>
<tr>
<td>731</td>
<td>Single</td>
<td>n/a</td>
<td>Ash Fraxinus excelsior</td>
<td>8.1</td>
<td>199</td>
<td>3 3 2.5 2 1.5 av</td>
<td>Y</td>
<td>Good</td>
<td>Good</td>
<td></td>
<td>40+</td>
<td>C 1</td>
<td></td>
</tr>
<tr>
<td>732</td>
<td>Single</td>
<td>n/a</td>
<td>Alder Alnus glutinosa</td>
<td>3 (est)</td>
<td>150 (est) NR</td>
<td>NR NR NR NR</td>
<td>Y</td>
<td>Poor</td>
<td>Poor</td>
<td>Leader 100% dead</td>
<td>&lt;10</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>733</td>
<td>Single</td>
<td>n/a</td>
<td>Cherry Prunus spp.</td>
<td>11.4</td>
<td>309</td>
<td>6 6.5 6 5.5 1 (S)</td>
<td>M</td>
<td>Fair</td>
<td>Good</td>
<td>Pavement to N (&lt;2m from base) displaced by roots</td>
<td>10 to 20</td>
<td>B 2</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Type</td>
<td>Quantity</td>
<td>Health</td>
<td>Size (mm)</td>
<td>Condition</td>
<td>Notes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>----------</td>
<td>--------</td>
<td>-----------</td>
<td>-----------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>733</td>
<td>Single</td>
<td>n/a</td>
<td>Cherry</td>
<td>Prunus spp.</td>
<td>5 (est)</td>
<td>Y</td>
<td>Good</td>
<td>pavement to N (&lt;2m from base) displaced by roots</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>734</td>
<td>Single</td>
<td>n/a</td>
<td>Rowan</td>
<td>Sorbus aucuparia</td>
<td>5 (est)</td>
<td>Y</td>
<td>Good</td>
<td>twin stems fused up to 0.5 AGL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>735</td>
<td>Single</td>
<td>n/a</td>
<td>Purple Leaved Sycamore</td>
<td>Acer pseudoplatanus ‘purpureum’</td>
<td>5 (est)</td>
<td>Y</td>
<td>Good</td>
<td>wound at base on S. Recommend - remove lower limb on S originating at 1m AGL to balance tree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>736</td>
<td>Single</td>
<td>n/a</td>
<td>Swedish Whitebeam</td>
<td>Sorbus intermedia</td>
<td>Max 10</td>
<td>Y</td>
<td>Good</td>
<td>trees create avenue; spaced at approx. 5m centres, balanced crowns; located approx. 2m from back edge of footpath; provide good screening for residential housing to the south.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>737</td>
<td>Single</td>
<td>n/a</td>
<td>Ash</td>
<td>Fraxinus excelsior</td>
<td>5 (est)</td>
<td>Y</td>
<td>Good</td>
<td>included bark between acute branch union</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>738</td>
<td>Single</td>
<td>n/a</td>
<td>Alder</td>
<td>Alnus glutinosa</td>
<td>5 (est)</td>
<td>Y</td>
<td>Poor</td>
<td>leader snapped (subordinate branch now substitute for leader), crossing branch at 1m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>739</td>
<td>Single</td>
<td>n/a</td>
<td>Silver Birch</td>
<td>Betula pendula</td>
<td>Max 10</td>
<td>Y</td>
<td>Fair</td>
<td>leader snapped (subordinate branch now substitute for leader), crossing branch at 1m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Area A Group NR
Willow (dominant); Lime; Hawthorn; Sycamore; Field Maple; Hornbeam
Top height 15.3
Willow 200av Other <200
Depth of linear belt (N to S extent) 15m (Max)
NR Y/MA Good | 20 to 40 | C 2 |

Area B Group NR
Willow (frequent); Hawthorn (frequent); All other spp. occur occasionally: Pine; Lime; Ash; Beech; Birch; Elderberry; Dog rose
Av. top height 12m
200 av
Depth of linear belt (E to W extent) 15m (Max)
NR Y/MA Good | 20 to 40 | C 2 |

Area C Group NR
Poplar (dominant); Willow (frequent); Sycamore (occ); Field maple (occ); Pine (occ); Birch (rare); Horse chestnut (rare)
Top height 17 Av
Overall Av. 15
250 av NR NR NR NR NR MA Good | 20 to 40 | A 2 |
## Appendix D. Root Protection Area Calculations

Root Protection Areas calculated in accordance with Table 2 of BS 5837:2005

<table>
<thead>
<tr>
<th>Tree</th>
<th>Species</th>
<th>Stem Diameter (mm)</th>
<th>*RPA Circle Radius (m)</th>
<th>*RPA (m²)</th>
<th>**20% offset value (linear m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>725</td>
<td>Cherry</td>
<td>177</td>
<td>2.2</td>
<td>14.2</td>
<td>0.42</td>
</tr>
<tr>
<td>726</td>
<td>Apple</td>
<td>142</td>
<td>1.7</td>
<td>9.2</td>
<td>0.34</td>
</tr>
<tr>
<td>727</td>
<td>Rowan (ms)</td>
<td>131</td>
<td>1.3</td>
<td>5.4</td>
<td>0.26</td>
</tr>
<tr>
<td>728</td>
<td>Ash (ms)</td>
<td>363</td>
<td>3.6</td>
<td>41.5</td>
<td>0.73</td>
</tr>
<tr>
<td>729</td>
<td>Cherry</td>
<td>154</td>
<td>1.9</td>
<td>10.8</td>
<td>0.37</td>
</tr>
<tr>
<td>730</td>
<td>Acer spp.</td>
<td>197</td>
<td>2.4</td>
<td>17.6</td>
<td>0.47</td>
</tr>
<tr>
<td>731</td>
<td>Ash</td>
<td>199</td>
<td>2.4</td>
<td>18.0</td>
<td>0.48</td>
</tr>
<tr>
<td>732</td>
<td>Alder</td>
<td>150</td>
<td>1.8</td>
<td>10.2</td>
<td>0.36</td>
</tr>
<tr>
<td>733</td>
<td>Cherry</td>
<td>309</td>
<td>3.8</td>
<td>43.2</td>
<td>0.74</td>
</tr>
<tr>
<td>734</td>
<td>Rowan</td>
<td>100</td>
<td>1.2</td>
<td>4.6</td>
<td>0.24</td>
</tr>
<tr>
<td>735</td>
<td>Purple Leafed sycamore</td>
<td>90</td>
<td>1.1</td>
<td>3.7</td>
<td>0.22</td>
</tr>
<tr>
<td>736</td>
<td>Swedish Whitebeam</td>
<td>139</td>
<td>1.7</td>
<td>8.8</td>
<td>0.33</td>
</tr>
<tr>
<td>737</td>
<td>Ash</td>
<td>233</td>
<td>2.8</td>
<td>24.6</td>
<td>0.56</td>
</tr>
<tr>
<td>738</td>
<td>Ash</td>
<td>100</td>
<td>1.2</td>
<td>4.6</td>
<td>0.24</td>
</tr>
<tr>
<td>739</td>
<td>Silver Birch</td>
<td>100</td>
<td>1.2</td>
<td>4.6</td>
<td>0.24</td>
</tr>
<tr>
<td>740-756</td>
<td>Swedish Whitebeam</td>
<td>257</td>
<td>3.1</td>
<td>29.9</td>
<td>0.63</td>
</tr>
<tr>
<td>757</td>
<td>Poplar</td>
<td>656</td>
<td>7.9</td>
<td>194.7</td>
<td>1.57</td>
</tr>
<tr>
<td>Area A</td>
<td>Mixed</td>
<td>200</td>
<td>2.4</td>
<td>18.2</td>
<td>0.48</td>
</tr>
<tr>
<td>Area B</td>
<td>Mixed</td>
<td>200</td>
<td>2.4</td>
<td>18.2</td>
<td>0.48</td>
</tr>
<tr>
<td>Area C</td>
<td>Mixed</td>
<td>250</td>
<td>3.0</td>
<td>28.3</td>
<td>0.6</td>
</tr>
</tbody>
</table>

* figure rounded up to next 1/10

** 20% offset value is only applicable in certain circumstances as determined by an arboriculturalist
## Appendix E. TPO and CA Information

### Record of telephone conversation

**Project Title:** Kettering Buccleuch Academy  
**Project No:** 275367  
**File No:** DA02  

<table>
<thead>
<tr>
<th>Between (for MMG)</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhys Lennon (RL)</td>
<td>27th September 2010</td>
<td>11:15am</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>And (name)</th>
<th>Organisation</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda (AM)</td>
<td>Kettering Borough Council</td>
<td>01536 410333</td>
</tr>
</tbody>
</table>

**Subject:** Tree Preservation Orders and Conservation Area status – Kettering Buccleuch Academy

**Summary**

RL called Kettering Borough Council to confirm if Kettering Buccleuch Academy is located within a Conservation Area or whether any of the trees within the Academy grounds and associated playing fields (Weekley Glebe Playing Fields) were subject to a Tree Preservation Order (TPO). AM confirmed that there were no TPO designations in the above location and the Academy does not fall within a Conservation Area. (Note: Amanda confirmed her position was in customer services and the information she had relayed to RL had been provided by her colleague Duncan Law).

### Action

For information – to be contained within Kettering Buccleuch Academy Arboricultural report.

<table>
<thead>
<tr>
<th>To</th>
<th>A</th>
<th>I</th>
<th>C</th>
<th>Sign</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Return to: n/a
Appendix F. Temporary Protective Fencing

Figure F.1: Excerpt from BS5837:2005 - Details of required scaffold framework for Temporary Protective Fencing

Permission to reproduce extracts from British Standard BS 5837:2005 Trees in relation to Construction - Recommendations is granted by BSI. British Standards can be obtained in PDF or hard copy formats from the BSI online shop: www.bsigroup.com/Shop or by contacting BSI. Tel: +44 (0)20 8996 9001, Email: cservices@bsigroup.com.
Appendix G. Example signs to be erected on Temporary Protective Fencing

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.

CONTRAVENION 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 H. Glossary

**Adventitious Bud**
Adventitious buds develop from places other than a shoot at the tip of a stem e.g. along a branch, often formed as a result of stress e.g. after the stem is wounded or pruned.

**AGL (Above Ground Level)**
Terminology (prefixed by a measurement) stated within the Tree Survey Schedule to reference the location/height of a particular tree feature or tree part.

**Co-dominant stem**
A stem that has grown in direct competition to the main stem and which has formed a substantial size influencing the appearance of the tree.

**Crown Lift**
The removal of the lowest branches, usually to a specified height. It can be used to allow more residual light and greater clearance underneath the canopy for vehicles etc.

**Dieback**
Where branches are beginning to show signs of death usually at the tips of the crown.

**Epicormic growth**
Small branches that grow in uncharacteristic clusters around the base of a tree, usually as a result of bad pruning or other stress factor.

**Etiolated**
Tall, thin tree which has extended vertically without substantial lateral development. Usually as a result of competition for light from other species.

**'Hung up' branch**
A branch which has become detached from the tree but is prevented from falling to the ground by the presence of other branches within the crown.

**Included bark**
Where the bark on two adjoining branches or stems is growing tight together, forming a joint with limited physical strength.

**ms**
A multi-stemmed tree.

**Pollarding**
A method of tree management in which the main trunk of the tree is cut at a particular height, and the resulting branches are then cropped on a regular basis.

**Occluded Wound**
The overgrowth of a wound with (callus) tissue produced subsequently.

**RPA (Root Protection Area)**
The theoretical rooting area of a tree defined by BS5837:2005 Trees in Relation to Construction - Recommendations.

**Topping**
Topping is a form of pruning that removes terminal growth leaving a 'stub' cut end. Topping causes serious health problems to a tree.
Appendix I. References

British Standard BS 5837:2005 Trees in Relation to Construction – Recommendations; Amd. No. 15988; Corrigendum No 1; September 2005; ISBN 0 580 46418 0


The National Joint Utilities Group, Issue 1 – 8th October 2007, Volume 4 - Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

Arboricultural Association, 1991, Leaflet 4 - Tree Management