Land rear of 26 Cross Lane

Royston, Barnsley

– BS 5837 (2012) Tree Survey, Arboricultural Impact Assessment and Arboricultural Method Statement

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Report Title: **26 Cross Lane, Royston, Barnsley – Tree Survey BS 5837 (2012) Tree Survey, Arboricultural Impact Assessment and Arboricultural Method Statement**

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Executive Summary

On behalf of William Smith (Wakefield) Ltd, Ecus Ltd. have carried out a tree survey to BS 5837 (2012) "*Trees in relation to design, demolition and construction- Recommendations"* in October 2016 on land to the rear of Cross Lane, Royston, Barnsley. Ecus carried out a tree survey of the site in July 2012, this report supersedes the 2012 report. The survey has formed the basis of an assessment of the impact development proposals may have on existing trees and any methodologies to be adopted to protect any retained trees.

The survey records all trees within the site and all those which may be affected by any development proposals within the site boundary, recording a number of parameters including species, crown spread and Root Protection Area (RPA).

Throughout this report 'RPA' is used to refer to 'Root Protection Area'. The RPA of any given tree is the area of ground around that tree which should not be disturbed by excavation, compaction, changes in level or other construction/demolition operations. The extent of the RPA is calculated in accordance with BS5837 (2012), and is an important part of the methodologies described in this report.

The survey recorded nine tree groups and 43 individual trees. These are a mix native and non-native trees that are primarily in the younger age classes. Many are low quality, small trees with poor form.

None of the trees are protected by a Tree Preservation Order ref. The site is not located within a Conservation Area.

The Client proposes construction of 21 dwelling plots with associated car parking. This will require the removal of 33 trees or groups. Six more trees should be removed irrespective of whether development proceeds due to their poor condition or because they are dead. Six trees have been removed between the first survey in July 2012 and the second survey in October 2016.

The proposed development may also have an impact on above and below ground parts of retained trees unless adequate protection of these trees is provided.

This report details the arboricultural impact and offers a range of protection measures that should be put in place prior to works starting on site as well as construction methodologies which should be adopted. These measures as described in detail in Chapter 5 will prevent accidental damage and other adverse affects on the health of retained trees and cover:

- Access facilitation pruning;
- Protective fencing;
- Temporary Ground Protection;
- No-dig Construction; and
- Installation of power supply and services.

Contents

1. Introduction

1.1.1 Ecus Limited were commissioned by William Smith (Wakefield) Ltd to undertake a tree survey of the site to the rear of 26 Cross Lane, Royston, Barnsley. The site location is shown on Figure 1 below.

1.1.2 The survey was carried out in accordance with BS 5837 (2012) "*Trees in relation to design, demolition and construction- Recommendations*". This report sets out the findings of the survey and recommendations have been made for preliminary tree work that may be required.

Figure 1 – Location Plan
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2. Tree Survey Methodology

2.1 Site survey

2.1.1 Ecus carried out the initial tree survey in July 2012 when the trees were in leaf. An updated survey, including an additional area of land at the eastern end of the site, was carried out in October 2016. The tree survey was a ground based visual inspection carried out by a suitably qualified arboriculturist. The trees were not tagged as part of the survey.

2.1.2 The tree survey update, in October 2016, together with the additional area at the eastern end of the site was carried out by Ian Kennedy, BSc (Hons), MArborA., MICFor.

2.1.2 The following characteristics were recorded:

- Species
- Stem diameter at 1.5m above ground level (mm).
- Estimated height (m)
- Approximate crown spread (m) as North, South, East and West measurements.
- An estimate of the number of years that the tree is likely to remain suitable for retention.

  <10 = less than 10 years

  10+ = 10-20 years

  20+ = 20-40 years

  40+ = more than 40 years
- Age class

  YNG = Young and recently established trees

  SM = Semi-mature trees age less than 1/3 life expectancy

  EM = Middle age trees 1/3 – 2/3 life expectancy

  M = Mature trees over 2/3 life expectancy

  OM = Over mature – declining or moribund trees of low vigour
- Condition category in accordance with BS5837: Trees in relation to the design, *demolition and construction recommendations (2012)*. The categories listed are defined as per BS5837:2012 and briefly are:

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

  A = Those of high quality and value- best trees with a long expected safe life

  B = Those of moderate quality and value

  C = Those of low quality and value and trees less than 15cm diameter
- Value subcategories in accordance with *BS 5837:2012.* The subcategories listed are defined as per BS5837:2012 and briefly are:

  1 = Mainly arboricultural values

  2 = Mainly landscape values

  3 = Mainly cultural values, including conservation

- General notes about physiological and structural condition and any management recommendations.

2.1.3 The survey recorded all trees on site with a stem diameter of 75mm or more at 1.5m height and includes all trees outside the site boundary which may be affected by any future development of the site, either by their crown overhanging the site or their Root Protection Area potentially extending into the site.

2.1.4 A full topographic survey of the site was provided; this was used as the basis for producing the tree survey plan. The topographic survey did not pick up tree locations of T47, T49, T50, T51 or T52 within the development site and therefore these tree locations were estimated.

2.2 Consultation with Local Authority

2.2.1 The survey included identification of any existing designations affecting trees on site such as Tree Preservation Orders and Conservation Area status by checking the map information available on Barnsley Metropolitan Borough Council's website www.barnsley.gov.uk.

2.3 Calculation of Root Protection Area (RPA)

2.3.1 Below ground constraints to development are represented by the root plate around a tree which needs protecting in order for the tree to be incorporated into a proposed scheme, without adverse harm to the tree or structural integrity of any proposed foundation structures. This area is illustrated by the Root Protection Area (RPA) and is calculated according to the formulae set out in BS5837:2012 clause 4.6.1.

2.3.2 Any deviation in the RPA from the original circular plot should take account of physical site conditions that influence the disposition of tree roots, e.g. streams, building foundations and retaining walls.

3. Tree Survey Results

3.1 General Site Description

3.1.1 The site consists of a grassed area with several areas of trees and bushes. The surrounding land use is predominantly residential.

3.1.2 The trees surveyed during the site visit are located largely around each of the boundaries in groups with a smaller number found individually throughout the interior.

3.1.3 There are a number of timber and brick built buildings in the northern half of the site used to stable horses and for storage.

3.1.4 The site is enclosed by housing on the northern, southern and western boundaries. A small paddock adjoins the eastern boundary meaning that there are very limited views of the site from public places.

3.2 Results of Tree Survey

3.2.1 The Tree Survey Schedule in Table 1, Appendix 1 describes the results of the tree survey and includes preliminary management recommendations. The table should be read in conjunction with Figure 2 Tree Survey and Tree Constraints Plan. This drawing illustrates the location of the trees surveyed, the extent of their canopies as well as the Root Protection Areas (RPA) of each tree and tree group.

3.2.2 Nine tree groups and 43 individual trees have been recorded during the survey. A full survey to BS 5837 (2012) was carried out for those trees, including the recording of the stem diameter to determine the Root Protection Area (RPA) of the trees.

3.2.3 There is a wide range of broadleaved and conifer tree species throughout the site, including fruit trees. Some of the trees are native species but many are non-native plantings. Whilst the fruit trees are mature many of other trees are in the younger age ranges.

3.2.4 The trees are quite small either because they are from smaller growing species such as the fruit trees or because they have not yet reached maturity. Most of the trees are low quality either because they are closely grown in groups or because they are suffering from soil compaction and a number have large bark wounds that have possibly been caused by grazing animals.

3.2.5 The trees have low public amenity value because they are relatively small and the site is surrounded by housing.

3.3 Tree Designations

3.3.1 Barnsley Metropolitan Borough Council's website was checked on 11 October 2016 and this confirmed that there are no Tree Preservation Orders (TPO) on any of the trees surveyed. The site is not within a Conservation Area.

4. Arboricultural Impact Assessment (AIA)

4.1 Development Proposals

4.1.1 An Arboricultural Impact Assessment of the proposed site plan has been undertaken to assess the likely impact of the development on existing trees and tree groups. This assessment is based on the development plan provided by the William Smith (Wakefield) Ltd (ref: SBP Architect Dwg No. 16-025-ssp01 Rev 01 Dated 07 September 2016).

4.1.2 The client proposes construction of 21 dwellings in a cul-de-sac formation with associated car parking. Access would be from the southern boundary.

4.2 Arboricultural Impact Assessment

Direct impact from development

4.2.1 The development plan indicates that 33 trees or groups within the red line site boundary will need to be removed to accommodate the new development, including new buildings, new roads and drives as well as new hard landscape.

Removal of trees for amenity and safety reasons

4.2.2 Six trees on site have been assessed as being "unsuitable for retention". Unless otherwise agreed with the developer/owner, these trees should be removed to ensure the safety of the site during construction and operation of the development/ improve the amenity spaces within the site.

Shading

4.2.3 The removal of Trees and Groups 6, 7, 8, 9, 10, 16, 32 and 43 is required to minimise shading of properties and in order to provide usable outdoor space in the gardens of the properties.

4.2.4 A total of 32 *Category C* trees and one Category B tree will have to be removed to facilitate the development, in addition to six trees or groups (T12, G21, G22, T24, one tree in G31 and T50) recommended for removal due to their poor quality.

4.3 Recommendations

4.3.1 Chapter 5 Arboricultural Method Statement describes measures to protect the retained trees during the development, and operations within the RPA of retained trees including:

- Protective fencing; and
- Arboricultural Clerk of Works.

4.3.2 Replacement tree planting could be carried out in some of the rear gardens but this could only be small scale planting given the restricted space available. Any planting would have very limited amenity or wildlife value. Small fruit trees and small trees / large shrubs such as Amelanchier and Magnolia within gardens could be considered as part of the landscape proposals.

5. Arboricultural Method Statement (AMS)

5.1.1 The Arboricultural Method Statement should be read in conjunction with Figure 3 Tree Protection Plan in Appendix 2. The Arboricultural Method Statement paragraphs below are written in the chronological sequence they are to be carried out.

5.2 Pre-Commencement

5.2.1 It is advised that a Pre-Commencement Site Meeting is held with contractors who are responsible for operating machinery on site. The meeting will firstly highlight the potential for damage occurring to tree crowns, but thereafter ensure that extra care is applied when manoeuvring any machinery within close proximity of retained trees to prevent any contact with the tree and consequent damage to crown, stem or roots.

5.2.2 For clarity, prior to any construction or development work proceeding, the alignment of the protective fencing (Section 5.4) and the RPA's of any individual trees to be retained which are not able to be protected by fencing should be marked out using the distances provided in the table within the tree survey report. Marking out should be completed or approved by a person with arboricultural expertise as individual trees will have root zones that may be affected by local conditions and allowances will need to be made to accommodate this. This may be done prior to, or during, the Pre-Commencement Site Meeting.

5.3 Access facilitation works (T30 and T37)

5.3.1 Trees on site which are not to be retained can be removed prior to development works commencing. To avoid mistakes, the individual trees to be removed should be identified and marked by a person with arboricultural expertise.

5.3.2 The Facilitation Pruning Works specification shall be prepared by an arboriculturist and submitted to the local planning authority for approval before construction, demolition or fencing operations commence on site. It is expected that the works will include specific pruning works to specific branches within the canopies of T30 and T37.

5.3.3 The following trees require pruning to facilitate the development:

Table 1: Access facilitation pruning

Tree number	Tree work required	Reason
T30	Pruning of north west side of canopy.	To provide 1m clearance from proposed building allowing building construction.
T37	Pruning of west side of canopy.	To provide 1m clearance from propose building allowing building construction.

5.3.4 All tree works should be carried out in accordance with BS 3998 (2010) "*Tree Works-Recommendations*".

5.3.5 The Facilitation Pruning should be carried out on site by a suitably qualified and experienced tree surgeon before construction or demolition operations commence on site. The Facilitation Pruning can run concurrent with operations to erect tree protection fencing as long as this can be co-ordinated such that neither presents a hazard to the other.

5.3.6 Trees on site which are not to be retained, can be removed as part of the Facilitation Pruning (or earlier if the appropriate planning consent is confirmed). To avoid mistakes, the individual trees to be removed should be identified and marked by a person with arboricultural expertise.

5.3.7 It is recommended that any trees that require removal or significant canopy works, should be checked in advance of works by an ecologist to ensure there is no possibility of any disturbance to nesting birds or roosting bats.

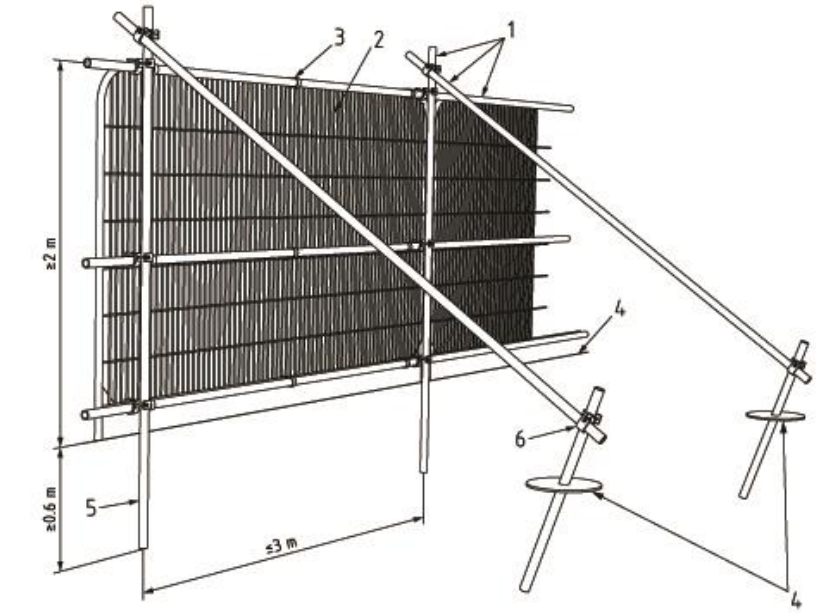
5.4 Protective Barrier/Tree Protection Fencing

5.4.1 The development design prepared for the site indicates that G1, T2, G22, T30, part of G31 and T37 within the site could be retained. In addition there are two trees off site but within 12m of the site boundary that are to be retained (T44 and T46). All these trees need to be protected from all construction operations by a protective barrier (fencing to BS5837 (2012) which creates a sacrosanct Construction Exclusion Zone (CEZ).

5.4.2 The alignment of the protective barrier is based on the calculated extent of the RPA in accordance with BS5837 (2012). The detailed alignment is shown in Figure 3 Tree Protection Plan in Appendix 2.

5.4.3 In principle, protective fencing should be erected before any construction/demolition operations start on site and should be removed only on completion of all construction/demolition works on site.

5.4.4 The default specification for protective barrier is shown in Figure 4 below. Site hoarding is an acceptable alternative. It may be appropriate on some sites to use temporary site offices as components of the protection barriers, on the understanding that they will remain in situ for the duration of the construction/demolition works and their removal will be planned to ensure the Contractor's co-ordinated withdrawal from site away from the trees rather than towards them.



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

Figure 4: Default Specification for Protective Barrier to BS 5837 (2012)

5.4.5 All weather notices should be placed on fencing to indicate that operations are not permitted within the fenced area, for example “CONSTRUCTION EXCLUSION ZONE – NO ACCESS” or similar.

5.4.6 Once set up fences should not be removed or altered without prior consultation with the arboricultural advisor.

5.5 Temporary Ground Protection (T30, T37)

5.5.1 Where unmade ground within the RPA of trees but outside the protective barrier is exposed to construction damage and/or soil compaction, temporary ground protection should be installed immediately following the erection of tree protection fencing and prior to starting work on site.

5.5.2 The ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

5.5.3 The location and extent of the ground protection is shown in Figure 3 Tree Protection Plan.

5.5.4 Following completion of construction/demolition works, the ground protection should be removed and the ground reinstated without soil disturbance.

5.6 Permanent Surfacing (No-dig construction) in RPA (T30, T37)

5.6.1 If a path is proposed within the area marked as no-dig construction on Figure 3 Tree Protection Plan as part of the detailed design, the path is to be constructed as ‘no-dig’.

5.6.2 A geotextile will be laid out on top of the existing ground, before a three-dimensional

Cellular Confinement System (CCS) will be installed, acting as the sub-base. Infill materials should include no-fines aggregate (granular) sub-base layer which when compacted is free draining and allow gaseous exchange. Clean angular stone 4-20mm or 20-40mm in diameter, or angular gravel over 4mm are able to create a positive interlock with the CCS.

5.6.3 The wearing course should be a permeable surface allowing gaseous exchange and the infiltration of water into the root zone.

5.6.4 New hard surfacing should only be installed on completion of surrounding construction work.

5.6.5 Roots smaller than 25mm diameter may be pruned back, making a clean cut with a suitable sharp tool except where they occur in clumps. Roots occurring in clumps or of 25mm diameter and over should be severed only following consultation with an arboriculturist, as such roots might be essential to the tree's health and stability.

5.6.6 Kerbs and edgings that require excavations should not be used. Where kerbing is required for light structures, above-ground peg and board edging might be acceptable. Where the use of standard kerbs is unavoidable in areas used by vehicular traffic, foundations should not be continuous where this would require cutting or severing of roots larger than 25mm diameter. Instead, the kerbs should be "bridged" over the roots, leaving space that allows for future increase of the root diameter.

5.7 Installation of power supply and services

5.7.1 There are currently no proposals to route services or utilities through the RPA of any retained trees. If this changes at a later stage of the project, proposals should be submitted to the local planning authority Tree Officer for approval.

5.7.2 As guidance only, it is noted here that any underground power supply and services routed through the RPA should be installed in accordance with BS 5837:2012 clause 7.7.2 and NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

5.8 Removal of Protective Fencing

5.8.1 The tree protective fencing can only be removed once the construction work has been completed.

6. Tree Management

6.1.1 The following section provides some general guidance as to how retained trees could best be protected during construction. More detailed guidelines for tree protection during construction are given in BS5837: Trees in relation to the design, demolition and construction recommendations (2012).

6.1.2 Any tree roots severed during site clearance works should be wrapped or covered with hessian sheets (wet in summer, dry in winter) as an immediate protection measure against desiccation and rapid temperature changes. This should be removed prior to backfilling which should be carried out as soon as possible. In addition the advice of an arboriculturist, or the Tree Officer of the local planning authority, should be sought as soon as possible on the potential effect of the root damage on the tree's stability, vitality and legal implications.

6.1.3 All tree works should follow best practice procedures as set out in BS 3998 (2010). All trees should be maintained in good condition on site and be inspected annually (where overall condition requires) or every 2 years and after any major storm events, with safety a priority.

6.1.4 The best practice principles have been broadly summarised below:

- Once areas around trees have been protected by fencing, any works on the remaining site area may be commenced providing activities do not impinge on protected areas.

- Wide or tall loads etc. should not come into contact with retained trees. Banksman should supervise transit of vehicles, jibs, booms etc. where this is in close proximity to retained trees.

- Oil, bitumen, cement or other material that is potentially injurious to trees should not be stacked or discharged within 10m of a tree bole. No concrete mixing should be done within 10m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree.

- No fires will be lit where flames are anticipated to extend to within 5m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire.

- Notice boards, telephone cables or other services should not be attached to any part of a retained tree.

- In the event of having caused any branch or limb damage to retained trees, the advice of an arboriculturalist should be sought on what tree surgery be carried out, in accordance with BS 3998 (2010) Recommendations for Tree Work, to correct the damage, and the best timescale for that tree surgery which will be determined by season, species, gravity of damage and legal status of the tree (Tree Preservation Order/ Conservation Area/nesting birds/roosting bats).

6.1.5 All of the above precautionary measures should be applied to minimise the effect of any damage to long-term tree health and safety.

6.1.6 It is recommended that any trees that require removal or significant canopy works, should be checked in advance of works by an ecologist to ensure there is no possibility of any disturbance to nesting birds or roosting bats.

Appendix 1 – Tables

Table 1 – BS5837 Tree Survey Schedule

Key:	Measurements	Age – Class	Overall Condition	BS 5837 2005 : Cascade Chart for Quality Assessment/Retention Category	Symbols:
	MS – Multi-stemmed	YNG – Young Mature	G – Good	A – High	< = less than
	Ht - Height in metres	SM – Semi-mature	F – Fair	B – Moderate	~ = approximately
	Stem – Stem Diameter at 1.5m in mm	EM – Early mature	P – Poor	C – Low	> = greater than
	Crown – Crown spread in metres	M – Mature	D - Dead	U – Unsuitable for retention	
	TD - Trunk division (height in metres)	OM – Over mature		**Sub-categories:**	
		Est Yrs – estimate of years remaining (40+ years; 20+ years; 10+ years, <10 years)		**1** = mainly arboricultural values **2** = mainly landscape values **3** = mainly cultural values.	
RPA = Root protection area (equivalent to a circle with a radius 12 x the stem diameter of single stem trees or 12 x the notional stem diameter of multi stemmed trees as per BS 5837:2012 clause 4.6). This will be capped to 707m² for trees with a stem diameter larger than 1.25m.					

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m²)
G1	Lawsons Cypress *(Chamaecyparis lawsoniana)*	10	170 to 300	2	2	2	2	2	SM	20+	F	Overgrown hedge. Group of five trees growing close together. The largest stem has a developing acute stem union at 1.5m	Could be retained but not particularly suitable in the long term.	C2	4.6	66.1
T2	Deodar cedar *(Cedrus deodara)*	10	325	2.5	2	2.6	2	2	SM	20+	G	No significant defects	Could be retained but would occupy a large proportion of the garden.	C1	3.9	47.8

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T3	Norway maple *(Acer platanoides)*											This tree has been felled leaving a 1m stump				
T4	Cherry *(Prunus)*											This tree has been felled leaving a 1m stump				
T5	Oak *(Quercus robur)*											This tree has been felled leaving a 1m stump				
T6	Ash *(Fraxinus excelsior)*	7	180	1.5	2	2	3	3	YNG	40+	G	No significant defects.	*Fell*	C1	2.2	14.7
T7	Cherry *(Prunus)*	7	145	1.5	1	2	2.4	2	YNG	10+	G	No significant defects.	*Fell*	C1	1.7	9.5
T8	Whitebeam *(Sorbus aria)*	8	115 + 155	2	1.5	2	1.5	3	SM	10+	F	Developing acute stem union at 1.5m	*Fell*	C1	1.9	11.7
T9	Cherry *(Prunus)*	8	265	4	3.9	4.7	2	3	SM	10+	F	Acute stem union at 2.5m	*Fell*	C1	3.2	31.8

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G10	Hawthorn *(Crataegus monogyna)*, and Sycamore *(Acer pseudoplatanus)*, Lawson's cypress *(Chamaecyparis lawsoniana)*, spruce *(Picea)*, Norway maple *(Acer platanoides)*	4 -12	<300	2.5	2.5	2.5	2.5	0.5	YNG – SM	10+	F – G	Dense group of trees	*Could be retained but would occupy a large proportion of the gardens, therefore fell as part of development.*	C2	2.4/ tree	
G11	Hawthorn *(Crataegus monogyna)*	7	230 + 140 twin at 0.5m. 150 + 200 twin from base. 100, 100 + 100 triple stemmed from 1m.	2.5	2.5	2.5	2.5	1.5	SM	10+	F	Group of three trees	*Fell*	C2	1.7 – 3.0	30.0

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T12	Eucalyptus	9	350	4	4	4	2	2	M	<10	P	The tree is in severe decline with only the lower crown alive. There is a dead path of bark between ground level and 2m with decay at the base.	Fell irrespective of development proposals.	U		
T13	Hawthorn *(Crataegus monogyna)*	5.5	150 + 165	2.2	2.2	2.2	2.2	2.5	SM	10+	F	No significant defects.	*Fell*	C1	2.2	15.8
G14	Hawthorn *(Crataegus monogyna)*	6	100 + 100	1.5	1.5	1.5	1.5	0.25	SM	10+	F	These are small multi-stemmed trees/large shrubs	*Fell*	C2	1.7	9.4
T15	Ash *(Fraxinus excelsior)*	12.5	310	3.7	3.7	3.5	3.5	3	SM	40+	G	No significant defects	*Fell*	C1	3.7	43.5
T16	Sycamore *(Acer pseudoplatanus)*	11	343	4#	4#	3.8	3.5	3	SM	40+	G	No significant defects	*Fell*	C1	4.1	53.2
T17	Hawthorn *(Crataegus monogyna)*											This tree has been felled				

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G18	3 Plum *(Prunus)* and 1 Hawthorn *(Crataegus monogyna)*	<9.5	280, 16, 222, 233, 228, 160, 220, 200	2	2	2	2	2 – 3.5	SM – M	10+	F	Group of four trees	*Fell*	C1	6.1	117.9
T19	Hawthorn *(Crataegus monogyna)*	8.5	200, 220, 165, 100, 100	4	3.5	3.2	1.9	1.8	SM	<10	P	Some of the stems have bark wounds that are occluding. They don't contain decay	*Fell*	C1	3.7	42.6
T20	Hawthorn *(Crataegus monogyna)*	7	70, 100, 3x110	2.5	2.5	2.5	2.5	2	SM	<10	P	The trees health is declining.	*Fell*	C1	1.6	8.5
G21	Eucalyptus	12	300 + 200	4	4	3	3	2	SM	<10	P	The tree is in severe decline	Fell irrespective of development proposals.	U		
G22	Lawson's Cypress *(Chamaecyparis lawsoniana)*	12	275, 190, 450	1.5	1.5	1.5	1.5	2	SM	10+	F – G	Acute stem union at 1.5m on the largest tree.	Fell irrespective of development proposals.	C1	2.3 - 5.4	95

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T23	Horse Chestnut *(Aesculus hippocastanum)*	8	245	2.5	2.5	2	1	1.5	YNG	10+	F	The crown is weight biased to the east.	*Fell*	C1	2.9	27.2
T24	Plum *(Prunus)*	8	200 + 300	3	2	2	2	3	M	<10	P	One of the main stems has failed at 2m. The second has a large decay cavity.	Fell irrespective of development proposals.	U		
T25	Apple *(Malus)*	7	225 x 2	4	4	4	3	3	M	10+	F	No significant defects.	*Fell*	C1	3.2	31.8
T26	Hawthorn *(Crataegus monogyna)*	8	275, 165, 145	3	3	3	3	2.5	SM	10+	F	There are a number of bark wounds on the main stem. These are occluding but don't contain decay.	*Fell*	C1	3.5	38.9
T27	Apple *(Malus)*	6	230, 220	2	4	4	2	3	M	10+	F	1 stem is weight biased to the northwest.	*Fell*	C1	3.2	31.8
T28	Apple *(Malus)*	10	300, 215, 180	3	3	3	3	3	M	10+	F	The tree's health is declining. There is a large bark wound on the main stem to 1.8m	*Fell*	C1	4.1	53.9

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T29	Sycamore *(Acer pseudoplatanus)*	10	345	2	2	3	3	2	SM	40+	G	No significant defects	*Fell*	C1	4.1	53.9
T30	Pear *(Pyrus)*	10	510	5.2	4	4	4	2	M	20+	G	Some minor dead wood.	*Prune to allow access for development and clearance of new building.*	B1	6.1	117.1
G31	Eucalyptus	10	320 + 200	2	2	2	2	2	SM	0 – 10+	D – F	One of the trees is dead	Fell the dead tree irrespective of proposals. Retain the other.	U – C1	3.8	46.3
G32	Hawthorn *(Crataegus monogyna),* Elder (Sambucus nigra), Lawson's Cypress *(Chamaecyparis lawsoniana)* and Blue atlas cedar *(Cedrus atlantica)*	<10	<320	2.5	2.5	2.5	2.5	1	YNG – SM	20+	F	A densely growing group of trees.	*Fell*	C1	3.8/ tree	

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T33	Pear *(Pyrus)*	8	440 @ 1m	3.4	3.4	3.4	3.4	2	M	10+	F	The tree is in early decline, possibly due to compaction caused by grazing. There are a number of old bark wounds up to 1m long. These don't contain decay.	*Fell*	C1	5.3	87.6
T34	Pear *(Pyrus)*	11	500	4	5.5	3	3	1.8	M	10+	F	There are two large bark wounds to 1m long on the main stem. One contains decay.	*Fell*	C1	6.0	113.1
T35	Eucalyptus											This tree has been felled				
T36	Apple *(Malus)*	8	310 + 275	1.5	1.5	1.5	3	3	M	10+	P	One of the stems has a large bark wound and pruning wounds. These contain significant decay. The crown is biased to the south.	*Fell*	C1	4.1	54.0

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T37	Apple *(Malus)*	9	360 + 380	2.8	4.9	2.8	2.8	3.5	M	10+	F	Dead branch stub on northeast side of main stem at 1.5m.	*Prune to provide adequate space for construction.*	C1	5.2	86.1
T38	Cotoneaster	8	210 + 100	2.5	1	3	3	1.5	M	10+	F	There are a number of branch stubs following previous pruning.	*Fell*	C1	2.3	17.0
T39	Lime *(Tilia cordata)*	9	310	4.4	3.6	4.5	3.0	2	SM	40+	G	A well-formed tree with no significant defects.	*Fell*	B1	3.7	43.5
T40	Apple *(Malus)*	7	145 + 200	3.5	3.5	2	2	3	M	10+	F	One stem has an old pruning wound that has formed a cavity.	*Fell*	C1	2.5	19.2
T41	Sycamore *(Acer pseudoplatanus)*	9	228	4	5	3	3	3	YNG	40+	F	No significant defects	*Fell*	C1	2.7	23.5
T42	Eucalyptus	12	450 + 260	4	5	4	3	4	SM	20+	F	There are a number of small dead lateral branches up 2m long and 3cm diameter throughout the crown.	*Fell*	C1	5.2	84.9

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T43	Eucalyptus	11	275	2	2	3	2	3	SM	20+	F	There are a number of small dead lateral branches up 2m long and 3cm diameter throughout the crown.	*Fell*	C1	3.3	34.2
T44	Purple Plum *(Prunus cerasifera)*	5	100#	2	2	1.5	2.5	1.5	SM	10+	F	A small insignificant tree.	No works	C1	1.2	4.5
T45	Dead tree	4										This is just a stump covered in ivy.				
T46	Eucalyptus	12	400#	3	3	3	3	3	SM	10+	F	One major limb is dead.	Remove dead limb over the garden regardless of development proposals.	C1	4.8	72.4
T47	Dawn redwood *(Metasequoia glyptostroboides)*	10	185	2.5	2.5	2	1.5	2	SM	20+	F	A small tree that has good form.	*Fell*	C1	2.2	15.5

Tree No	Species	Ht (m)	Stem Diam @ 1.5m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations *Management as a consequence of construction*	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G48	Lawson's *(Chamaecyparis lawsoniana)* and Leyland cypress *(Cupressus × leylandii),* cherry *(Prunus),* hawthorn *(Crataegus monogyna),* apple *(Malus),* ash *(Fraxinus excelsior)*	<12	300	2	3	2	2.5	0.5	SM	20+	F	A linear group of trees possibly planted as a hedge but developing into a line of trees due to lack of management.	*Fell*	C1	3.6/ tree	
T49	Sycamore *(Acer pseudoplatanus)*	5	150#	2	2	2	2	0.5	YNG	20+	F	A small insignificant tree.	*Fell*	C1	1.8	10.2
T50	Eucalyptus	10	200#	1.5	1.5	1.5	1.5	2	SM	0	D		Fell irrespective of development proposals.	U		
T51	Eucalyptus	12	200#	2	2	2	2	2	SM	20+	F	No apparent defects.	*Fell*	C1	2.4	18.1
T52	Eucalyptus	12	200#	2#	2#	2#	2#	2#	SM	20+	F	Inspection of the main stem wasn't possible.	*Fell*	C1	2.4	18.1

Appendix 2 – Site Photographs

T12 Eucalyptus

T39 Lime

Appendix 3 – Tree Survey and Tree Constraints Plan

T46 remove dead limb overhanging garden irrespective of development proposals

Fell T12 irrespective of development proposals

Fell T50 irrespective of development proposals

Fell T24 irrespective of development proposals

Fell the dead tree in G31 irrespective of development proposals, retain the living tree.

Fell G22 irrespective of development proposals

Fell G21 irrespective of development proposals

KEY- Tree Survey and Tree Constraints Plan (to be read in conjunction with Ecus Ltd. Tree Survey report ref. 3604)

Tree surveyed by Ecus - location of tree centre from topographic survey

Tree surveyed by Ecus - tree location approximated by Ecus

Tree categories (BS 5837:2012)

- Category A Trees
- Category B Trees
- Category C Trees
- Category U Trees

Root Protection Area (RPA) of category A, B and C trees

N

Rev	Date	Initials	Checked	Revision
B	06.10.16	IK	ECUS	Updated and Additional Trees
A	12.07.12	KAM	ECUS	PRELIMINARY ISSUE

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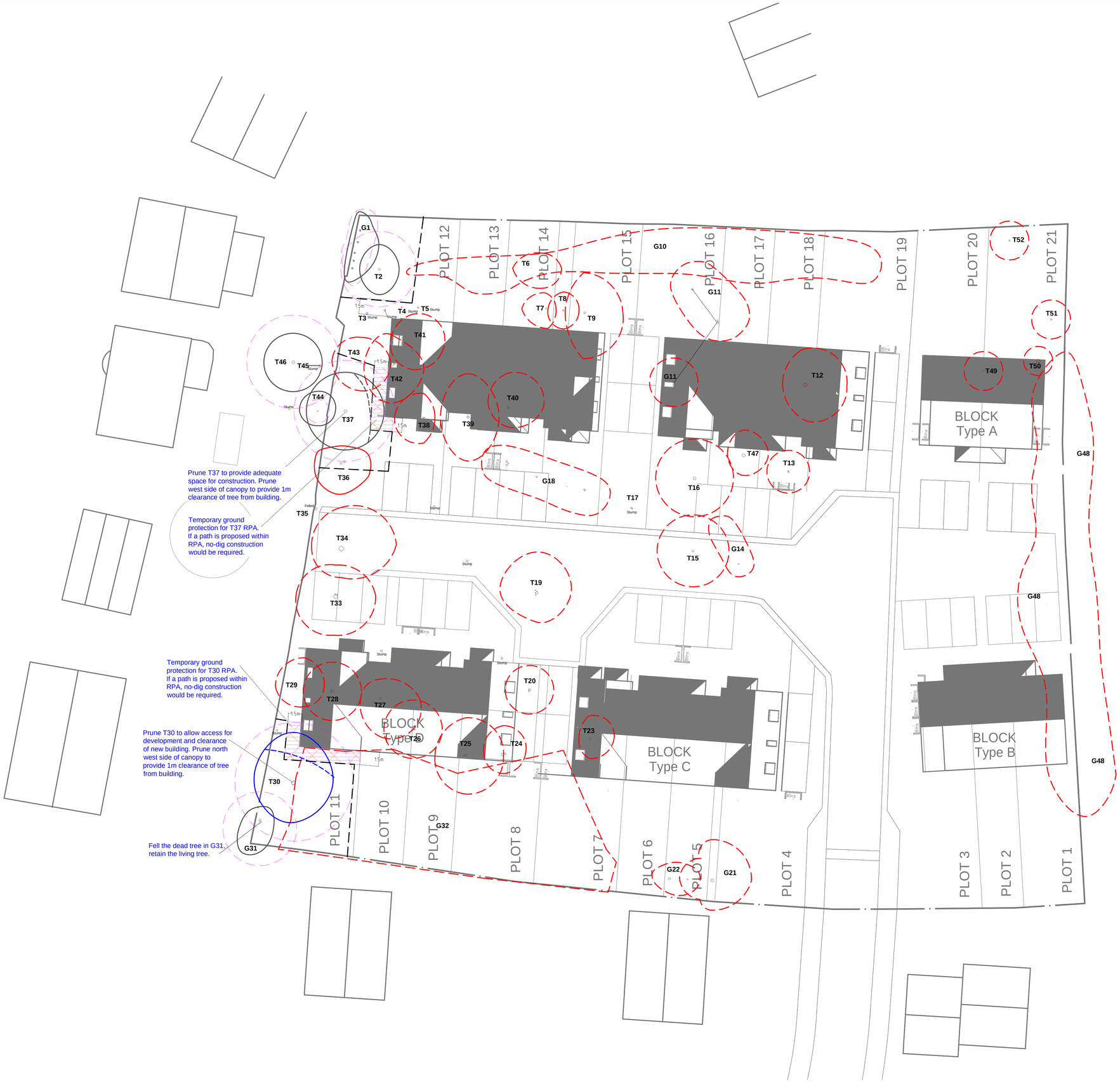
Title
Figure 2: Tree Survey and Tree Constraints Plan

Drawn by	Date	Scale	Drg. no.
KAM	**July 12**	**1:500@A1**	**L3604/01**

Appendix 4 – Tree Protection Plan



KEY- Tree Protection Plan
(to be read in conjunction with Ecus Ltd. Tree Survey report ref. 3604)

- Tree surveyed by Ecus - location of tree centre from topographic survey
- Tree surveyed by Ecus - tree location approximated by Ecus

Tree categories (BS 5837:2012)

- Category A Trees
- Category B Trees
- Category C Trees
- Category U Trees
- Existing tree to remove
- Root Protection Area (RPA) of trees to be retained
- Protective Barrier - BS5837 (2012), clause 6.2.2
- Temporary ground protection - BS5837:2012, clause 6.2.3
- No-dig construction - BS5837:2012, clause 7.4.2

N

Rev	Date	Initials	Checked	Revision
B	10.01.17	KM	ECUS	Revised Layout
A	06.10.16	IK	ECUS	Preliminary

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Figure 3: Tree Protection Plan

Drawn by	Date	Scale	Drg. no.
IK	**Oct 16**	**1:500@A1**	**L3604/02**