



**BS 5837:2012 Arboricultural Survey**

**Jasmin Green, Birchwood, Lincoln**

**For JH Walter on Behalf of Birchwood Big Local  
Partnership Board**

**Delta-Simons Project No. 16-1044.01**

**Issued: January 2017**

**EXECUTIVE SUMMARY  
BS 5837:2012 ARBORICULTURAL SURVEY  
JASMIN GREEN, BIRCHWOOD, LINCOLN**

**FOR**

**JH WALTER ON BEHALF OF BIRCHWOOD BIG LOCAL PARTNERSHIP BOARD**

**DELTA-SIMONS PROJECT No. 16-1044.01**

<b>Purpose</b>	Delta-Simons Environmental Consultants Ltd was instructed by JH Walter on behalf of Birchwood Big Local Partnership Board (the 'Client'), to undertake a Tree Survey to BS 5837:2012 standard of an area of land situated west of Jasmin Road in Birchwood, Lincoln (the 'Site'). The survey was undertaken on 12 <sup>th</sup> December 2016. The survey was undertaken in order to inform a planning application for the Site.
<b>Current Site Status</b>	The Site is characterised by a large area of managed grassland bisected by paths, with areas of scattered trees and plantation woodland.
<b>Proposed Development</b>	The proposals, which have not yet been finalised, are for a residential development with associated hard and soft landscaping.
<b>Results</b>	A total of ten individual trees and eight tree groups were identified and assessed as part of the Tree Survey. The results of the desk search revealed that no trees on-Site or immediately adjacent to the Site are covered by Tree Preservation Orders (TPOs), or are within a Conservation Area.
<b>Recommendations</b>	<p><u>Recommendation 1 (Adequate Tree Protection)</u> Those trees identified within any proposed development plan for retention will need to be adequately protected during any approved development works. Measures to protect trees should follow the best practice principles set out in BS 5837: Trees in Relation to Design, Development and Construction (2012).</p> <p>Prior to any development work proceeding, the Root Protection Area (RPAs) of individual trees to be retained should be marked out. Marking out should be completed by a competent person with arboricultural expertise. All trees retained on-Site and adjacent to the Site should be protected by barriers or ground protection around the calculated RPA, and as indicated on the Tree Constraints Plan (TCP) produced in association with this survey.</p>
<p><b>This Tree Survey Executive Summary is intended as a summary of the assessment of the Site based on information received by Delta-Simons at the time of production. This Executive Summary should be read in conjunction with the full Report.</b></p>	

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**BS 5837:2012 ARBORICULTURAL SURVEY**  
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**1.0 INTRODUCTION**

**1.1 Purpose and Scope of the Survey**

Delta-Simons Environmental Consultants Ltd was instructed by JH Walter on behalf of Birchwood Big Local Partnership Board (the 'Client') to undertake an Arboricultural Survey to BS 5837:2012 standard. The survey was undertaken of land west of Jasmin Road in Birchwood, Lincoln (hereafter referred to as the 'Site'). The survey was undertaken on 12<sup>th</sup> December 2016. The Site location and the area surveyed are shown in Figure 1. The survey was undertaken in order to inform a planning application for the Site.

The aims of the Tree Survey were to:

- △ Identify the individual tree species present at the Site by means of visual inspection;
- △ To define the approximate age, condition and canopy spread of all individual mature trees identified and the value of these within the development;
- △ To identify any trees that present a risk to existing or proposed foundations or other structures that may be constructed on the Site and recommend actions to remove this risk; and
- △ Recommend tree management or mitigation measures where appropriate.

**1.2 Site Description**

The Site is centred at Ordnance Survey (OS) grid reference SK 9314 6954 in the western area of Birchwood, Lincoln. The Site covers an area of approximately 2 hectares (ha) and comprises managed grassland with footpaths crossing through and around the grassland. In the north, north-west, and on the southern boundary are areas of mixed plantation woodland, whilst scattered trees lie within the central grassland and towards the south-western, south-eastern and northern extents of the Site. Small areas of scattered scrub border the woodland in the south, whilst the

majority of the boundary comprises fencing with short lengths of wall present on the eastern boundary.

Further grassland and trees continue north of the Site, whilst to the east are a school, medical centre and a shopping centre with car parking. South of the Site are residential properties and gardens, whilst further properties and grassland lie to the west.

Topographically, the majority of the grassland at the Site is relatively flat with shallow embankments present beneath the north-eastern and north-western trees and in the west of the Site. The Site appeared to be well drained and did not support standing water at the time of the survey.

The Site layout is shown in Figure 2.

### **1.3 Proposed Development**

The proposals, which have not yet been finalised, are for a residential development with associated hard and soft landscaping

## **2.0 LEGISLATION**

### **2.1 Trees**

Local planning authorities look upon trees as being highly beneficial to the locality. To ensure that any important specimens, or significant groups of trees are retained, they may place Tree Preservation Orders (TPOs) on them. In other situations, villages or whole districts may be classified as conservation areas. In these instances, certain trees in the designated area will be protected. When trees are protected, legal procedures must be followed before any work is carried out.

When trees are protected by TPOs, no work should be carried out on them without prior written consent from the Local Planning Authority (LPA). Once an application is made, the Authority personnel must inspect the trees, and make a decision within a statutory eight-week period as to whether work can go ahead. If no decision is made within the eight weeks' period, the appellant can appeal to the Office of the Deputy Prime Minister for non-determination. If the Local Authority (LA) refuses the application the appellant still has the right to appeal.

If a tree protected by a TPO is either killed or wilfully destroyed, the owners of the tree, and the contractor who did the work, can both be prosecuted. The fines for killing or wilfully destroying a tree can be high, i.e. the current maximum is £20,000 per tree, and there is an automatic requirement to re-plant. The current maximum for minor unlawful infringements, such as pruning, is £2,500.

Trees which are dead, dying, or dangerous are exempt from the legislation, although if such trees are removed, the onus on proving they fell into one of these categories lies with the tree owner. Whenever possible it is strongly recommended that the LA be given at least five days' notice before any work on such trees is carried out.

### **3.0 METHODOLOGY**

The methodology set out below is a detailed summary of the suggested approach to tree assessment as described in British Standard 5837:2012. This Report has applied the methodology to all significant individual trees or groups of trees present at or near to the Site. Trees below 15 cm trunk diameter were generally excluded from the survey.

#### **3.1 Trees**

Trees have been broadly assessed based on guidance set out within the British Standard BS 5837:2012 Trees in Relation to Design, Development and Construction. This standard provides recommendations and guidance on the principles to be applied to achieve successful integration of development with trees, shrubs and hedgerows. Where development is to occur, the standard provides guidance on the approach needed to decide which trees are appropriate for retention, and the means for protecting these trees during the development (including demolition and construction works) and the means of incorporating trees into the developed landscape.

Trees on or adjacent to the Site have been divided into one of four categories (based on the cascade chart for tree quality assessment). These are classed as A, B, C or U (Section 4 of BS 5837) within Table 1. This gives an indication as to the tree's importance in relation to the Site, the local landscape and, also, the value and quality of the existing trees on-Site. This assists informal decisions concerning which trees should be removed or retained should development occur. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).

Categories A, B and C cover trees that should be a material consideration in the development process, each with three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural (nature conservation) values. Category U trees may have no significant landscape value but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. In assigning trees to the A, B or C categories, the presence of any serious disease or tree-related hazard is taken into account. If the disease is considered fatal and/or irremediable, or likely to require sanitation for the protection of other trees it may be categorised as U with a recommendation for work or even removal, even if they are otherwise of considerable value.

**Category (A):** Trees whose retention is most desirable and are of high quality and value. These trees are considered to be in such a condition as to be able to make a lasting contribution (a minimum of 40 years) and may comprise:

- △ Trees which are particularly good examples of their species, especially rare or unusual, or essential components of groups or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue);
- △ Trees, or groups of trees, which provide a definite screening or softening effect to the locality in relation to views into or out of the Site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups); and
- △ Trees or groups of significant conservation, historical, commemorative or other value (e.g. Veteran or wood-pasture trees).

**Category (B):** Trees whose retention is considered desirable and are of moderate quality and value. These trees are considered to be in such a condition as to make a significant contribution (a minimum of 20 years) and may comprise:

- △ Trees that might be included in the high category but because of their numbers or slightly impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage), are downgraded in favour of the best individuals;
- △ Trees present in numbers such that they form distinct landscape features and attract a higher collective rating than they would as individuals. Individually these trees are not essential components of formal or semi-formal arboricultural features, or trees situated mainly internally to the Site and have little visual impact beyond the Site; and
- △ Trees with clearly identifiable conservation or other cultural benefits.

**Category (C):** Trees that could be retained but are considered to be of low quality and value. These trees are in an adequate condition to remain until new planting could be established (a minimum of ten years) or are young trees with a stem diameter below 150 mm and may comprise:

- △ Trees not qualifying in higher categories;

- △ Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value and or trees offering low or only temporary screening benefit; and
- △ Trees with very limited conservation or other cultural benefits.

**Category (U):** Trees that are considered to have no significant landscape value but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. These trees will be in such a condition that any existing value would be lost within ten years and which should in the current context be ignored or removed for reasons of sound arboricultural management. Trees within this category are:

- △ Trees that have a serious irremediable structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees;
- △ Trees that are dead or are showing signs of significant, immediate or irreversible overall decline; and
- △ Trees infected with pathogens of significance to the health and or/safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality.

Species have been recorded by common and scientific name. Height has been estimated in metres and stem diameter measured in centimetres unless impractical, taken at a height of 1.5 m from the base of the tree.

In the assessment, particular consideration has been given to:

- a) The health, vigour and condition of each tree;
- b) The presence of any structural defects in each tree and its life expectancy;
- c) The size and form of each tree and its suitability within the context of the proposed scheme; and
- d) The location of each tree relative to existing Site features, e.g. its value as a screen or as a skyline feature.

Age class is assessed according to the age class categories referred to in BS 5837.

- Y: Young trees age less than 1/3 life expectancy;
- SM: Middle age trees 1/3 – 2/3 life expectancy;
- M: Mature trees over 2/3 life expectancy; and
- OM: Over mature – declining or moribund trees of low vigour.

The overall condition of any individual tree, or group of trees, has been referred to using one of the definitions listed below. A more detailed description of condition has been noted in the Tree Schedule:

- G **Good:** A sound tree or trees needing little, if any, attention;
- F **Fair:** A tree or trees with minor but rectifiable defects or in the early stages of stress, from which it may recover;
- P **Poor:** A tree or trees with major structural and physiological defects or stressed such that it would be very expensive and inappropriate to retain; and
- D **Dead:** A tree or trees no longer alive. However, this could also apply to those trees that are dying and will be unlikely to recover, or are becoming or have become dangerous.

Major defects or diseases and relevant observations have also been recorded. Dead wood has been defined as the following:

- |                                 |   |                              |
|---------------------------------|---|------------------------------|
| Twigs and small branch material | - | Up to 5 cm in diameter.      |
| Minor dead wood                 | - | 5 cm to 10 cm in diameter.   |
| Major dead wood                 | - | 10 cm in diameter and above. |

The survey was completed from ground level only. Aerial inspections were not undertaken. Evaluations of tree conditions given within this assessment apply to the date of survey and cannot be assumed to remain unchanged, and it may be necessary to review these within 24 months, in accordance with good arboricultural practice.

### **3.2 Potential for Protected Species**

Potential bat roost locations are described within this Report using the methodology as that recommended by the Bat Conservation Trust (BCT), see Collins (ed, 2016) in references (Appendix I). Each tree of significant size assessed within this survey has also been assessed for the potential to provide roosts for bats and the table in Appendix II includes reference to this.

### **3.3 Tree Plans and Tree Schedules**

The extent and positions of significant individual trees or groups of trees close to the Site are shown on the Arboricultural Survey Plan (Figure 2). The Root Protection Areas (RPA) of the key trees of value identified for, or recommend for retention have been marked within the Constraints Plan (Figure 4) using the RPAs provided in the Tree Schedule within Table 1.

A summary that includes the trees identified on or near to the Site is included in the Tree Assessment Report detailing information on each group of trees. This is also provided in Table 1. Within the summary table maximum RPAs (m<sup>2</sup>) for estimated tree diameters have been included where appropriate, as well as a calculated corresponding radius of the circle for that RPA. The RPAs are formulated as described below and assist when designing layouts in relation to trees.

### **3.4 Root Protection Area**

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 RPA and is calculated according to the formula set out in BS 5837:(2012). This area is equivalent to a circle with a radius 12 x the stem diameter for single stem trees or the basal diameter for trees with more than one stem arising less than 1.5 m above ground level.

$$\text{RPA (m}^2\text{)} = (\text{stem diameter (mm)} \times 12 / 1000)^2 \times 3.142$$

This figure should be capped to 707 m<sup>2</sup>, that is, equivalent to a circle with a radius of 15 m, or a square with approximately 26 m sides

Taken from Table 2: Calculating the RPA, BS 5837 (2005).

## **4.0 RESULTS**

### **4.1 Data Search**

The results of the desk search indicated that all trees within the proposed development Site are outside of any Conservation Area. No trees on-Site nor on land adjacent to the Site are covered by a TPO.

### **4.2 Survey Details**

The tree inspection took the form of a walkover inspection completed by Peter Morrell on 12<sup>th</sup> December 2016. Each individual semi-mature or young tree of significance that could be impacted by any proposed development was identified and visually inspected and classified. The trees identified during the survey at the Site have been individually noted and identified within this Report and are shown in the Tree Survey Plan within Figure 2, and within the Photograph Section of this Report (Appendix III).

### **4.3 Semi-Mature and Young Trees**

A total of ten Trees (T) and eight Tree Groups (TG) have been identified and assessed as part of the tree survey. All trees surveyed, with the exception of four individual trees and a single tree group, were within the Site boundary.

#### **4.3.1 Species and their Arrangement in the Landscape**

There are a limited range of tree species on Site, with no single predominant species. However, the following species are represented in multiple numbers: Field maple *Acer campestre*, Scot's pine, *Pinus sylvestris*, silver birch *Betula pendula*, sycamore *Acer pseudoplatanus*, pedunculate oak *Quercus robur*, and London plane *Platanus x hispanica*.

The distribution of the trees and tree groups across the Site are limited to the boundaries of the Site and occasional scattered small groups and individual trees across the Site, whilst individual trees are also present off-Site, immediately adjacent to the northern and southern boundaries.

#### **4.3.2 Height and Significance in the Landscape**

A number of semi-mature trees present on the proposed development Site are significantly visual within the immediate area, with the most prominent being TG11, a mixed group of trees reaching a height of 22 m. T7, T8 and T9, comprising an individual ash and London Plane trees, are by their isolated positions at the north-

western extent of the Site highly visible within the local area. For this reason, these trees are placed within Category B (see Table 1). If retained, these trees will require protection measures to ensure no impact occurs as a result of any development.

A number of other individual trees and tree groups, whilst not as large in size or structure as the previously mentioned trees, are, by their isolated positions within the Site, quite prominent in the residential landscape. Whilst due to their young age, these trees would normally be placed within Category C, where their structural condition merits it, they have been allocated to Category B due to their combined landscape value.

#### **4.3.3 Age and Condition**

All trees present within the Site are semi-mature or young. None of the trees within the Site boundary show signs of past management. All on-Site trees appear to be in fair condition.

#### **4.3.4 Environmental Condition**

Given the Site's current amenity use, it is surmised that no damage to the root system of either boundary or on-Site trees has been sustained through any recent on-Site activity. The trees on-Site and immediately adjacent to the Site are not in an exposed position, having been protected from prevailing winds by the surrounding buildings.

Groundwater conditions are not assessed to be a significant factor in present or future growth or health of trees since the generally flat Site appears to be well drained and this situation will probably improve further following completion of any development.

#### **4.3.5 Bat Roost Potential**

All trees on-Site and immediately adjacent to the Site were found to have negligible Bat Roost Potential (BRP). None of the trees had potential cracks, crevices or hollows suitable to support roosting bats, or dense ivy *Hedera helix* that can conceal or provide roosting opportunities.

#### 4.4 Tree Schedule

Table 1 - BS5837:2012 Tree Schedule

Tree No.	Species	Ht (m)	Stem Diam cm@ 1.5m	Canopy Spread (m)	Height of Crown Clearance (m)	Age Class	Est yrs	Physical Condition	Structural Condition	Recommendations	BS 5837 Category	RPA (m <sup>2</sup> )	RPA Radius (m)
TG1	Field maple <i>Acer campestre</i> Scots pine <i>Pinus sylvestris</i> Silver birch <i>Betula pendula</i>	12	27.5 Av	N-4 S-4 E-4 W-4	0	Y	>40	F	A mixed group of trees supporting canopies that read as one. All trees have negligible BRP.		B2	34	3.30
T2	Leylandii <i>Cupressus x leylandii</i>	10	25 Est	N-3 S-3 E-3 W-3	1	Y	>40	F	Multiple stems supporting a dense conical canopy. Negligible BRP.		C2	28	3.00
T3	Field maple	10	15, 15	N-4 S-4 E-4 W-4	0	Y	>40	F	Single trunk supporting a rounded canopy that is well balanced and lightly branching. Negligible BRP.		B2	18	2.40
T4	Silver birch	12	15, 17.5	N-4 S-4 E-4 W-4	0.5	Y	>40	F	Bifurcated at 1 m. Rounded canopy that is well balanced and lightly branching. Negligible BRP.		B2	23	2.70
T5	Field maple	8	6 x 10	N-4 S-4 E-4 W-4	0	Y	>40	F	Multi-stemmed from base supporting a rounded canopy. Negligible BRP.		B2	28	3.00

Tree No.	Species	Ht (m)	Stem Diam cm@ 1.5m	Canopy Spread (m)	Height of Crown Clearance (m)	Age Class	Est yrs	Physical Condition	Structural Condition	Recommendations	BS 5837 Category	RPA (m <sup>2</sup> )	RPA Radius (m)
TG6	Field maple Scot's pine Silver birch Cherry <i>Prunus</i> sp. Hawthorn <i>Crataegus monogyna</i> Pedunculate oak <i>Quercus robur</i>	11	22.5 Av	N-4 S-4 E-4 W-4	0	Y	>40	F	Crowded linear mixed group of trees with canopies that read as one. Provides screening for residential properties to the south. All trees have negligible BRP.	Selective thinning to promote even growth and reduce canopy width.	B2	23	2.70
T7	Ash <i>Fraxinus excelsior</i>	14	50	N-6 S-8 E-8 W-8	3	SM	>40	F	Single stem supporting a slightly unbalanced open canopy. Pruning wound at 1 m. Negligible BRP.	Monitor	B2	113	6.00
T8	London plane <i>Platanus x hispanica</i>	16	50	N-8 S-8 E-8 W-8	4	SM	>40	F	Single trunk, supporting a rounded canopy that is well balanced. Negligible BRP		B2	113	6.00
T9	London plane	15	50	N-8 S-8 E-8 W-8	4	SM	>40	F	Single trunk, supporting a rounded canopy that is well balanced. Stem leaning to south. Negligible BRP		B2	113	6.00

Tree No.	Species	Ht (m)	Stem Diam cm@ 1.5m	Canopy Spread (m)	Height of Crown Clearance (m)	Age Class	Est yrs	Physical Condition	Structural Condition	Recommendations	BS 5837 Category	RPA (m <sup>2</sup> )	RPA Radius (m)
T10	Silver birch	11	17.7, 25	N-3 S-3 E-3 W-3	2	Y	>40	F	Bifurcated at base. Stems supporting a rounded canopy. Negligible BRP.		B2	41	3.60
TG11	Field maple Scot's pine Silver birch Pedunculate oak Sycamore <i>Acer pseudoplatanus</i>	22	30 Av	N-7 S-7 E-7 W-7	0	SM	>40	F	Linear tree screen with canopies that read as one providing screening to residential properties on the west side of Jasmin Green. All trees have negligible BRP.		B2	41	3.60
T12	Sycamore	16	30	N-3 S-3 E-3 W-3	0	Y	>40	F	Straight stem and columnar crown. Major bark wound at 1 m. Negligible BRP.	Monitor	C2	41	3.60
TG13	Field maple Silver birch Pedunculate oak	15	35 Av	N-5 S-5 E-5 W-5	0	Y	>40	F	Group of three trees with trunks, supporting rounded canopies that read as one. Negligible BRP.		B2	55	4.20
TG14	Field maple Goat willow <i>Salix caprea</i>	19	45 Av	N-6 S-6 E-6 W-6	4	SM	>40	F	Open group of six trees. All trunks supporting rounded canopies with the exception of the goat willow that is prone. All trees have negligible BRP.		B2	450	5.40
TG15	Field maple Silver birch	12	17.5 Av	N-3 S-3 E-3 W-3	0	Y	>40	F	A group of trees supporting rounded canopies that read as one. Negligible BRP.		B2	14	2.10

Tree No.	Species	Ht (m)	Stem Diam cm@ 1.5m	Canopy Spread (m)	Height of Crown Clearance (m)	Age Class	Est yrs	Physical Condition	Structural Condition	Recommendations	BS 5837 Category	RPA (m <sup>2</sup> )	RPA Radius (m)
TG16	Ash Sycamore Silver birch Goat willow Scot's pine Pedunculate oak	18	55 Av	N-7 S-7 E-7 W-7	3	SM	>40	F	Group of mixed trees supporting rounded canopies that read as one. Provides screening to a school present to the north-east All trees have negligible BRP		B2	137	6.60
T17	Sycamore	17	60 Est	N-8 S-8 E-8 W-8	4	SM	>40	F	Single trunk supporting a rounded canopy that is lightly branching and well balanced. Negligible BRP.		B2	163	7.20
T18	Norway maple <i>Acer platanoides</i>	15	30 Est Av	N-6 S-6 E-6 W-6	4	SM	>40	F	Linear group of three trees with trunks supporting rounded canopies that read as one, Negligible BRP.		B2	41	3.60

**Table 2 – Key to Tree Schedule**

Key:	Measurements	Age – Class	Overall Condition	BS 5837 2005 : Cascade Chart for Quality Assessment/Retention Category	Symbols:
	MS – Multi-stemmed	Y - Young	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	R – Trees for Removal	
	TD - Trunk division (height in metres)	V - Veteran  <b>Est Yrs</b> – estimate of years remaining (>40 years; 20 –40 years; <20 years)		<b>Sub-categories:</b>  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 for single stem trees and 10 x the basal diameter for trees with more than one stem arising below 1.5m above ground level).					

## **5.0 TREE MANAGEMENT**

### **5.1 Arboricultural Assessment**

Adjacent to the northern and central boundaries of the Site are a number of individual trees that could be impacted by any proposed development works. It may be possible to retain and incorporate certain trees and tree groups currently present within the Site into the landscaping scheme of the proposed development.

It appears no management has taken place to the trees present on-Site. TG6 would benefit from selective thinning which should extend the viability and general health of the trees, and T7 and T12 both have trunk wounds that will require monitoring to ensure that the trunk does not rot. To ensure that the root areas and canopy extremities of the individual trees and the tree groups that may be retained are not damaged, a Constraints Plan has been prepared to show the locations where protective fencing should be erected for any trees selected for retention (see Figure 3). Any tree surgery required is best carried out towards the conclusion of the development so that, if necessary, any known root damage can be corrected by the appropriate crown thinning to restore root /shoot balance.

It is considered that the Site would benefit from native deciduous tree planting along the south-eastern boundary to provide additional screening for the residential housing beyond.

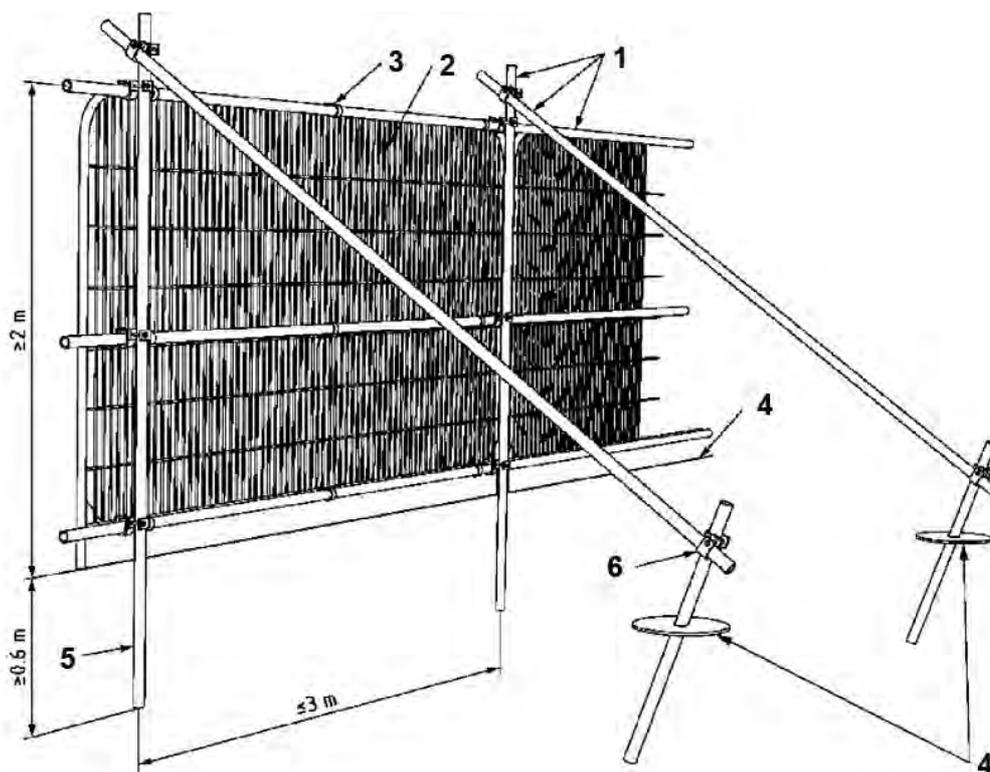
### **5.2 Recommendations**

#### **Recommendation 1 (Adequate Tree Protection)**

Those trees identified within any development plan for retention will need to be adequately protected during any approved development works. As a general rule at this Site, measures to protect trees should follow the best practice principles set out in BS5837: Trees in Relation to Design, Development and Construction (2012). Prior to any construction or development work proceeding, the RPAs of individual trees to be retained should be marked out using the distances provided in the Table 1. Marking out should be completed by a person with arboricultural or horticultural expertise as individual trees will have root zones that may be affected by local conditions and allowances would need to be made to accommodate this.

The best practice principles have been broadly summarised below:

- △ All trees retained adjacent to the Site should be protected by barriers or ground protection around the calculated RPA and as indicated on any Tree Constraints Plan (TCP) that may be produced in association with the assessment;
- △ Any fencing required should be erected prior to commencement of construction and before demolition including erection of any temporary structures. Once set up fences should not be removed or altered without prior consultation with the arboricultural advisor;
- △ Arrangements should be made for an arboriculturalist to supervise works and tree protection where trees are particularly vulnerable or sited close to access points; and
- △ Pre-development works may be undertaken prior to the installation of fencing with the agreement of the local planning authority;



1. Standard scaffold poles
2. Heavy Gauge 2m tall galvanised tube and weld mesh infill panels
3. Panels secured to uprights and cross members with wire ties
4. Ground Level
5. Uprights driven into ground until secure (up to 0.6m)
6. Standard scaffold clamps

- △ 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 two years and after any major storm events, with safety a priority;
- △ Fencing should be clearly visible and suitable for the location, type and proximity of construction activity;
- △ It may be appropriate on some sites to use temporary site offices as components of the protection barriers;
- △ Where it has been agreed, and shown on a Tree Protection Plan, construction access may take place within the RPA if suitable ground protection measures are in place (e.g. existing surfaced car park areas). In other areas, this may comprise single scaffold boards over a compressible layer laid onto geo-textile materials for pedestrian movements. Vehicular movements over the RPA will require the calculation of expected loading and may require the use of proprietary protection systems;
- △ 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. Notices should be placed on fencing to indicate that operations are not permitted within the fenced area;
- △ 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 10 m of a tree bole. No concrete mixing should be done within 10 m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree;
- △ No fires should be lit where flames are anticipated to extend to within 5 m 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;
- △ Where it is deemed necessary to operate a wide or tall load, plant bearing booms, jibs and counterweights or other such equipment, as part of

construction works, and such equipment would have potential to cause injurious contact with crown material i.e. low branches and limbs, of retained trees within the RPA fencing, it is best advised that appropriate, but limited, tree surgery be carried out beforehand to remove any obvious problem branches. This is classed as 'Facilitation Pruning' within BS 5837 (2012). Any such pruning should be undertaken in accordance with a specification prepared by an arboriculturalist;

- △ It is advised that a Pre-Commencement Site Meeting is held with contractors who are responsible for operating machinery, as described above, to firstly highlight the potential for damage occurring to tree crowns and to ensure that extra care is applied when manoeuvring machinery during such operations within close proximity to retained trees to avoid any contact;
- △ In the event of having caused any such branch or limb damage to retained trees it is strongly recommended that suitable tree surgery be carried out, in accordance with BS 3998 (2010) Recommendations for Tree Work, to correct the damage, upon completion of development; and
- △ All of the above precautionary measures should be applied to minimise the effect of any damage to long-term tree health and safety.

## **6.0 LIMITATIONS OF THE TREE SURVEY**

The recommendations contained in this Report represent Delta-Simons' professional opinions, based upon the information referred to in Section 1.0 of this Report, exercising the duty of care required of an experienced Environmental Consultant.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed as defined in Section 1.1 of this Report. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

This Report was prepared by:



Peter Morrell

Date 10<sup>th</sup> January 2017

**Senior Ecologist**

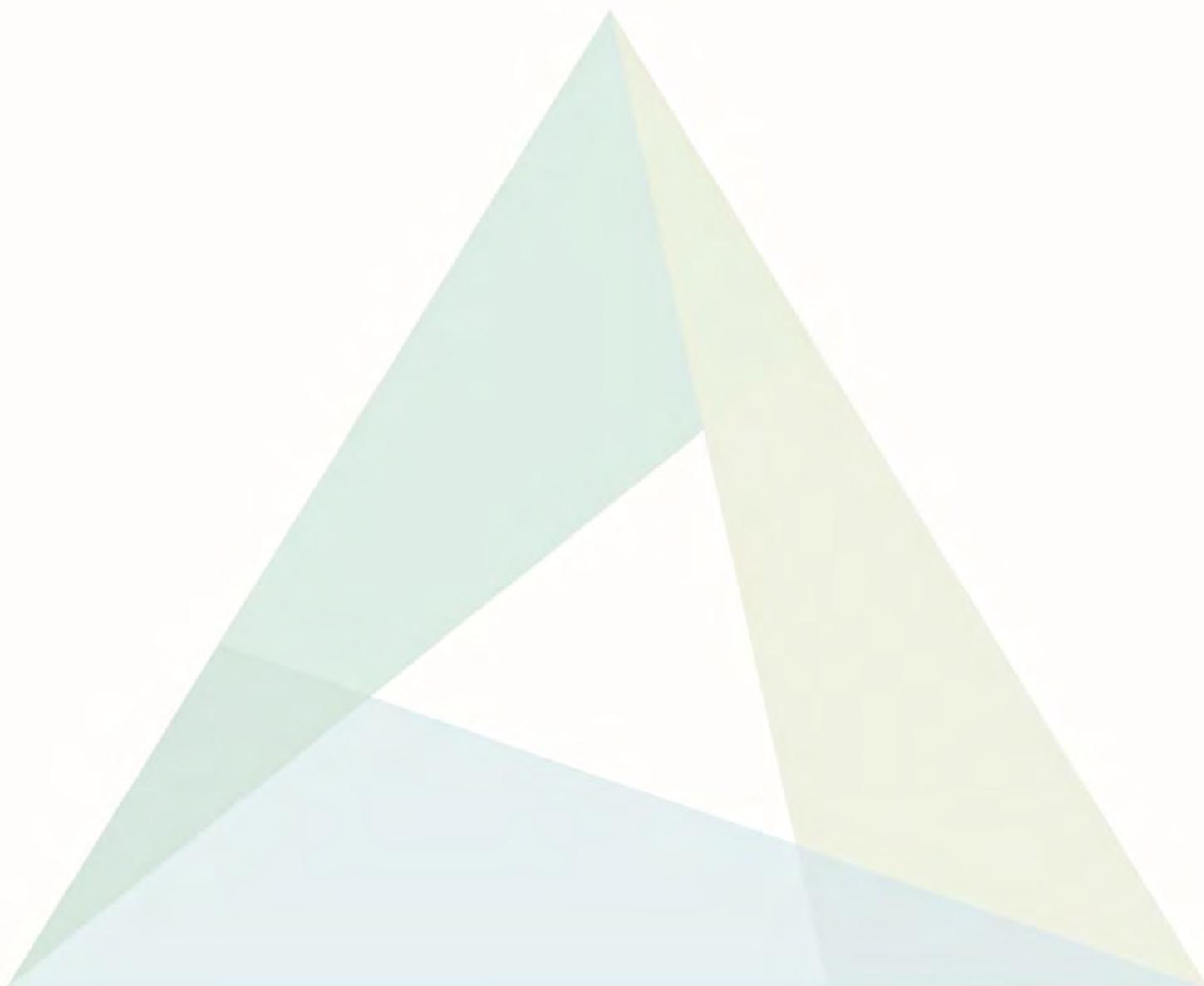
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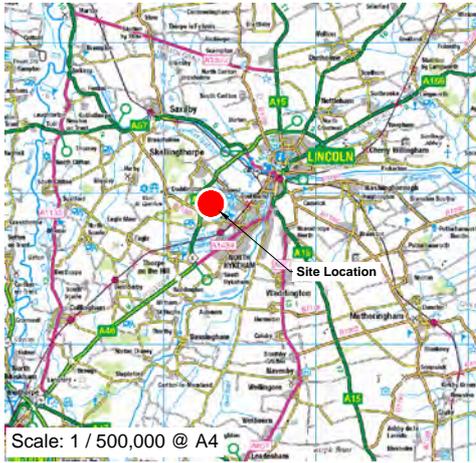


Charlotte Sanderson

Date 10<sup>th</sup> January 2017

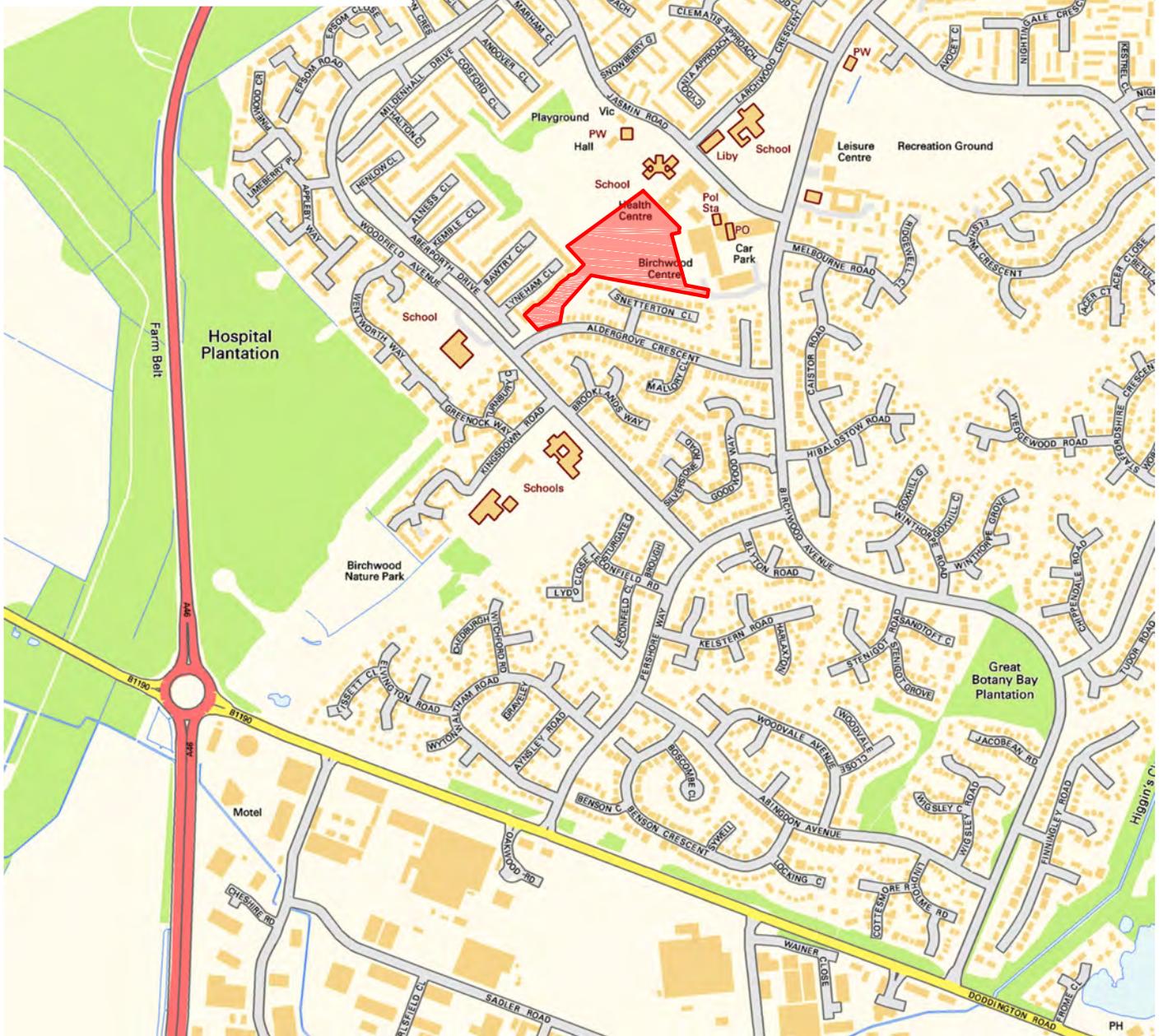
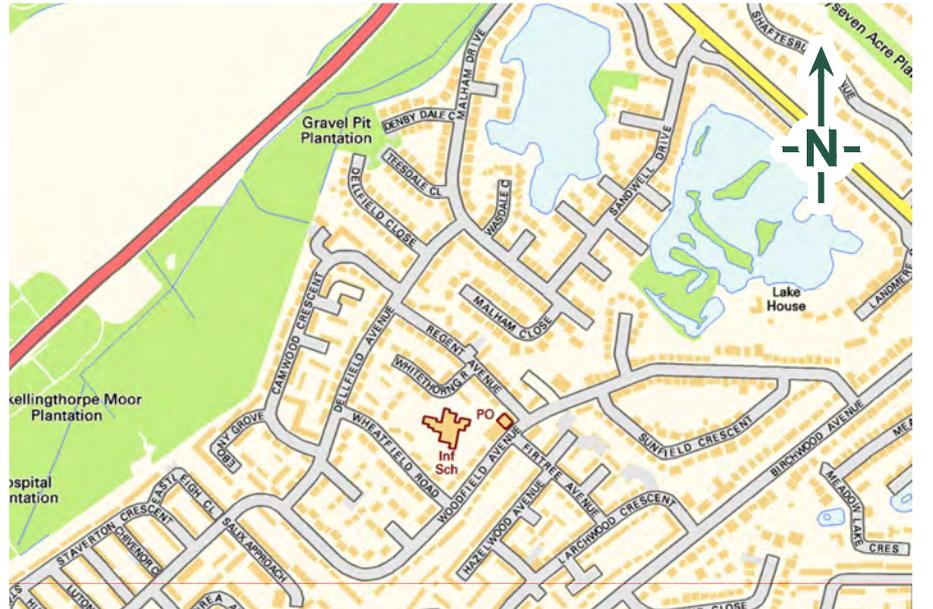
**Associate and Ecology Team Leader**





**LEGEND**

 Site Boundary



Scale: 1 / 10,000 @ A4

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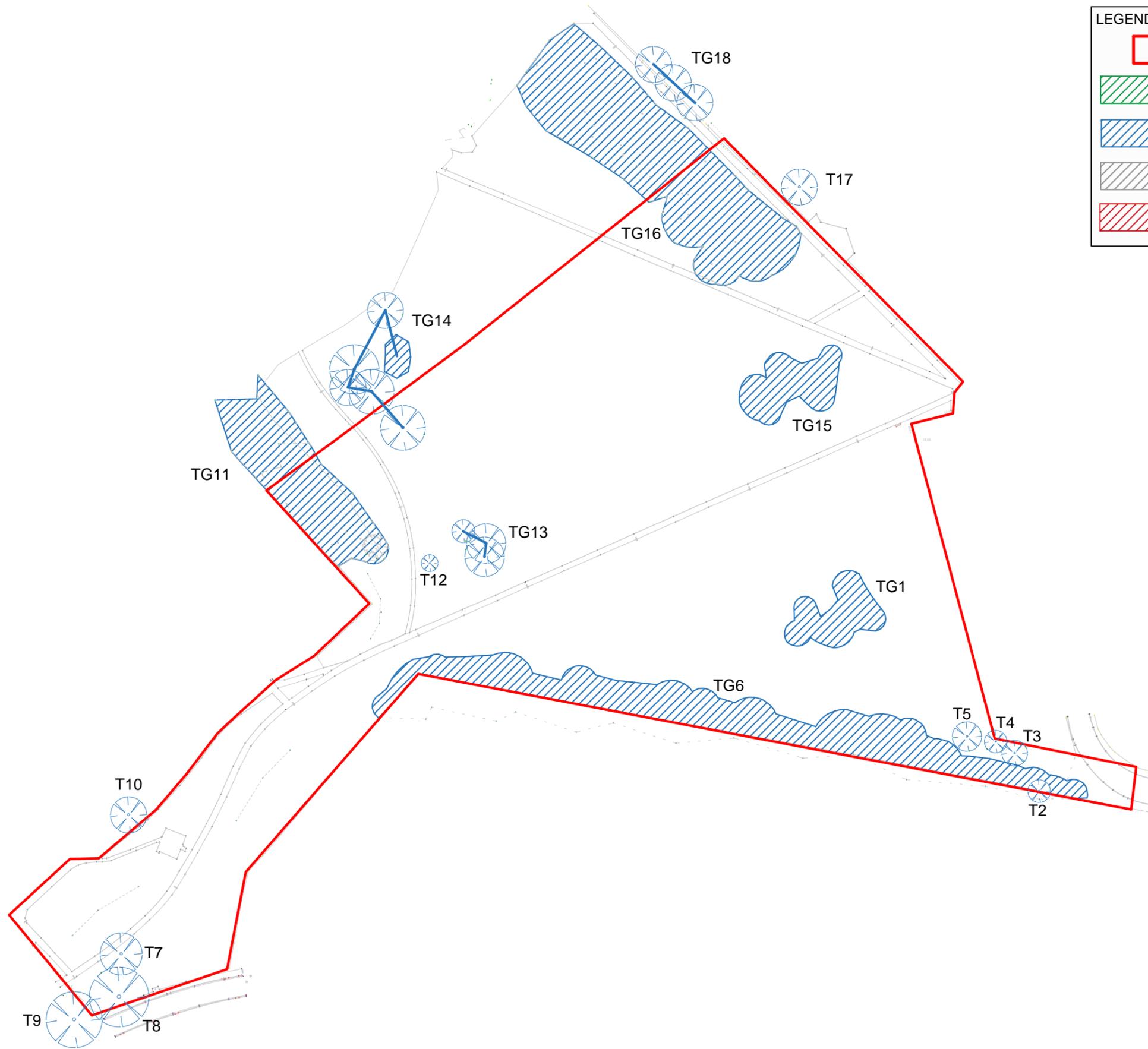


TITLE:  
 Site Location Map  
 Jasmin Green, Birchwood  
 Lincoln

DRAWN BY: PH  
 CHECKED BY: PM  
 DATE: 20 December 2016

SCALE:  
 To Scale @ A4  
 REVISION: 1

PROJECT NO:  
 16-1044.01  
 FIGURE NO:  
 1



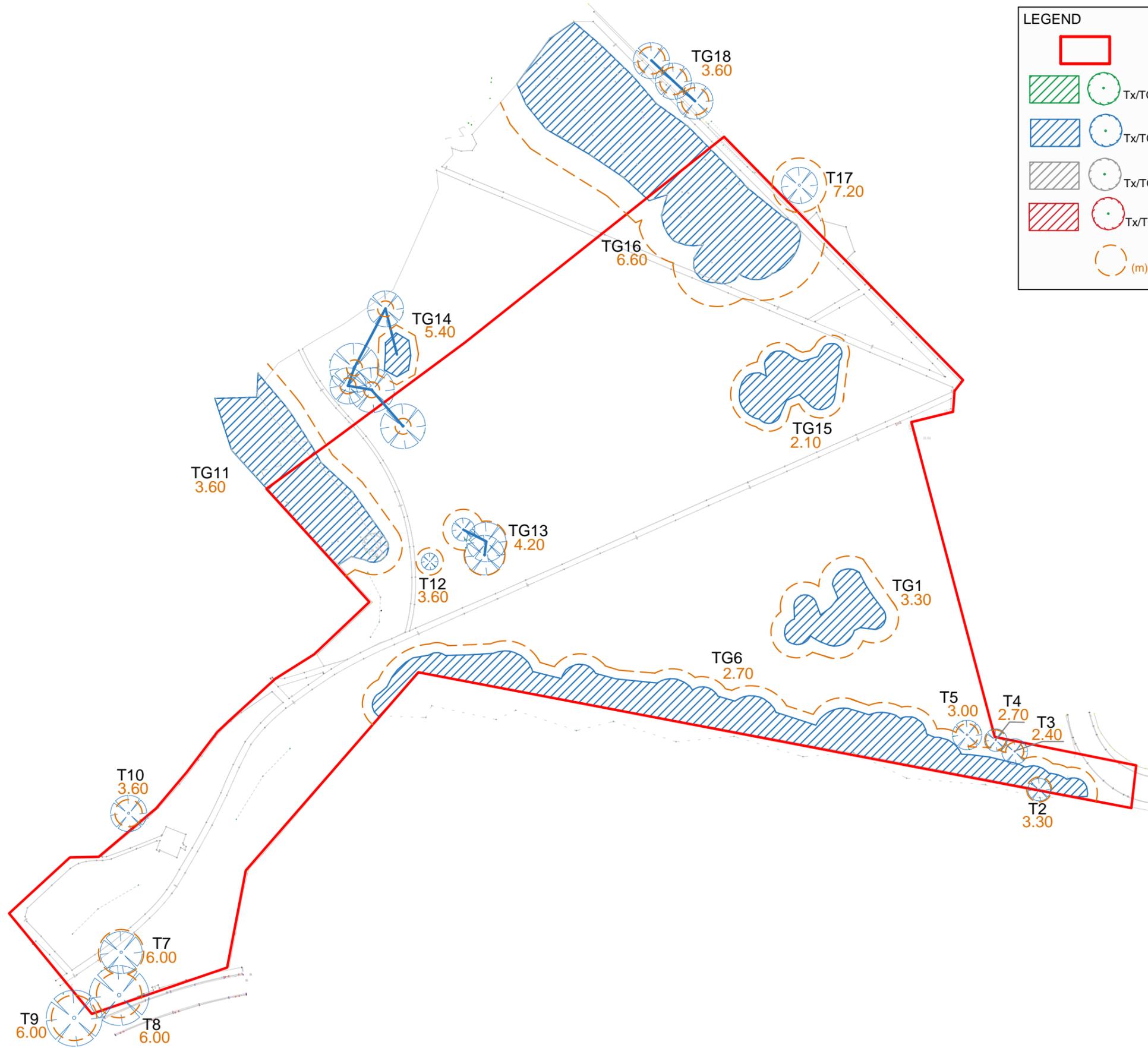
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	Site Boundary
	Category A: High value retention most desirable
	Category B: Moderate value retention desirable
	Category C: Lower value could be retained
	Category U: For removal



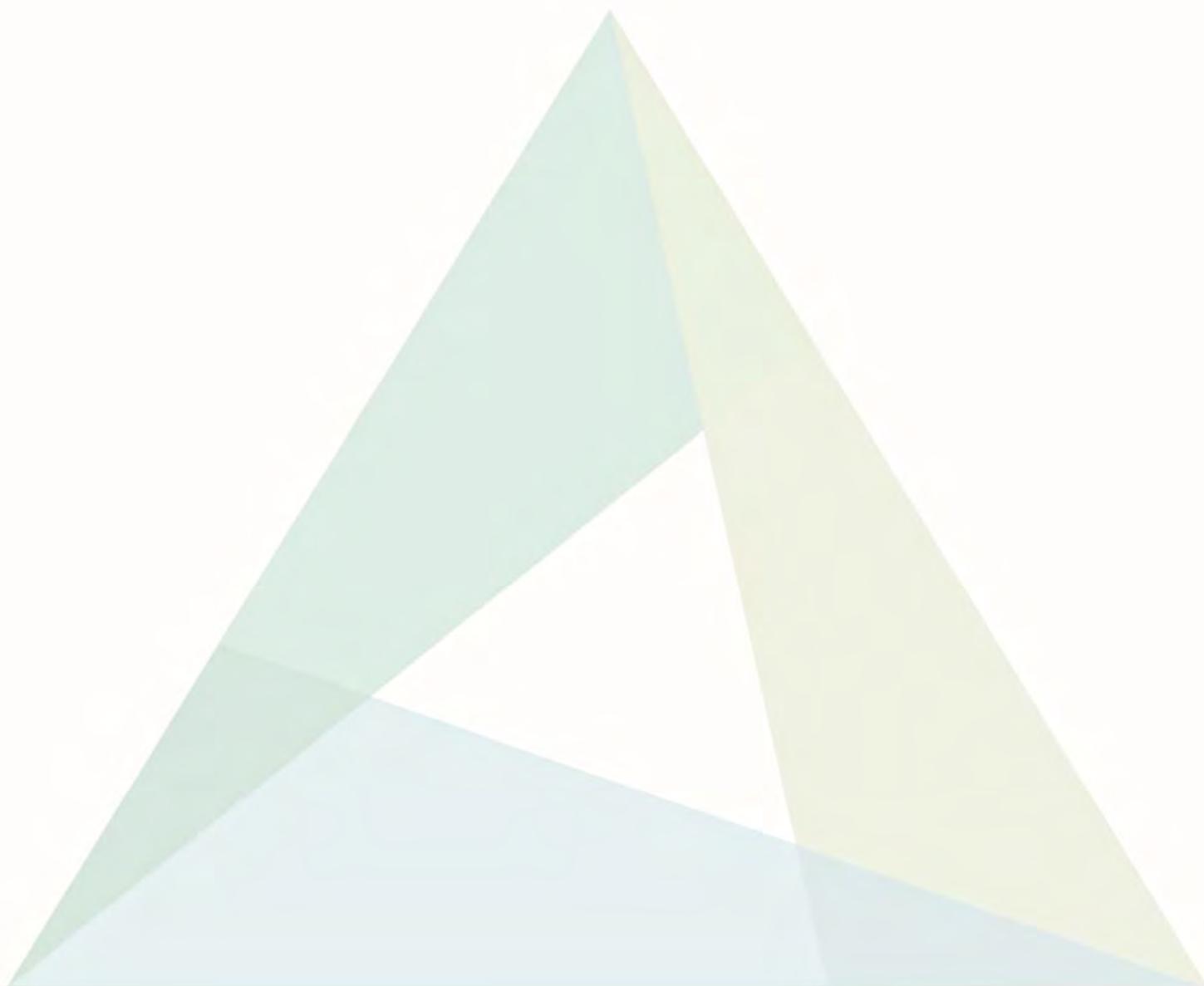
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Tree Survey  
Jasmin Green, Birchwood  
Lincoln

DRAWN BY: PH	SCALE: Not to Scale
CHECKED BY: PM	REVISION: 1
DATE: 20 December 2016	

PROJECT NO: 16-1044.01
FIGURE NO: 2



LEGEND	
	Site Boundary
	Tx/TGx Category A: High value retention most desirable
	Tx/TGx Category B: Moderate value retention desirable
	Tx/TGx Category C: Lower value could be retained
	Tx/TGx Category U: For removal
	(m) RPA: Root Protection Area





## References

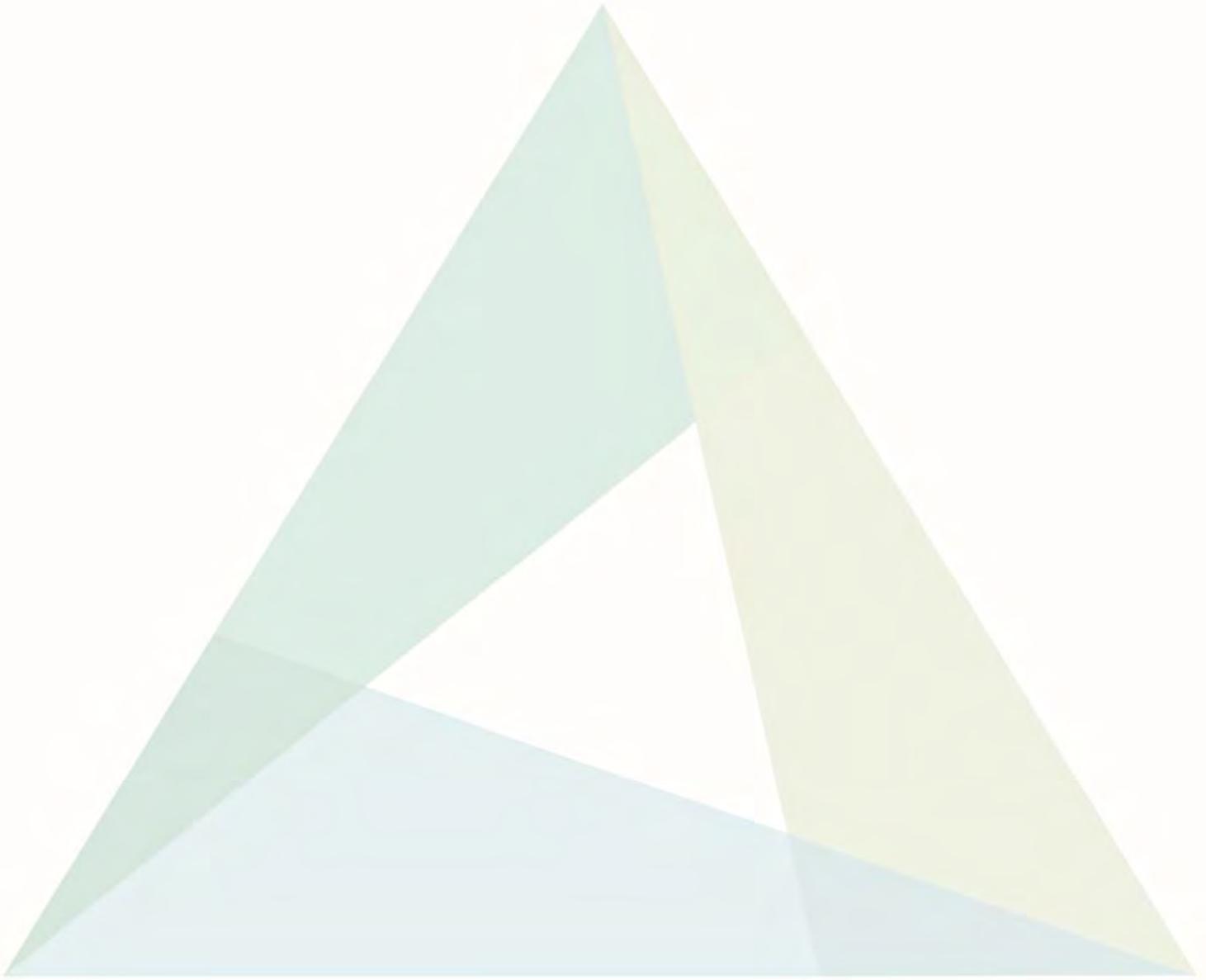
Collins, J (ed). (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3<sup>rd</sup> edition. Bat Conservation Trust, London.

Stace, C. (2010). New Flora of the British Isles 3<sup>rd</sup> edition. University Press, Cambridge.

The Conservation of Habitats and Species Regulations 2010 (as amended) HMSO

BSI Publication BS 5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations.

BSI Publication BS 5837:2005 Trees in Relation to Construction - Recommendations.





**Guidance on Assessing the Potential Suitability of Development Sites to Support Bats**

(adapted from Collins, J. (ed)).

Suitability	Description	
	Roosting	Commuting and Foraging
<b>Negligible</b>	<p>An inspected structure or tree which is considered to have no features of importance for roosting bats.</p> <p>No further constraints apply to the method or timing of proposed works.</p>	<p>Negligible habitat features on-Site to support commuting or foraging bats</p>
<b>Low</b>	<p>A structure with at least one or more features suitable to support opportunistic individual bats. However, inadequate space, shelter, protection and conditions, and the low suitability of surrounding habitats means that it is unlikely to be used as a maternity or hibernation roost site.</p> <p>A tree of adequate age and stature to support potential roosting features, however, either no features, or only features of limited potential recorded from the ground.</p>	<p>Habitat with potential to support low numbers of commuting bats due to its quality and connectivity. For example, a gappy hedgerow or unvegetated stream that is isolated from the surrounding landscape.</p> <p>Alternatively, suitable but isolated habitats suitable to support low numbers of foraging bats such as a lone tree or a patch of scrub.</p>
<b>Moderate</b>	<p>A structure or tree with one or more potential roost sites that are of adequate size, shelter and protection, with suitable conditions and surrounding habitat to support a bat roost not of high conservation status (with respect to roost type not individual species conservation status).</p>	<p>Linear habitat continuity connecting to the wider landscape offering potential to support commuting bats, such as rows of trees and scrub or linked back gardens.</p> <p>Habitat such as trees, scrub, grassland or a waterbody with connectivity to the wider landscape offering foraging opportunities for bats.</p>
<b>High</b>	<p>A structure or tree with one or more potential roost sites that are suitable for use by large numbers of bats on a regular basis and for long periods of time due to their size, shelter, protection, conditions and the surrounding habitat.</p>	<p>Continuous high-quality habitat with strong connectivity to the wider landscape that is likely to be used by commuting bats on a regular basis, such as flowing waterbodies, hedgerows, rows of trees and woodland edges.</p> <p>High quality habitat with strong connectivity to the wider landscape that is likely to be regularly used by foraging bats, such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to, and connected to, known roost sites</p>



**Jasmin Green, Birchwood, Lincoln  
Delta-Simons Project No. 16-1044.01**



Photograph 1 – Tree Group (TG) TG1



Photograph 2 – Tree (T) 2

**Jasmin Green, Birchwood, Lincoln  
Delta-Simons Project No. 16-1044.01**



Photograph 3 – T3



Photograph 4 – TG4

**Jasmin Green, Birchwood, Lincoln  
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Photograph 5 – T5



Photograph 6 – TG6

**Jasmin Green, Birchwood, Lincoln  
Delta-Simons Project No. 16-1044.01**



Photograph 7 – T7



Photograph 8 – T8

**Jasmin Green, Birchwood, Lincoln  
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Photograph 9 – T9



Photograph 10 – T10

**Jasmin Green, Birchwood, Lincoln  
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Photograph 11 – TG11



Photograph 12 – T12

**Jasmin Green, Birchwood, Lincoln  
Delta-Simons Project No. 16-1044.01**



Photograph 13 – TG13



Photograph 14 – TG14

**Jasmin Green, Birchwood, Lincoln  
Delta-Simons Project No. 16-1044.01**



Photograph 15 – TG15



Photograph 16 – TG16

**Jasmin Green, Birchwood, Lincoln  
Delta-Simons Project No. 16-1044.01**



Photograph 17 – T17



Photograph 18 – TG18