barrell
T R E E   C O N S U L T A N C Y

Tree assessment on development sites:
the future of the profession in the balance

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Tree assessment on development sites; the future of Arboricultural Profession in the balance?

Jeremy Barrell is a world leader in the field of tree management systems. In the 1980s, he developed the SULE (safe useful life expectancy) method of categorising trees on development sites, which now has a proven track record around the world (see SULE panel). He is an outspoken critic of the BS 5837 method of assessing trees and has exploited its flaws as the basis for his new tree assessment method called TreeAZ. Jeremy brings his formidable international expertise to bear in explaining for us why he believes the BS 5837 survey method is bad for trees and Arboriculture, and why TreeAZ sets the mould for modern tree assessment methodology.
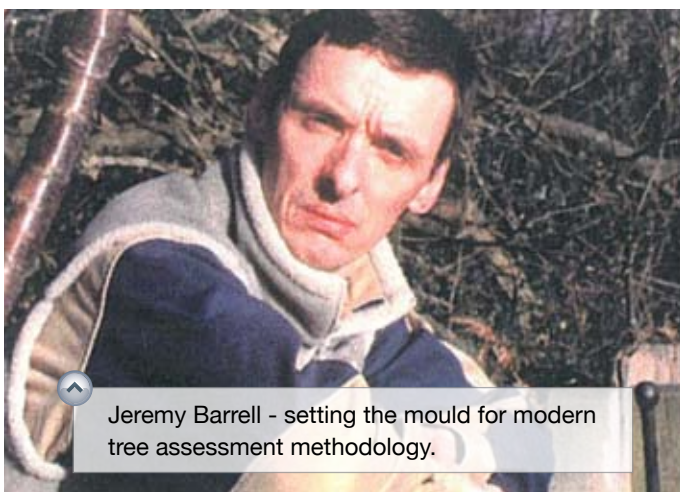
Jeremy Barrell - setting the mould for modern tree assessment methodology.

In addition to being widely used in the UK, SULE is proving an invaluable help to tree managers around the world. 7,500 trees in Centennial Park, Sydney, the site of the 2000 Olympics, were assessed using SULE as part of an overall management strategy. Ted Hoare, Senior Arborist of the Centennial and Moor Park Trust was delighted with the results: "So, what I had been seeing and talking about for the past 17 years re trees, decline and replacement came home with a bang thanks to SULE, Streets Ahead and our Tree Master Plan".

Jeremy's latest project is with the City of Plantation in Florida, which is developing a SULE based tree management strategy. The City is only about 30 years old and in its early days, extensively planted one species of tree, the black olive (Bucida buceras). Although a wonderful looking street tree, it turns out that it causes extreme problems staining cars and stonework beneath it, creating an unexpected management headache. The SULE assessment methodology has been instrumental in solving this problem, providing managers with a tool for phasing removals based on a structured prediction of when the nuisance will become intolerable. Replacing the existing strategy of responding to complaints is resulting in obvious benefits including more accurate removal/replanting budgeting and increased public confidence in the City Administration.

On the face of it, tree surveys are pretty mundane and there is no obvious link between them and the things that matter in working life; job satisfaction, how much we earn or the potential for promotion being obvious examples. But a link there is, tangled up with the

status of the Arboricultural Profession and the relatively large number of other professionals that deal with trees on development sites.

Taking the Profession first, it is common sense that the higher the credibility of a profession, the higher the esteem its members will be held in and the more important they are perceived to be in the wider scheme of things – lawyers and doctors being two good examples. It is not too difficult to make the connection that the status of your profession has a direct impact on your quality of life. So, where do tree surveys fit into all of this? Well, the status of a profession is very strongly related to the quality of the written material it produces and the procedures it has in place as the framework for its daily business. Development sites involve a whole range of other professionals; planners, lawyers, surveyors, engineers and architects who all have to work with tree documents. This interface is huge and the quality of tree assessment procedures has a direct impact on the status of the Arboricultural Profession in the eyes of these other professionals. Methods that do not perform well are the signature of poorly developed professions; when that applies to Arboriculture, it is bad news for trees and all those associated with them.

"This antiquated method (BS 5837) is riddled with inconsistencies, ambiguities and anomalies that make it awkward to use and inadequate for the task in hand."

So how bad is it, what are the main problem areas and what can we do about it? The flagship of UK Arboriculture is BS 5837 Trees in relation to construction, the majority of which is a useful daily working reference for managing trees on development sites. However, the tree survey section has barely changed since it was first designed over 20 years ago and no longer matches up to the demands of the modern day development site scenario. This antiquated method is riddled with inconsistencies, ambiguities and anomalies that make it awkward to use and inadequate for the task in hand. Yet despite these obvious problems, it is still widely used in a variety of forms where individuals have tried short term fixes to gloss over its failure to deliver what they require. Arboriculture has adopted the mindset 'we are used to it now after 20 years, warts and all, so why bother changing; it gets us by'. This is not the hallmark of a progressive profession; it has the air of amateurs making do because they cannot be bothered or do not have the expertise to analyse the problem and devise an effective solution.

To fully appreciate the problems with the BS 5837 method, it is useful to review the reasons why a tree assessment in a development scenario is necessary in the first place. Chapter 8 Section 197 (a) of the Town & Country Planning Act 1990 states that it is:

"The duty of the local planning authority to ensure, that in granting planning permission for any development adequate provision is made by the imposition of conditions, for the preservation or planting of trees."

I and many others believe it reasonable to interpret this as meaning there should be a presumption that all trees are a material consideration in the planning process. At the same time, it is also common sense that there will normally be a range of quality in any tree population and, although considered, some trees will not be worthy of being a constraint. In this context, the purpose of a tree assessment is to identify those trees that are worthy of being a constraint and those that are not. This will allow proper consideration to be given in the layout design and ensure that planners are fully aware of the impact on trees of any development proposal. This tree information should be presented in a way that can be easily interpreted by the many non-tree experts in the planning system.

This seems quite a simple task so why does BS 5837 not deliver? To understand the real reason, it is necessary to delve into its origins more than 20 years ago. At that time, the requirements were more or less the same as they are now; design a categorisation that allows a value judgement to be made on which trees should have a priority for retention. There were no other assessment methods available so, in the absence of experience, it would seem quite reasonable to base a method on what makes a tree suitable for retention. And this is what we see in BS 5837; a categorisation focused around the desirable aspects of trees; their contribution to screening, good form, long life expectancy, etc. It is a method that seeks to justify why trees should be considered worthy of retention. Yet the law and government guidance point quite clearly to all trees being a material consideration, i.e. there is a presumption that all trees should be retained unless there are good reasons against it.

It follows that the selection process should be focused around what makes tree unworthy of retention rather than what makes them worthy.

Furthermore, when analysed in detail, the actual assessment process for each individual tree works on the same basis. It is not possible to confirm a tree is suitable for retention until all the factors that may make it unsuitable have been considered. So, in practice, the factors that make it unsuitable for retention have to be considered first and if it passes all those tests, by default, it has to be suitable for retention. It usually ends up that these trees have the good qualities referred to in BS 5837 but

this is incidental, not the reason for their selection. This can be illustrated by taking any tree and analysing how it is assessed. It may be a good looking tree from a distance and a method based on desirable attributes would rate it highly. But the reality is, issues such as safety and inconvenience are valid reasons to remove even the best looking trees; a proper assessment has to systematically review these aspects first before the final decision is made. As with the government guidance, the focus in the actual assessment process is around unworthiness rather than worthiness. The BS 5837 method is so fundamentally and fatally flawed that no amount of superficial tinkering can put it right (see panel).

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Categorising trees based on what the look like at the pre-design stage is fundamentally flawed; even the best looking tree may not be retainable because of structural defects.

I had been instinctively aware for many years that there was a fundamental problem with BS 5837 but could never quite work out why it was so wrong. Ironically, my final enlightenment was only prompted by comments from a colleague on the BS 5837 Review Group only a month or so ago. He had pointed out to me that all trees were a material consideration in planning terms; this was the key point that lead to the answer - an answer that just suddenly came to me when I was out walking the dog of all things. As seems to be the case with many great innovations, the final solution was so obvious it defies belief that no one else had worked it out sooner. Of course, if all trees are a material consideration, then the starting point has to be that they are all good unless proven otherwise. So, the only logical approach is to base separation into categories on what excludes trees. BS 5837 is completely the other way round, primarily basing its categorisation on why trees should be included.

So simple and yet it has gone unnoticed for more than 20 years; this is the root of all today's problems. The BS 5837 method is fatally flawed because it is based on the principle of inclusion rather than exclusion. Today's problems relating to amenity, ambiguous category descriptions, small trees and illogical structure all arise from this fundamental blunder. Despite all good intentions, no amount of superficial tinkering with the wording or category structure can put right something that is wrong at the core.

"I stopped in a Little Chef on the way to the inquiry and in half an hour, I sketched out the embryo TreeAZ."

It was against this background of the inadequacy and functional incompetence of the BS 5837 methodology that I developed SULE back in the 1980s, which still remains far superior to anything else available. However, whilst SULE overcame many of the problems found in BS 5837, my everyday experience in the planning system convinced me there was still some way to go in this field. So I began to review the problem, going back to basics, but with a focus on what was required to solve problems in the field rather than from the desktop. This exercise was the start of the evolutionary process that over several years produced the A/Z system of assessing trees on development sites or TreeAZ for short. It is an unusual story because the solution was so unexpected; a journey of much thinking, many trials of ideas and several leaps of faith.

For many years, I felt quite happy with SULE because it provided a logical structure that was easy to understand but, deep down, I knew that five categories colour coded on to a plan was overly complicated. This unease gradually increased as our experience was telling us that developers and councils alike were beginning to focus on one common requirement; they only seemed to be interested in whether trees were good or bad and not the various shades in between. A trend was developing; layout designers wanted precise information about what space they had to work with and councils were only interested in the best trees. Without really realising it, we had been working a two category system for many years. It was a radical step to go from five categories to just two and I resisted it for too long. This first leap of faith came at a planning inquiry when I was going through the farce of discussing the BS 5837 category descriptions and what they meant with the opposing expert. In the end, the inspector was so confused and fed up with it all, he told us to go away and agree a list of trees that mattered and those that did not. It made so much sense that the next day I stopped in a Little Chef on the way to the inquiry and in half an hour, I sketched out the embryo TreeAZ. Of course, it had no name then and it actually had three categories – but it was the start of something different and that was what mattered. From that initial suspicion that all was not well, I now knew that there was a better way and the hunt was on for the elusive solution.

One of the BS 5837 anomolies - the same small tree fits into three different categories! A2: healthy young trees of good fors, B2: immature tree, C2: immature trees.
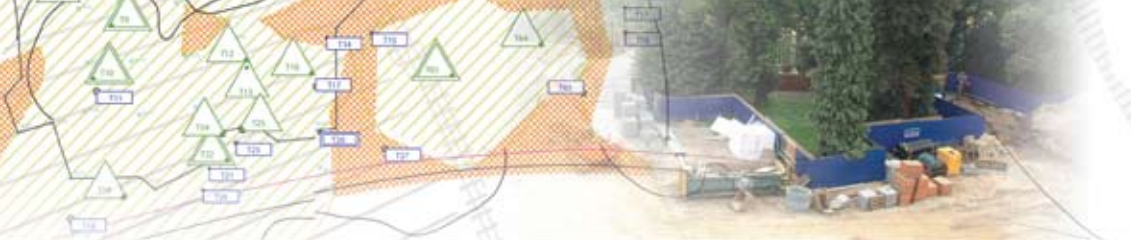
Having taken that first rather radical step of two categories, I decided this might be a good time to review any other changes that could be equally as obvious but had been missed because the problem had not been analysed properly. This meant focusing on exactly what a tree assessment was intended to do; it is to identify which trees are worth retaining and which ones are not - which should be a material constraint and which should not. So, the first question I had to answer was what makes trees worth retaining? The seed of that answer lay within SULE in the principle that the longer trees can be safely and usefully retained, the more valuable they become. A fundamental element of any solution would have to consider this issue of length of time; I needed to identify what was a reasonable threshold in years that a tree could be retained for to make it worthy of being a constraint. Through a combination of a literature review, consultation with other members of the Profession and common sense, I arrived at a threshold figure of 10 years. If a tree has a SULE of less than 10 years it is not worthy of influencing layout design; if it has a SULE of more than 10 years it should be a material design constraint.

Another dilemma related to small trees; in the context of overall tree management, they are critically important because they are the future cover, but was it realistic that small randomly placed elements of the landscape should have a large influence on layout design? A useful solution flows from taking a wider tree management perspective where the focus is away from the individual and towards the entire tree population. In a planning context, the exact location of individual trees is often not that critical; it is their potential for amenity contribution to the whole community that is the main consideration. If they can be reliably moved or replaced in a location that maintains or enhances this contribution, then their precise location is not a significant issue. For this reason, in most situations, I believe that small trees should not be a material constraint on development sites. In the context of present day abilities to easily move small trees or replace them with virtually identical semi-matures, they can be discounted from the equation. Of course, the question of what is meant by small still needs to be resolved but this is a matter of detail rather than a problem with the principle.

Amenity is another serious difficulty; what does it mean and how should it be applied to tree assessment? In its widest interpretation, amenity implies the qualities of benefit, wellbeing and goodness. Whilst the multiple benefits that trees impart are well recognised and important, the focus in our planning and legal system is on visual amenity over time. The amount of benefit is directly proportional to the volume the tree occupies, how many people can see it and the length of time it can be seen for. The obvious conundrum here is that visual amenity changes over time as the tree grows larger and then gets smaller as it declines. More subtly, this is often compounded by dramatic changes over time in the number of people seeing it because of new roads or landscape changes in exposure or screening. Even further complication arises because visual amenity fails to consider the overriding priority of safety; a tree of the highest visual amenity may not be retainable because of severe structural defects. These conflicts cannot be resolved; amenity cannot be used as a primary assessment criterion at the pre-design stage of development. However, once the primary assessment criteria have been applied to select trees that are worthy of being a material constraint in the pre-design stage, amenity is then an important element in assessing the impact of a layout in the post-design stage when the future visibility relating to that layout will be known.

As I considered and researched all of these issues over several years, the fundamental requirements of the new method began to emerge. It should be based on two simple categories, those categories should be defined by the principle of exclusion rather than inclusion, small trees should be automatically excluded and amenity should not be used. Within that framework, I needed to work on the detail of the category descriptions, how to number them and what to call it all.

I decided on calling the best trees category A and the worst trees category Z very early on for the simple intuitive nature of the choice. Of course, my instincts wanted me to choose numbers because that was what I had used in SULE; BS 5837 used letters so I was not too keen on that. But, despite my prejudices, common sense cried out that there was a natural association with A being the best because it was first in the alphabet and Z being the worst because it was last. Z has a distinct finality to it that anyone could grasp quickly without too much explanation. Numbers did not really do this; 1 is commonly perceived as the best but what was the worst – 5, 10, 100, 1,000 – there was no sensible number that instantly conjured up an image of the worst. Alternatively, it is often a common view that higher numbers imply increased quality so that did not help either. Selecting A and Z for the main category names also helped with the sub-categories because it naturally followed that they should be numbered. I knew there were going to be a lot of sub-categories for Z trees so numbers rather than letters seemed a more understandable structure.

CONFUSING CATEGORIES

SULE Categories		BS Categories		BS Sub Categories	
1 Green	🟢	A Green	🟢	A Green	🟢
2 Yellow	🟡	B Blue	🔵	AB Green/Blue	
3 Orange	🟠	C Brown	🔴	B Blue	🔵
4 Red	🔴	D Red	🔴	BC Blue/Brown	
5 Blue	🔵			C Brown	
				CD Brown/Red	
				D Red	🔴

Both BS 5837 and SULE have too many categories; bonfire night on paper is not helpful and signals time for change

BS 5837 EXISTING ADVICE

BS Cat	Normal View		Colour Blind View	
A	Green	🟢	Yellow	🟡
B	Blue	🔵	Blue	🔵
C	Brown	🔴	Brown	🔴
D	Red	🔴	Yellow	🟡

Statistics
- Red/Green colour blindness most common – 99% of cases
- 5%-8% men (high as 1 in 12) suffer colour blindness
- 0.5% woman (high as 1 in 200) suffer colour blindness
- There is no cure/treatment

BS 5837 ignores the most common colour blindness, showing the best trees (green) and the worst trees (red) as the same colour! This is not all that it got wrong.
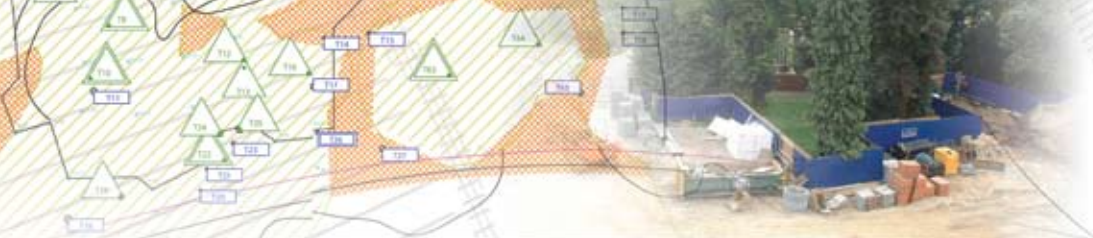
Colours had always concerned me; SULE had five categories and some consultants used split categories with BS 5837 that gave seven colour combinations. This was ridiculous when seen on a plan and was always more confusing than helpful. Two categories lent itself to a much neater and intuitive presentation, which is essential if the planning process is to run smoothly. Layout designers and other professionals who have no tree expertise have to interpret and use this information so the existing colour confusion made not sense. And there was another problem; the almost universal use of green for good and red for bad could not be easily distinguished by people with the commonest colour blindness disorder. Traffic lights addressed this issue by light sequences and orientation but there are no such clues on a flat plan; the colours had to be changed. I was keen to stick with green as good, which left blue for bad. This works well and I expect all colour presentations to follow this lead as the realisation dawns.

" There was another problem; the almost universal use of green for good and red for bad could not be easily distinguished by people with the commonest colour blindness disorder."

So, lots of changes and new ideas but it still had no name. It contained elements of SULE so I originally called it SULE 2 in the absence of anything better. But it was different, so much so, that it soon became clear that it had to have a name of its own. I had been mulling it over for quite few months; the letters A and Z were obviously important but it also had to be easy to remember, preferably mean something so the word tree would help and be original. Again, the solution came to me when I was walking the dog (he has a lot to answer for!!). Looking back, TreeAZ is so obvious, it is hard to believe it took so much thought and consideration to get there.

With it christened at last, the final dilemma was how to market such an important, unique and innovative product. I had specifically developed it to make me more efficient in my daily work so that my business was more effective than my competitors, with the obvious financial benefits. It had taken literally hundreds of man hours working all this out, a very significant business cost in terms of lost revenue that could have been charged to a client. Did I keep it secret and get some of my investment back by selling it under licence or did I make it freely available and recoup the costs another way? Well, I chose the latter (see panel) and it still remains to be seen if there ever will be a payday. This is a risky strategy because opening it up for public scrutiny exposes any mistakes and if I have got it wrong, my credibility is in tatters. But we have field tested this to death so we know it works and that is a fantastic confidence booster. I believe that any risk is far outweighed by the benefit to the Profession by having access to such an excellent tool and that my payday will come by being a member of a better Profession.

TreeAZ: an innovation in Arboriculture

TreeAZ has evolved through a process of research and development based on daily work experience to meet the demands of the modern UK planning system. It has been honed through extensive field trials within Barrell Treecare over several years and was launched to the wider Profession at the AA Conference in September 2002.

In a similar vein to how Linux was developed in the IT world, this release made TreeAZ freely available to the Profession on an extended field trial basis. Jeremy feels he has taken it as far as it can go 'in-house' and a wider input into its development has now become necessary if it is to become an accepted standard. Anyone can download the detailsfrom www.barrelltreecare.co.uk and contribute to its development by feedback through the web based Discussion and User Groups. This is an innovation for Arboriculture with the potential to lead to a method developed by the Profession for the Profession rather than a product associated with a specific individual.

Subtle differences - this tree is a material consideration but not a material contraint

TreeAZ has been available for public comment for about six months now and there has been substantial feedback from all over the world. Thankfully, the basic principles have withstood that test and remained more or less intact but I have made changes to detail, which has only been achieved so quickly by this wider consultation. The most interesting feedback related to only having two categories; many people felt there was a benefit to having more to allow the very best and the very worst to be identified. At first I resisted, but it soon became clear that this was important and I had to consider it. Whilst my practical experience committed me to the basic principle of only two categories, I realised that this was not compromised by providing the opportunity of sub-dividing each category if the user found it useful. So we quickly field tested a revised version identifying the very best trees as AA and the very worst as ZZ on the following basis:

AA Very important trees suitable for retention

A Important trees suitable for retention

Z Unimportant trees not particularly suitable for retention

ZZ Poor trees unsuitable for retention
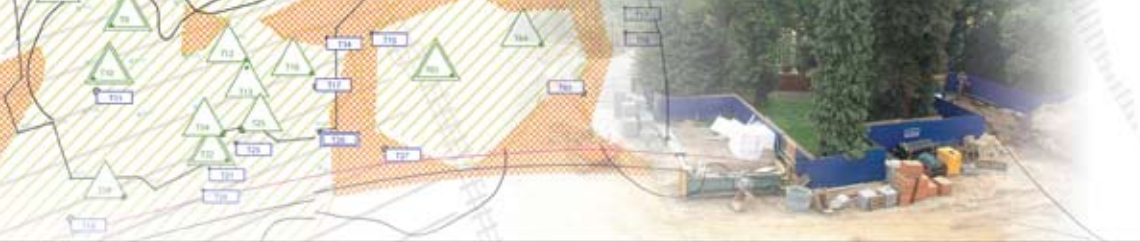
This worked well and is now incorporated into the method for those who wish to use it. A simple example of the value of the feedback exercise that is already making this less my tool and more a resource for the Profession.

Another post-launch change relates to the ordering of the category descriptions and is driven by the fundamental principle that categorisation should be based on exclusion rather than inclusion. It is just so obvious that the A categories should come first and the Z last because that is the intuitive way we think. But, in fact, the principle is that we work on the reasons for exclusion first and so illogical as it seems at first glance, it would be more appropriate to put the Z categories first and the A categories last. This is so counter-intuitive that the immediate reaction is that it cannot be right. But it is and it works. I believe that these are the types of leaps of faith that we have to make if Arboriculture is to mature as a credible Profession. It is perhaps too much for most laymen to do but professionals should have the training and foresight to understand the need and overcome the immense initial resistance.

Turning full circle, the revision of the BS 5837 survey section is a serious issue that will affect everyone in Arboriculture; from the brushwood draggers doing the physical work right up to the consultants arguing the case for trees at the strategic level. 25 years ago when the first version was conceived, a method of tree assessment based on inclusion because of desirable characteristics seemed a natural and sensible choice. In the context of a rapidly developing field and a young Profession, failure to identify its shortcomings in the 1990 revision was an understandable error of judgement. To continue with such a fundamentally and fatally flawed method in the current revision is unforgivable. The future integrity of the Arboricultural Profession hangs in the balance on this one issue. Cast aside the failings of the past and Arboriculture will move forward; resist change and we will remain amateurs clamouring to be heard in an increasingly professional world.

TreeAZ retention categories (Version 3.02)

Z — **Trees not worthy of being a material constraint:** Not suitable for retention for more than 10 years

(Small, young or regularly pruned trees/hedges that could be replaced like for like)

Z1	Small and young
Z2	Formal hedges and trees regularly pruned to restrict size

(Trees that would be removed within 10 years because they are a high risk)

Z3	Dead, dying, diseased, severely suppressed or declining
Z4	Severe damage or structural defects including cavities, decay, included bark, wounds/storm damage or poor form (severely unbalanced)
Z5	Present or future instability because of poor anchorage or loss of adjacent trees

(Trees that need severe pruning or removal within 10 years for good management reasons)

Z6	Poorly formed, diseased or damaged and in need substantial remedial care to reduce levels of risk
Z7	Overgrown hedge either unretainable as a hedge or needing significant pruning to re-establish as a hedge
Z8	Causing damage to existing structures
Z9	Causing unreasonable inconvenience to existing properties
Z10	Adversely interfering with better trees
Z11	Poor trees occupying space for new trees
Z12	Would be excessively expensive to retain for more than 10 years

A — **Trees worthy of being a material constraint:** Suitable for retention for more than 10 years (**Note:** This excludes small and young trees)

A1	No significant defects that could be retained for more than 10 years
A2	Minor defects but could be made suitable for retention for more than 10 years by remedial tree care or removal of adjacent trees
A3	Special significance for historical, commemorative, habitat or rarity reasons that would warrant extraordinary efforts to secure their retention for more than 10 years
A4	May have legislative protection as habitat for European Protected Species (Advisory and will require specialist investigation)

NOTE: Trees that are very good examples of category A can be noted as AA and trees that are the worst examples of category Z can be noted as ZZ summarised as follows:-

AA   **Very important trees suitable for retention**
A   **Important trees suitable for retention**
Z   **Unimportant trees not particularly suitable for retention**
ZZ   **Poor trees unsuitable for retention**