Tree AZ

Pre-planning tree surveys: Safe Useful Life Expectancy (SULE) is the natural progression

PRE-PLANNING TREE SURVEYS: SAFE USEFUL LIFE EXPECTANCY (SULE) IS THE NATURAL PROGRESSION

Summary

Pre-planning tree surveys involve the collection of information to help designers incorporate existing trees into development layout design. Their use to date and the essential features of a model method are discussed. Such a method will clearly identify the role of the surveyor and the nature of the subjective information required. Other essential features include ease of data collection/interpretation and adaptability for use in a wider arboricultural context. Initially there should be two stages of professional arboricultural input to ensure that trees are effectively considered in the planning process. For 12 years pre-planning tree surveys have been modelled around the British Standards (BS) method (BS 5837 - *Trees in Relation to Construction*) despite it not satisfying these obvious requirements.

An updated method of pre-planning tree assessment is proposed based on *Safe Useful Life Expectancy (SULE).* Guide-lines are suggested for how this method will be used in practice. It is suggested that the time has come for a natural progression from the existing BS 5837 method to a modification based on SULE.

If trees are present on a site, they usually rate as a major component of the overall survey. At present there are obvious problems with the methods available for assessing trees on development sites. These are resulting in designers being presented with information that is inconsistent and difficult to interpret. Many wrong decisions about trees are being made due to these basic inadequacies of information collection and presentation. This paper examines the history of tree surveys in a planning context and proposes a revised method of individual tree assessment based on the BS 5837 guidelines.

Trees have always been the subject of interest in the design of new layouts but as competition for space intensified it became necessary to present this information in a more formalised way. As environmental awareness increased, so did the perceived importance of incorporating trees into development proposals. Today, trees are usually considered as one of the most important components when designing the layout of new developments. These evolving needs were clearly recognised by JAMES (1972) and BRIDGEMAN (1976) but it was not until 1980 (BS 5837, 1980) that a pre-planning survey with detailed tree assessment categories was advocated. Alternative assessment categories have been proposed (HELLIWELL, 1985 and 1988) but these have not been widely used. Consequently, the BS 5837 method has remained virtually unquestioned to the present day as the authoritative reference on the subject. This has recently been revised (BS 5837, 1991) but the basic content of the pre-planning survey section remains similar to the original 1980 version. As a result of the credibility afforded to BS publications, and with no viable alternatives, the method advocated in BS 5837 is now widely used for tree surveys. Whilst it was clearly a step in the right direction 12 years ago, time has revealed a number of flaws in the reasoning and application of the BS 5837 guidelines. Loose definitions and illogical reasoning allow extremes of interpretation according to the users objectives. Developers can down-grade trees to fit in more units and councils can upgrade trees to limit the number of units. Somewhere in the middle an independent adjudicator has to decide the priorities. One of the most blatant examples is the definitions of young or small trees within the category structure. With a little enthusiasm and eloquent explanation, it is presently possible for an arboriculturist to place them in any one of three categories (depending on his persuasion) and successfully defend the selection! These problems cast serious doubts on the suitability of this method for future use in its present form. As tree inspection methods become better documented (CRANE, 1989) and tree biology becomes a major consideration in advanced consultancy (O·CALLAGHAN, 1989), tree care is being dragged into the 1990's. Pre-planning surveys are no exception and the time has come to rectify these shortcomings. Quite clearly the BS 5837 method is

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inadequate and a natural progression is needed to meet the demands of the present day.

A Model Method for Pre-planning Tree Surveys

Many pre-planning tree surveys will end up at a planning appeal where the information may well be disputed by several interested parties or their representatives. It therefore makes sense to prepare all pre-planning surveys on the basis that the information may have to be defended under the most hostile of scrutiny. Often, an independent adjudicator without an arboricultural background will be required to interpret the information. Consequently, it is vital that this information is presented in a manner that can be easily understood and evaluated by other professionals with only a lay knowledge of trees. Before any survey commences it is necessary to establish precisely what the objectives are. The detail of the objectives will directly influence the detail of the information required. Generally, the primary objective will be to provide information to help the evaluation and comparison of different layout options. Good communication from the start between arboriculturist and layout designer is essential if the survey is to be useful. The arboriculturist should be told precisely what information the designers require, and in turn the information presented to the designers should be easy to interpret. Once these basic requirements are clear, the practical part of the survey can be considered in more detail. In an ideal world, the perfect, or 'model', pre-planning tree survey should have the following features:

Clear definition of the role of the arboriculturist: There are two stages of professional involvement for arboriculturists in the early planning stages. Initially, their role is to collect information and present it in a form that can be interpreted by the layout designers. There are normally no firm proposals for layout design and considerations such as how suitable trees are for retention or are they in scale with the proposed development should not concern the arboriculturist at this early stage. The second stage of their professional involvement is to interpret this information in relation to the various design layouts that are proposed. It is important to appreciate and differentiate between these two stages of arboricultural involvement. Before the survey commences the arboriculturist should be clear beyond doubt about these different stages. Collection and presentation of information first; interpretation comes later and is distinctly separate from the first stage.

Clear definition of the information required: It is common for the information required to vary with each site. So before carrying out any field work, it is important for the arboriculturist to liaise with the designers and establish details of what information is required. Normally, both objective measurements and subjective assessments will be needed.

(i) *Objective information* is trunk diameter, crown spread and tree height measurements. This information should be free of operator related variation because the features are measurable. The results should be about the same irrespective of who does the collecting.

(ii) *Subjective information* is the assessment of the more intangible elements which cannot be measured in such a precise way. This information will be closely related to the experience and opinions of the arboriculturist, and can be a major source of disagreement. One of the main drawbacks with the BS 5837 method is that the guide-lines for subjective assessments are not clearly defined. In practice, this can result in wildly differing assessments between arboriculturists for the same tree. For a method to appear credible to the information end users, it is crucial that different assessors arrive at more or less the same answer. Assessor related variation must be reduced to a minimum. That means clearly defined assessment categories to minimise the scope for switching between categories.

The scope of subjective information required: Again, it should be remembered that this is a pre-planning survey, and the arboriculturist will not yet be in a position to comment on the desirability of tree retention. At this early stage, designers are mainly concerned with achieving the optimum layout within the existing site features-but the long term aspects of the development are also important. Unlike topographical features or existing buildings, trees change with time. So if they are to be effectively incorporated into the layout design, the initial survey information should attempt to reflect the future situation. It has been suggested (BRIDGEMAN, 1976) that amenity value is a suitable subjective basis for categorisation, but in practice this method does not effectively take account of tree life expectancy. A mature Monterey cypress infected with Coryneum Canker *(Seiridium cardinale)* could have a huge amenity value now - but it will probably be gone in five years time! (Figure I). How long each tree can be expected to remain on site with an acceptable degree of safety is the key information required for long term planning. Assessment of Safe Useful Life

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Expectancy (SULE) is one of the most effective ways of providing this information.

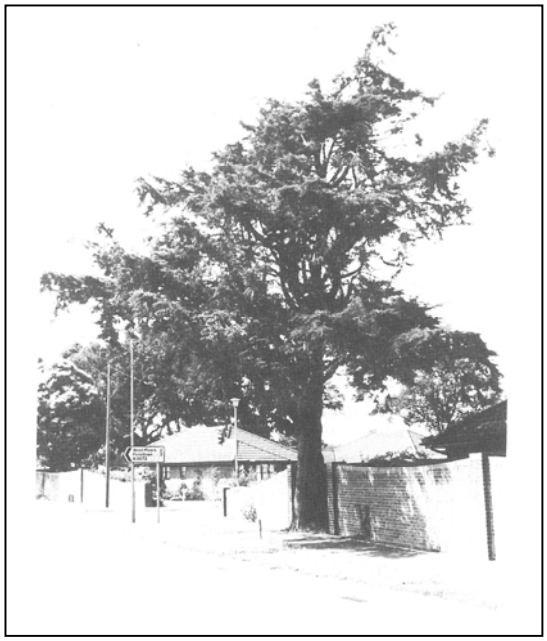

FIGURE I: Amenity value can figure heavily in the current BS 5837 method of tree assessment. Is it really acceptable for trees which will probably be dead in five years to influence long term development layouts?

Subjective assessment categories: Due to the intangibility of subjective information, assessments can only be presented as a loosely defined range or group. At best, SULE can only be estimated within a range of years. In realistic terms, long, medium and short are probably the finest divisions that can be achieved with a reasonable degree of consistency between assessors. Suitable ranges in years which each of these categories can represent are flexible. They should be structured to minimise the chances of allocation to more than one category whilst still providing the required detail of information. In addition to the main categories, there must be one for trees that are a hazard irrespective of future land use and need removing quickly for safety reasons.

Recording the reason for category allocation: It should be remembered that there may be many end users of the survey information. The reasons for allocating a tree to a particular category may be quite obvious to the arboriculturist on site, but not quite so obvious to future users of the information. These users may be designers wanting more detail without visiting the site, another arboriculturist trying to decide if the category is correct or even the original assessor trying to remember the reason for the allocation. Structured and detailed reasons for allocation to a particular category reduces misunderstandings through lack of information. This aids future interpretation of the information and reduces the margins for disagreement.

Young and small trees: Young or small trees should be considered as a special case separate from established and maturing trees because they can be successfully moved or replaced with similar individuals. BRIDGEMAN (1976) recognised that transplantable trees required a separate category. They are a flexible element within the site structure and it is quite unreasonable that their present position should have a long term influence on development layout (Figure 2). Despite having a long SULE in many cases, young or small trees should only be considered for retention if their positions are compatible with the finalised layout design. Flexibility is the key word and they should not significantly influence the layout design stage. In most cases they can be objectively defined in terms of age or size, and should be classed as an additional category to the subjective divisions outlined above.

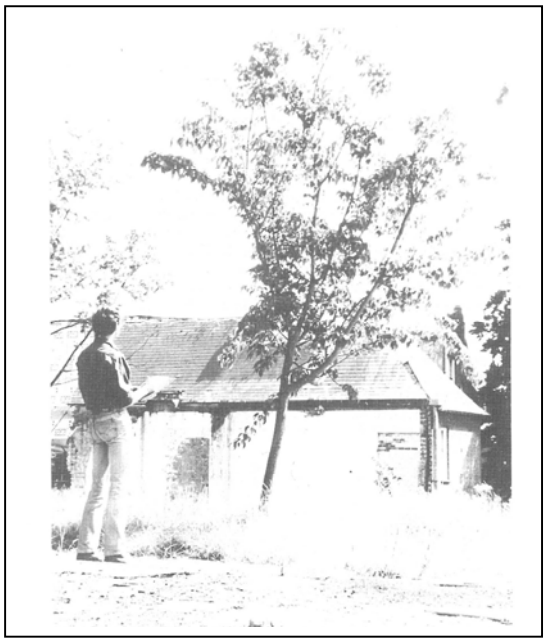

FIGURE 2: Small or young trees: Is it really acceptable that replaceable or transplantable trees should influence long term development layouts?

Simple presentation: In most cases, survey information will be interpreted by designers initially and possibly inspectors at a later stage. They will probably not be familiar with the site, and almost

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certainly will not be familiar with tree management. Consequently, it should be free of technical jargon, easy to understand away from the site and facilitate rapid interpretation by independent adjudicators.

Ease of data collection: Time is money, so for a method to be viable it must be quick and easy to use. In practice, assessors of differing levels of skills and experience will be involved in collecting this information. The credibility of any method depends on the results being consistent over a range of assessor ability, and so the principles must be easily understood on a basic level.

Multiple applications: It will be useful if the method can be used for all tree surveys, and not just those relating to development sites. SULE is a basic element that is common to the management of most arboricultural situations - from development sites to gardens and the street scene. A method that is based on this common thread, and that can be adapted to meet the requirements of a diverse range of situations will establish continuity throughout the many aspects of tree management that does not obviously exist at present.

Proposals for an Improved Method

At present, none of the existing methods come close to meeting the model requirements discussed above. Incorporating the above features into the existing BS 5837 structure is an obvious natural progression for perfecting the method. An improved method based on SULE has two sections as follows. Section A is guidance notes for the arboriculturist to ensure it is understood beyond doubt what is required before the project is started. Section B is the SULE category descriptions for the subjective tree assessments.

Section A: Guidance Notes for Arboriculturists

General:
This information should be collected by an experienced arboriculturist. Experienced means someone who is able to estimate with consistency and accuracy, tree life expectancy in the existing situation. It should be remembered that this is a pre-planning survey and it is not the role of the surveyor at this stage to consider the suitability of trees for retention. The objective of this survey is to provide the layout designers with reliable information which will allow them to evaluate and compare the impact of different layouts on the existing tree cover.

Preparation:
Before undertaking any field work the following requirements should be clearly established:

(i) What objective information is required, i.e. height, crown spread, trunk diameter, etc.
(ii) What subjective information is required, i.e. the most appropriate range for the SULE categories.

SULE Assessment:

(i) **What is SULE:** SULE is the length of time that the arboriculturist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static-it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments will decrease as time passes from the initial assessment and the potential for changes in variables increases.
(ii) **How to assess it:** For each tree it is necessary to estimate the remaining life expectancy. This will be based on the potential of the species in the locality, but be modified by the arboriculturist to take into account the particular circumstances of the situation. In making the final assessment of each tree, particular consideration should be given to:
   (a) Obvious past influences.
   (b) Health and vitality-present and future potential for the species on the site.
   (c) Estimated age in relation to expected life expectancy for the species.
   (d) Structural defects which may influence the potential life expectancy for the species.
   (e) Remedial work which may be necessary to allow retention in the existing situation.

Any arboriculturist who does not feel competent to make these types of assessments should not be undertaking the survey.

SULE Recording:
It should be appreciated that there will always be instances where trees will not fit neatly into the category descriptions in Section B. In such cases, the arboriculturist should decide on the preferred category, and record the allocation problem in the notes. This assessment data should be recorded on a schedule with the objective data that is collected. It is important to list the reason for each category allocation on the schedule so that future users of the information can appreciate the reason for the decision.

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SULE Category Ranges:
The selection of age categories will depend on the tree population of the site and therefore needs to be flexible so that adjustments can be made to meet particular circumstances. For example, if the trees on a site had a SULE well in excess of the upper limit of 40 years, then it may be more appropriate for the categories to be redefined as follows: Short SULE = 5–40 years, Medium SULE = 40–80 years and Long SULE = 80 years and longer. The Young and Remove Categories would remain the same.

Section B: SULE Categories

On the basis of the guidance notes in Section A, each tree should be allocated to one of the following categories:

Long SULE: Trees that appear to be retainable with an acceptable level of risk for more than 40 years.

(a) Structurally sound trees located in positions that can accommodate future growth.
(b) Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery.
(c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.

Medium SULE: Trees that appear to be retainable with an acceptable level of risk for 15 to 40 years.

(a) Trees that may only live between 15 and 40 more years.
(b) Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals.
(c) Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons.
(d) Storm damaged or defective trees that can be made suitable for retention in the medium term by remedial work.

Short SULE: Trees that appear to be retainable with an acceptable level of risk for 5–15 years.

(a) Trees that may only live between 5 and 15 more years.
(b) Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals.
(c) Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons.
(d) Storm damaged or defective trees that require substantial remedial work to make safe, and are only suitable for retention in the short term.

Remove: Trees with a high level of risk that would need removing within the next 5 years.

(a) Dead trees.
(b) Dying or suppressed and declining trees through disease or inhospitable conditions.
(c) Dangerous trees through instability or recent loss of adjacent trees.
(d) Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.
(e) Damaged trees that are considered unsafe to retain.
(f) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (e).

Young or Small Trees:

(a) Trees which are less than 5 metres (m) in height.
(b) Trees which are over 5m in height but less than 15 years old.

Application of SULE

Presentation: Data presentation would normally be in the form of a tree schedule listing the objective measurements and the subjective assessments, accompanied by a plan showing tree positions with any schedule information that was considered useful. An example of a typical tree schedule and explanatory notes is given in Table 1. Note the reason for allocation to a particular category is included as a letter code after the category number. How best to display the information on the plan can only be decided on the amount of detail required. Allocating colours to each category and drawing in tree crown dimensions as they exist on the ground (HELLIWELL, 1988) contributes greatly to the clarity and interpretation.

Interpretation in a planning context: The pre-planning tree survey provides the basis for evaluating and comparing the impact of different layout options on the existing tree cover. This information allows the layout designers to explore the potential of the site and arrive at the optimum overall solution for the trees within the limitations imposed by any other planning constraints. The SULE presentation makes it quite clear which trees are most suitable for retention and which trees are least suitable. In general terms preference should be given to retaining the Long and Medium SULE trees. Trees in the Short SULE and Young

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Categories should not influence layout proposals but may be considered for retention if suitably located. High risk trees should not influence layout proposals and not be retained.

TABLE 1 Tree Schedule—Example

Tree No.	Species	Category*	Notes
1	Cherry (*Prunus* sp.)	5(a)	Main stem defect at 2 metres but could be rectified by formative pruning.
2	Cherry (*Prunus* sp.)	2(a)	
3	Cherry (*Prunus* sp.)	4(b)	Dying.
4	Rowan (*Sorbus aucuparia*)	4(c)	Severe stem damage.
5	Oak (*Quercus robur*)	4(d)	Maturing tree but severe included bark at basal union is a serious structural defect.
6	Birch (*Betula pendula*)	5(a)	Sapling.
7	Rowan (*S. aucuparia*)	4(c)	Completely girdled stem.
8	Whitebeam (*S. aria*)	2(a)	Some minor stem damage.
9	Ash (*Fraxinus excelsior*)	3(b)/2(b)	Will probably need to be removed in less than 15 years to allow tree 10 to develop but could possibly be retained longer if important.
10	Ash (*F. excelsior*)	1(a)	Well formed maturing tree.
11	Ash (*F. excelsior*)	2(b)	Will need to be removed to allow tree 10 to develop.

Explanatory Notes for Tree Schedule
This schedule is to be interpreted in relation to the site plan showing tree positions, crown spreads and trunk diameters.

*1: SULE assessed as in excess of 40 years.
2: SULE assessed as between 15 and 40 years.
3: SULE assessed as between 5 and 15 years.
4: Trees assessed as high risk that should be removed within 5 years.
5: Young or small trees.

Use within the planning process: Several stages of arboricultural consultation are necessary if development proposals are to optimise the use of existing trees in the long term. Initially, the pre-planning survey provides general guide·lines for deciding which trees may be suitable for retention in a preliminary layout design. It is only when this has been produced that an arboriculturist can relate in detail the existing trees to the proposed development. This is the stage for fine tuning on a tree by tree basis. Errors of interpretation by the layout designers and special cases for individual trees can be identified and modifications suggested. This second stage of arboricultural input into the planning process is essential if trees are to be realistically retained and a satisfactory solution achieved.

Wider applications: The effective management of trees for their amenity attributes invariably involves some form of SULE assessments. An appreciation of how long trees can be expected to survive is a fundamental requirement of planned removal and regeneration in order that amenity can be sustained. As street tree survival rates become better documented through computerised inventories, SULE can be predicted within very tight ranges. Such precise information is not available for trees in gardens, but SULE is still the basis for deciding the extent and timing of removals and replacements. Throughout the range of situations amenity tree managers must use SULE based assessments in one form or other to be able to manage their trees competently. The problem is that a universal name tag and detailed definition is lacking at the moment.

SULE - The Natural Progression

As development pressures intensify, trees are becoming an increasingly threatened long term component of the urban environment. Accurate, unambiguous and easily understood information at the disposal of layout designers is the key to optimising the successful incorporation of existing trees into future landscapes. Appreciating the importance of the principle of pre-planning tree surveys has already occurred but existing methods are no longer satisfactory to cope with the increasing complexities of urban development. Quite clearly, changes are necessary if pre-planning tree surveys are to have any real value in future planning and development processes. SULE is the natural progression.

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