CAN A MORE DISCIPLINED APPROACH TO TREE APPRAISAL INFORM DEVELOPMENT SITE SURVEYS AND TREE PRESERVATION DECISIONS – AND VICE VERSA?

ABSTRACT

The benefits gained from applying a rigour of process to tree valuation can be exported to wider forms of tree appraisal such as development site surveys. Indeed, surveyors may already use depreciation methods intuitively, but unconsciously, on development sites. The advantage of unconscious usage is that practitioners have a pre-existing familiarity with these universal methods; the disadvantage of unconscious practice is that the process remains unfocussed and lacking in internal coherence. Alignment with more universal methods of quality categorisation than those employed in current industry practice (e.g. British Standard 5837: 2005 Trees in relation to construction), could lead to a greater transparency of process and greater consistency in consultants' reports. Similarly, tree officers could more readily justify their decisions or high-level fines when informed by a clearer and more coherent, logical process.

INTRODUCTION

A common criticism in the UK, where the Council of Tree & Landscape Appraisers' (CTLA) methods have recently been introduced, is that they are just too difficult to understand and apply, when there are a number of simpler methods to hand. Although CTLA methods are infused with a commendable degree of intellectual rigour, lack of intelligibility can be a serious design flaw when trying to promote a product to a new market. In a previous paper, "A critical analysis of CTLA's depreciation factors – do inherent inconsistencies of method complicate the simplicity of process?" (Hollis 2008b) the author sought to iron out some of these complications and streamline the process.

In this paper, the author hopes to show that arboriculturalists are already unconsciously familiar with the process of depreciation, through tree quality categorisation procedures in development site surveys. Whilst involvement in valuation claims can be infrequent, development surveys and tree preservation decisions are the daily round of tree officers and consultants alike. Yet, very few practitioners have even a basic grasp of appraisal logic (Cullen S. pers comm). An informal survey of consultants revealed that, not atypically as a profession, we know what we do, but not altogether how and why we do it (Quaiffe J, pers. Comm). We understand the middle of the process (survey), but neither its beginning (logical foundation) nor end (final purpose). A greater understanding of the depreciation process and how it relates to tree appraisal could provide both an ontological grounding and a teleological purpose to this philosophical dilemma.

Although development surveys in the UK are now produced almost exclusively within the arboricultural industry, they have a variety of end users from property developers, local authorities, planning consultants and solicitors, structural and highways engineers and indeed, members of the public. To many of these people tree quality categorisation is something of an impenetrable, arcane mystery, veiled beyond the purview of the arboricultural initiate. Alignment with more universal methods of quality categorisation would lead to a greater transparency of process and accountability.

Alignment could also lead to greater consistency in practitioners, where informed by a clearer and more evolved, logical process. Arboriculture is a young, niche profession and its working methods are of necessity, novel and evolving. Appraisal by contrast, is a seasoned, universal profession with tried-and-tested International Valuation Standards (IVS). Cross-fertilisation with universal convention offers an opportunity for a logical and focused grounding in received wisdom.

Tree surveyors may already use depreciation methods intuitively on development sites and in tree protection appraisals. The advantage of unconscious usage is that practitioners have a pre-existing familiarity with the methods; the disadvantage of unconscious adherence to such universal methods is that the practice is muddled. Thus, BS5837 tree quality assessments lack the internal coherence of International Valuation Standards: as will be demonstrated, the assessments consider aspects of *functional obsolescence* and *physical deterioration* loosely and interchangeably, and under-emphasise *external/economical obsolescence*. Given that planning decisions are economic decisions (e.g. supply of/demand for infrastructure vs. supply of/demand for environmental services), the latter under-emphasis is arguably, a failing of the standard. Greater consideration of external obsolescence could move tree preservation in general out of the expedient protection of individual trees from immediate threats, towards the sustainable management of population dynamics for the long-term future.

METHOD

1. Drawing parallels with CTLA methods from BS5837 to create familiarity

CTLA methods provide an indication of value by first estimating the replacement cost of an equivalent-sized tree and then making proportional deductions for obsolescence in the appraised tree in its current setting, compared to the optimal replacement tree (CTLA 2000). The appraised tree is graded on this basis to decide upon a percentage depreciation of the gross cost of its notional replacement. Thus, a mature tree, which might cost £50,000 to fully replace, might be valued at only 25%, of that estimate.

Few arboriculturalists are familiar with landscape costing, but the banding of qualities is second nature to those using BS5837's tree quality ratings of Categories R (poor), C (low), B (modest) and A (high). Although amenity valuations necessarily involve a variety of clients and locations, the above CTLA explanation could be simplified further to state that the appraiser derives a replacement cost (£50,000) and then deducts appropriately as to whether the appraised tree is Category R, C, B, or A (e.g. £50,000 x 60% for a B-category tree). In execution, the CTLA depreciation tends to be greater, because three factors of depreciation are considered (e.g. £50,000 x 50% x 90% x 75%) under Species, Condition and Location. However, the simplicity of the comparison and its logic holds, whether or not a greater complexity emerges in execution.

2. Drawing parallels with BS5837 from CTLA methods to create clarity

Scrutiny of the BS5837 Table 1: 'Cascade for tree quality assessment' reveals that it relies on similar considerations, if not explicit depreciation factors. The essential definitions of category (BS5837 Table 1, Column 1) rely upon a tree's Condition and Contribution. Condition obviously parallels the Condition factor in CTLA methods. Contribution, which is considered principally under Location within CTLA methods is related in BS5837 to 3 sub-categories of Arboricultural, Landscape and Conservation value. Their criteria mix both the Species and Location factors of CTLA methods interchangeably, with emphasis on the Species factor. The logic is therefore, somewhat confused.

Thus, a tree with high Arboricultural Values ("trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups or semi-formal arboricultural features") and a tree with moderate Conservation Value ("tree with clearly identifiable conservation or other cultural benefits") relate chiefly to the CTLA Species factor, and a tree with low Landscape Value ("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") relates principally to the CTLA Location factor.

It is neither surprising that there are parallels between methods of tree appraisal nor that they do not mesh evenly: BS5837's tree quality assessment was not written to satisfy CTLA protocol and has a specific appraisal exercise in mind (development site survey) for a specific context (UK planning framework). It would be presumptive therefore, to argue that BS5837 realign itself with CTLA methods, but the greater rigour of process in the latter could inform the evolution of the former towards greater clarity of design.

DISCUSSION

Incorporation of IVS into BS5837 to create universality

A more convincing argument in the UK, could be made for alignment with universal appraisal methodology or International Valuation Standards which both inform and transcend CTLA methods. Therein, CTLA Species, Condition and Location factors relate strongly to IVS *Functional Obsolescence, Physical Deterioration* and *External Obsolescence*, respectively, as confirmed by the Royal Institution of Chartered Surveyors' Valuation Standards Board (pers. comm.) in its review of UKI-RPAC Supplementary Guidance Note 1 (Hollis 2007).

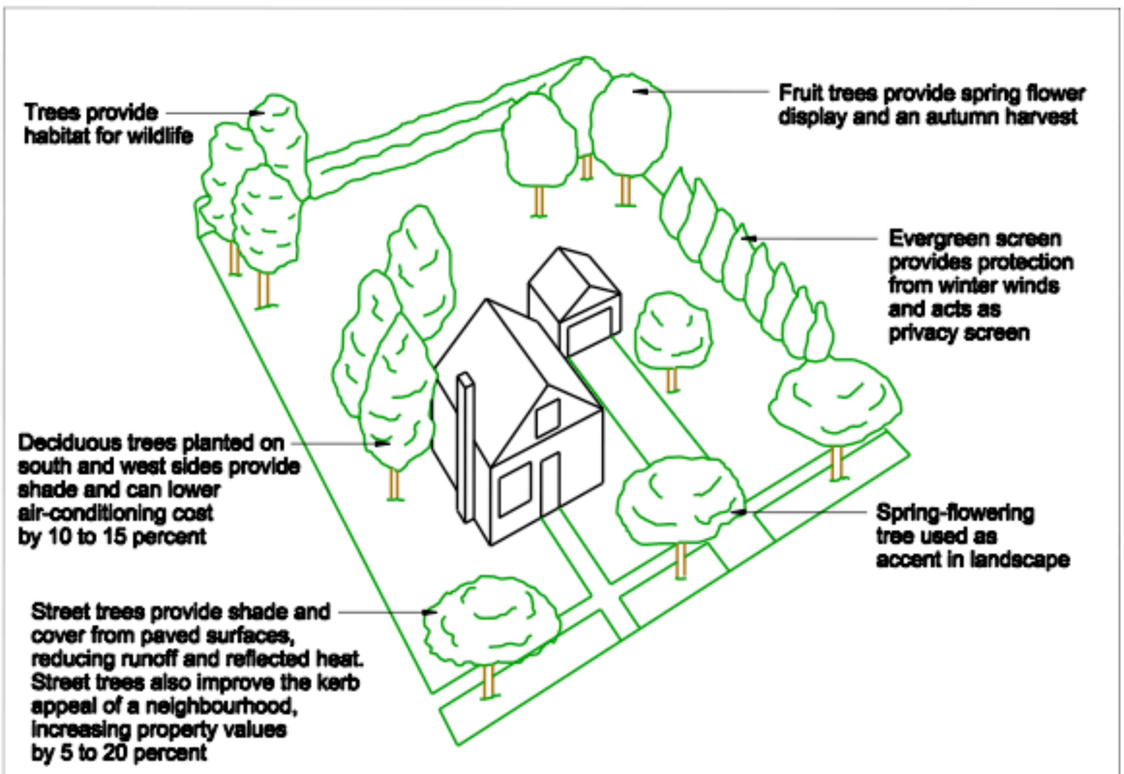
Functional Obsolescence

Functional Obsolescence determines the degree to which the design or specification of an asset (cf. species of tree) no longer fulfils the function for which it was originally designed (RICS 2006); in other words, is the asset fit-for-purpose in its current situation? Does it function well in the ambient environment (*comparative functionality*) and does it deliver its benefits efficiently within the site constraints (*comparative efficiency*)?

In terms of Conservation Area control and tree preservation, such considerations might include is the species a key component of the visual character of the area (e.g. beech in Buckinghamshire, Oaks at Windsor or hollies within 18th century gardens and Austrian pine within Victorian shelterbelts)?

In terms of development control, such an assessment might also consider how the species will fulfil its function within the new design proposals. In this light comparative functionality could consider species tolerance of site disturbance (increased exposure, altered drainage, changes of level, soil compaction, root severance etc) and comparative efficiency of the post-development pressure to prune or fell in relation to growth characteristics (dense shade, weak branch attachments, susceptibility to canker). Figure 1 below from ISA (2007) illustrates the comparative functionality and efficiency of different tree species within a designed landscape.

Figure 1: The fitness of tree specification to design.



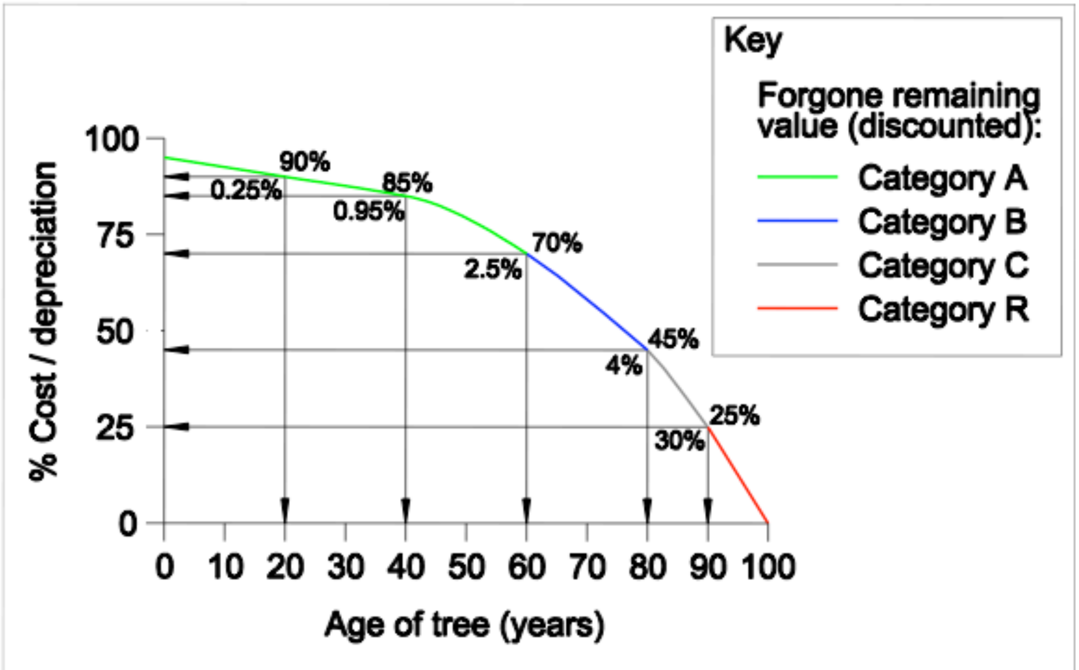
Some of these issues are alluded to in BS5837 Table 1 (e.g. under Arboricultural Values: trees that are essential components of groups or semi-formal arboricultural features), but they are spread loosely across the Table in different text boxes and columns with different headings. They suffer from a lack of definition. Incorporated into Functional Obsolescence, these loose thoughts can be disciplined within a single logical heading.

Physical Deterioration

Physical Deterioration considers the comparative age of an asset as well as its current condition (RICS 2006), thus including an element of accountants' depreciation; i.e. the writing off of the asset over time, as well as the more immediate structural debilitation considered within BS5837. Tree appraisals should accordingly consider the comparative age of a tree and its implications for obsolescence, rather than just defects alone. Hollis (2008a) considered the variable reducing balance of a tree's foregone remaining value over time, as modelled on a 3% discount curve.

BS5837 condition assessments consider the final years of depreciating value for tree quality categorisation in terms of life expectancy (Category A = >40 yrs, Category B = 20-40yrs, Category C= 10-20yrs and Category R= <10 yrs). Figure 2 compares these tree quality criteria with the depreciating value of a tree of 100 years' life expectancy, modelled on the 3% discount curve.

Figure 2 Cost profile of tree mortality spiral in relation to BS5837



The graph allows BS5837 quality criteria to be tabulated into the following numeric (remaining asset) values:

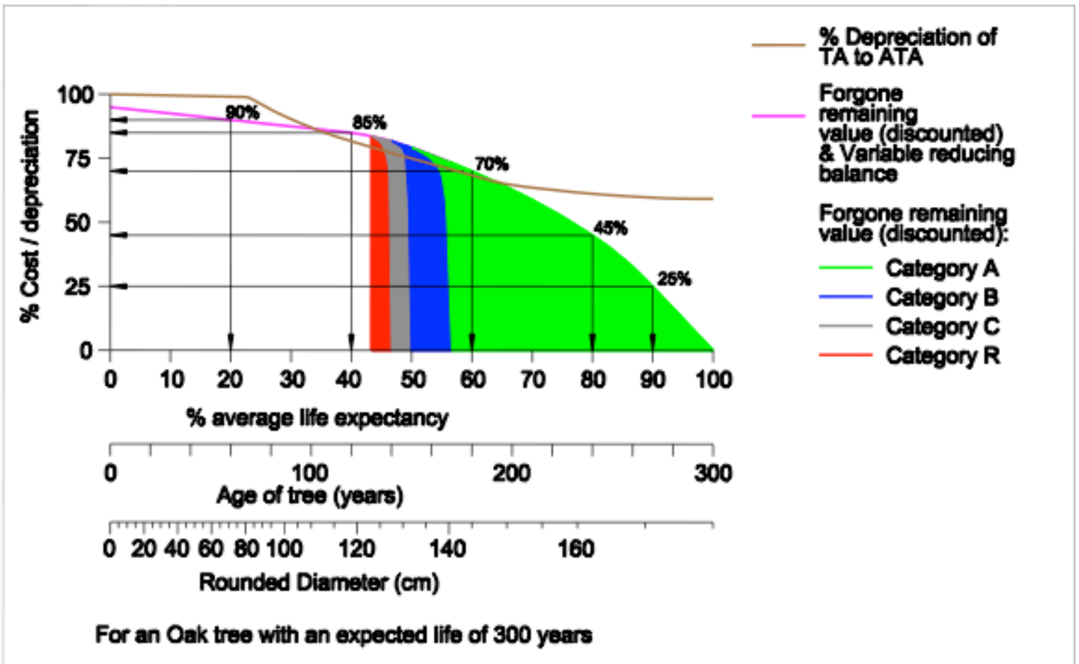
A= 70-100% B= 45-70% C= 25-45% R= 0-25%

These explicit values would appear to be broadly consistent with the implicit values of BS5837's four divisions of category and therefore, add further support to use of a 3% discount rate to inform the depreciation model proposed by Hollis.

Considerations of Comparative Age relate to average life expectancies only; a full appraisal will require further consideration of a tree's physiological condition/an asset's wear and tear; i.e. the defects that tree surveyors are more used to assessing.

Few appraised trees will live out their natural lifespan uneventfully. The actual, curve of a specific tree's current life expectancy (subject to damage, disease and infestation etc.) effectively represents a steeper mortality curve defining the tail of the generic species' curve. Figure 3 illustrates just how the remaining life expectancy of a 120-year-old tree with a generic life span of 300 years might be rated.

Figure 3   Cost profiles of comparative age and wear and tear combined



<u>External Obsolescence</u>

External obsolescence considers the impact of changing economic conditions on the demand for goods or services produced by an asset (RICS 2006). In other words, it relates to supply and demand for the good or in arboricultural terms, population dynamics: how many other similar trees are on the site?

These factors are partly considered within the Landscape Values of BS5837 as e.g. trees present in groups or woodlands ... or trees offering low or only temporary screening. However, there is no consummate assessment of the impact of the site's population dynamics upon individual tree or group rating.

Coder (1995) introduced the concept of Site Occupancy Rating to address this issue. The principle is that only a given amount of leaf area can be maintained on a site, providing a similar contribution of benefits. This leaf area can be concentrated on a few large trees or on many small trees. There is a trade-off between the number of trees and their sizes for similar site occupancy. One way to estimate site occupancy is by measuring basal area as an approximation for crown area. Coder considers a site over-stocked, if basal area is greater than 70 sq ft per acre, and under-stocked, if basal area is greater than 35 sq ft per acre.

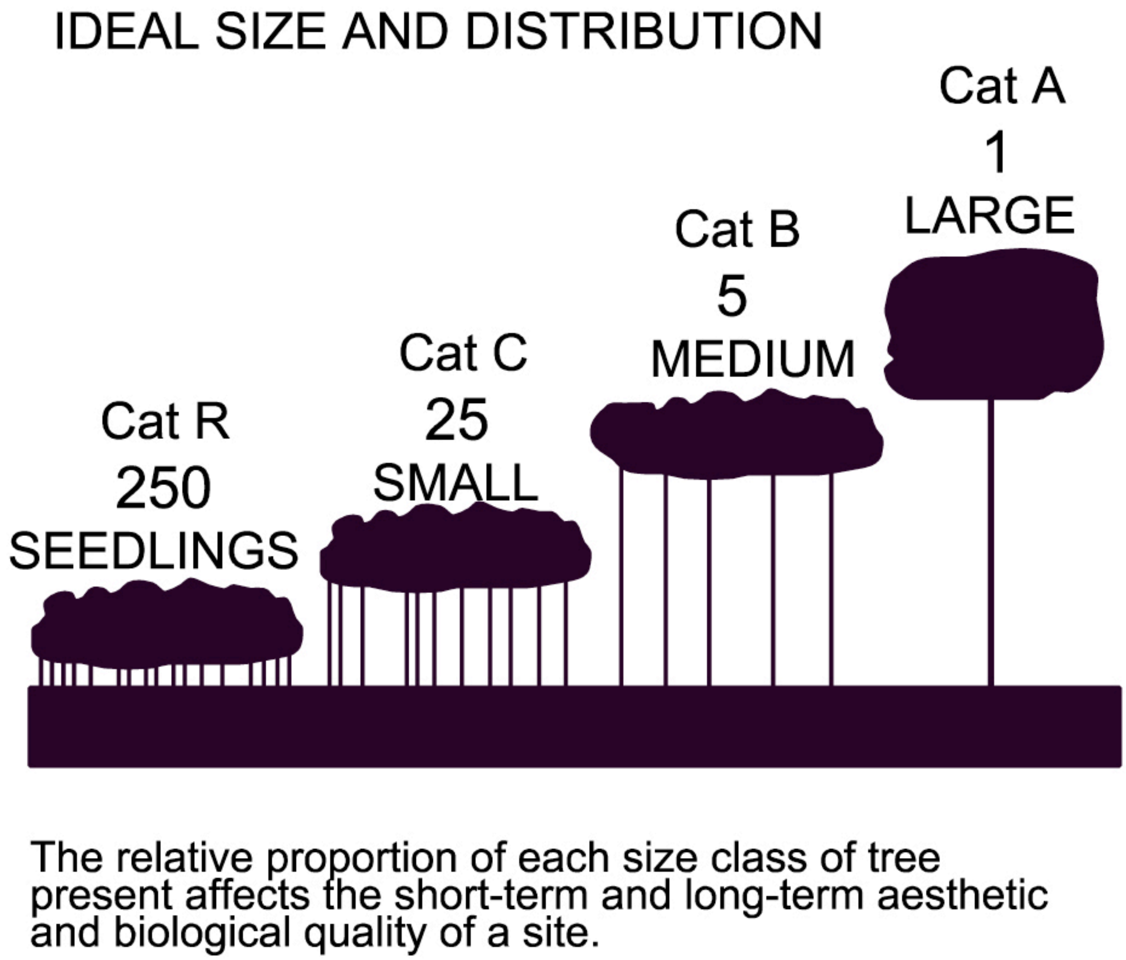
Similarly, a tree's vertical and horizontal canopy position relative to a given population density will affect its ability to deliver benefits and whether or not its removal would result in loss of benefit (Hollis 2007). Different site occupancy ratings and vertical and horizontal canopy positions can each be tabulated into numerical scores for ease of assessment (ibid).

However, the relative weighting of each class need not be the same for all sites: the canopy position has to be considered relative to site dynamics, where for instance, dominant trees may be over-represented. Universality in this respect may be considered a failing of BS5837 which tends to regard dominance as a paramount good, regardless of the requirements of canopy rotation / site regeneration. Client perceptions are also important – whether local authority or private owner.

Coder (1995) suggests that client perceptions of wooded sites, for instance, revolve around tree attributes. Management of tree size ratios on a site maintains the forest-like perceptions. Coder recommends for every existing large tree, there should be five medium sized trees. For every medium-sized tree, there should be five small trees. For every small tree, there should be ten saplings.

Figure 4 provides a graphical representation of Coder's ideal tree size distribution across a site with the BS5837 Arboricultural Landscape Values overlain.

Figure 4: Coder's ideal size and distribution ratios of trees across a site



Maintenance of a varied population dynamic within a Conservation Area and of a continuous cover for the urban forest may be exactly the long-term benefits that a Local Authority is charged with providing in terms of environmental sustainability. Appraisal of external obsolescence allows those making tree preservation or other planning decisions to consider such wider long-term goals, beyond the expediency of the moment; it allows for the vital distinction between conservation and preservation to be made.

RESULTS

Using CTLA/IVS methods to inform tree preservation/planning decisions allows for a numerical evaluation of that comprehensive appraisal, whether or not one chooses to append the depreciation score to a notional tree replacement cost. Detailed scoring of resource quality criteria, currently missing from BS5837 surveys, is compatible with Environmental Impact Assessment methodology and would perhaps be welcomed within the wider planning framework.

The original supposition of this paper was that within CTLA methods, the appraiser essentially derives a replacement cost (e.g. £50,000) and then deducts appropriately as to whether the appraised tree is Category R, C, B, or A (e.g. £50,000 x 60% for a B-category tree). It was explained that in execution the CTLA depreciation tends to be greater, because three factors of depreciation are considered (e.g. £50,000 x 50% x 90% x 75%) under Species, Condition and Location. Table 1 below offers a simplified banding of such treble depreciation, with each CTLA factor across a given row scoring within a similar percentile range. The rounded score bands for all 3 CTLA factors have been correlated to the BS Category score bands identified for Condition in Figure 2 above. The total score in Column 4 is converted to a score band in Column 5 and then compared with Safe Useful Life Expectancy (SULE) ranges (Barrell, 1995) in Column 6. These SULE ranges are the essential determinants of BS5837 tree quality categorisation, where remaining service life is paramount to all other considerations of Arboricultural, Landscape and Conservation Value (BSI 2005).

Table 1: Reconciliation of CTLA, SULE & BS5837 Ratings

Species (%)	**Condition (%)**	**Location (%)**	**Total Score (%)**	**Score Range (%)**	**SULE Range (yrs)**	**BS Rating**
>70	>70	>70	>35	35-100	40+	A
>50	>50	>50	>15	15-35	15-40	B
>30	>30	>30	>5	5-15	5-15	C
<30	<30	<30	<5	0-5	0-5	R

The CTLA score ranges and SULE ranges are almost identical. Appraisal theory refers to a final process of *Reconciliation*, where alternative approaches to value are compared to see if there is any supporting congruity in the values derived. Although the units of comparison are not alike, it is a fair assumption that SULE ranges relate to the final 100 year's of a tree's life and are therefore, broadly comparable with percentage ranges. SULE and BS5837 consider primarily how physical deterioration affects remaining value, whereas CTLA considers more evenly, the wider obsolescence. In the end, both systems can apply an equivalent score range to the A-R Categories, but the latter arrives there through a more formal and considered process.

CONCLUSION

When compared to universal appraisal methods, standard (BS5837) tree quality assessments lack their internal coherence: the assessments consider *functional obsolescence* and *physical deterioration* loosely and interchangeably, and under-emphasise *external/economical obsolescence*. Given that planning decisions are economic decisions (e.g. supply of/demand for infrastructure vs. supply of/demand for environmental services), this under-emphasis is a failing of the standard. Greater consideration of external obsolescence could move tree preservation out of the expedient protection of individual trees from immediate threats, towards the sustainable management of population dynamics for the long-term future. In so doing, CTLA methods allow for the consideration of a wider basket of benefits than the purely visual. CTLA methods can further help local authorities achieve the higher end fines for TPO/planning condition violations that have historically eluded them. Although the methods are more intellectually exacting than simpler tree valuation methods, for this very reason, they are capable of withstanding the greater legal scrutiny that high-end fines attract.

BIBLIOGRAPHY

Barrell, J., 1995, Pre-development Tree Assessment. In *Trees and Building Sites*, Watson, G. & Neeley, D., Eds, ISA.

British Standards Institute. 2005. Trees in Relation to Construction BS 5837: 2005 HMSO, London.

Coder, K., 1995, Protecting Residual Trees, presented at the Morton Arboretum June 1995 in "Trees and Building Sites" published by ISA, Gary Watson and Dan Neeley, eds.

Council of Tree & Landscape Appraisers (CTLA), (2000). *Guide for Plant Appraisal, 9th ed.* Champaign, IL, International Society of Arboriculture, 143pp.

Cullen, S. (2000) 'Tree appraisal: what is the trunk formula method (9th ed.)?' Arboricultural Consultant **Summer**, 7-8. Also at http://www.tree-tech.com/reports/index.xhtml (accessed 12 Sept., 2006).

Hollis, A., 2007, Supplemental Guidance Note 1 to CTLA Methods, UKI – Regional Plant Appraisal Committee.

(Hollis, A., 2008a, Can trees be depreciated like plant – a depreciated replacement cost solution to the adjusted trunk formula anomaly in CTLA's Trunk Formula Method, Arboricultural Journal. AB Academic Publishers???????)

(Hollis, A., 2008b, A critical analysis of CTLA's depreciation factors – do inherent inconsistencies of method complicate the simplicity of process?" , Arboricultural Journal. AB Academic Publishers???????)

ISA (2007) Benefits of trees, International Society of Arboriculture, Champaign, IL, USA
IVS Guidance Note 10, Valuation of Agricultural Properties (Revised 2007)

RICS (Royal Institution of Chartered Surveyors). 2006. Valuation Information Paper No 10: The Cost Approach for Financial Reporting. RICS Books, Coventry.