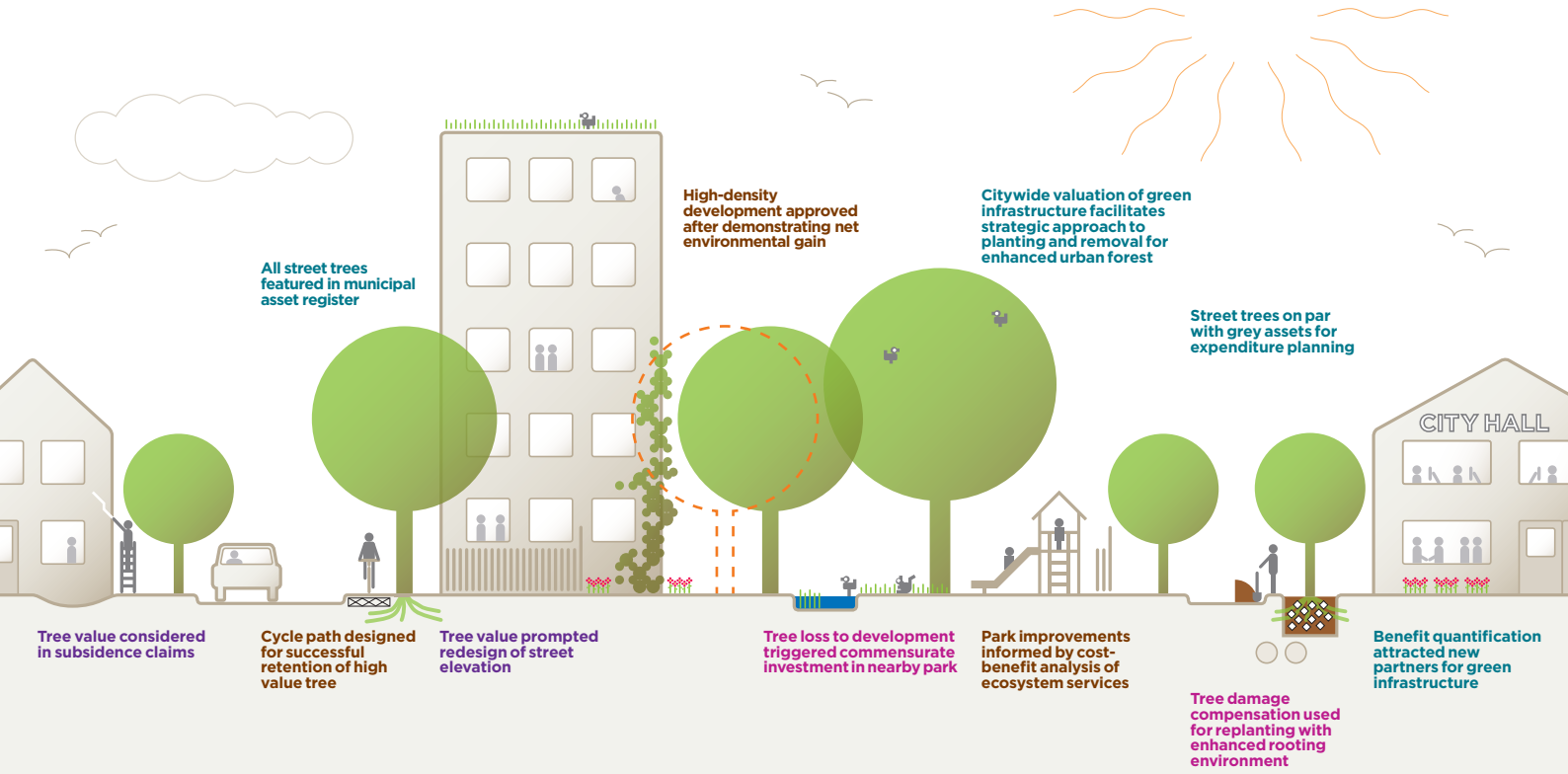
First Steps in Valuing Trees and Green Infrastructure



Protection
Use valuation to foster a balanced assessment of tree removal and deter avoidable loss.

Compensation
Use valuation to secure commensurate payment for removal or damage to public and protected trees.

Design
Use valuation to compare design options and articulate design outcomes to a wider audience.

Management
Use valuation to enhance expenditure planning and collaboration for green infrastructure delivery.

Trees & Design Action Group

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References

1 Terms highlighted in *green italics* are defined in the **Glossary**.

2 For England:
Link

For Northern Ireland:
Link

For Scotland:
Link

For Wales:
Link

3 Office of National Statistics, July 2018. *UK natural capital: ecosystem accounts for urban areas. Statistical Bulletin.*
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4 Hall, C., O'Brien, L. Hand, K., Susanne Raum, S. 2018. *Evaluation of i-Tree Eco surveys in Great Britain. Impacts and key lessons: The views of stakeholders*. Farnham, UK: Forest Research.
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5 Jaluzot, A. and Evison, S. (2016). *i-Tree Eco Wrexham impact assessment 2013-2016.*, Powys, Wales: Resources for Change.

6 UNDP Guidance Note. *Supporting economic valuation initiatives to drive change through Targeted Scenario Analysis*. 2017. New York, NY, USA: United Nations Development Programme.
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7 Natural England, 2013. *Green Infrastructure – Valuation Tools Assessment. Natural England Commissioned Report, NECR126*. London, UK: Natural England.
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8 Costanza, R., d'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J. and Raskin, R.G., 1998. The value of ecosystem services: putting the issues in perspective. *Ecological economics*, 25(1), pp.67-.
Link

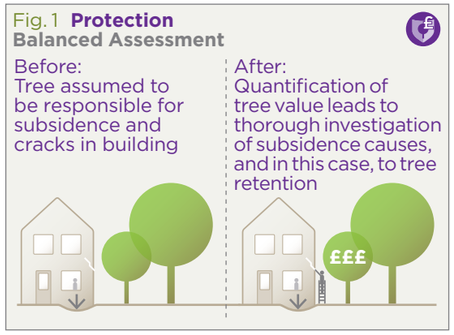
The last 30 years has seen an increasing impetus to ascribe a *monetary value*[1] to trees and other green infrastructure features, and to the services they provide, creating a new field of specialisation in environmental economics. There has been global adoption of new concepts, such as *ecosystems services*, *natural capital*, and *natural capital accounting*, which are reflected in planning policy[2] and statistical reporting[3] throughout the UK There is also an increasing range of practitioner tools to factor the value of green infrastructure through the use of monetary valuation (see Table 1). Despite these trends, the influence of these valuation tools on decision-making has been inconsistent[4,5,6] and the suitability of some tools for use in the UK has been challenged[7]. These uncertainties reduce confidence in the relevance of green infrastructure valuation, or the results of valuation projects. Indeed, as the global environment is indefinitely valuable for the existence of life there is also a broader debate on whether we should place a monetary value on the environment at all[8].

As decisions in our urban areas are often driven by monetary value, valuing green infrastructure assets and their ecosystem services can support decision-making. This introductory guide presents a range of common valuation scenarios and available tools. It describes how to approach valuation to ensure it delivers a change for the better in the way that policy, investment, design and management decisions affect environmental assets. Understanding the purpose of the valuation, and which stakeholders can act on valuation results is critical for success.

Common Valuation Scenarios

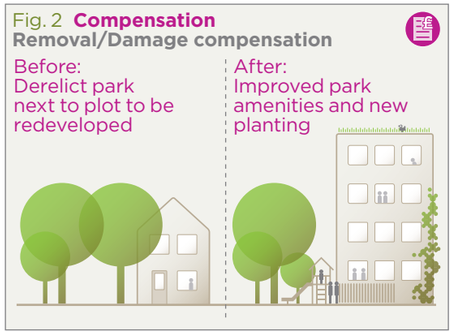
There are four general scenarios where valuing trees and green infrastructure has been shown to deliver good results. These include: achieving greater retention of existing green assets (Fig. 1), securing more commensurate compensation when green assets are compromised or lost (Fig. 2), enhancing design outcomes or how those outcomes are communicated (Fig. 3), and, enabling evidence-based management (Fig. 4).

Fig. 1 **Protection**
Balanced Assessment



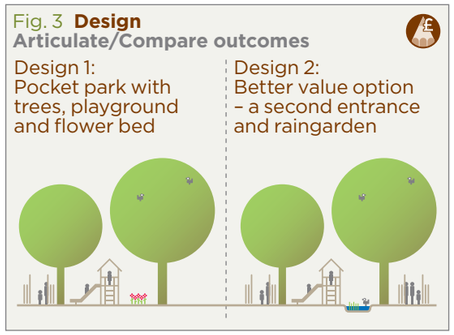
In subsidence cases or other circumstances where tree removal is considered, a tree value allows a more balanced, evidence-based, assessment.

Fig. 2 **Compensation**
Removal/Damage compensation



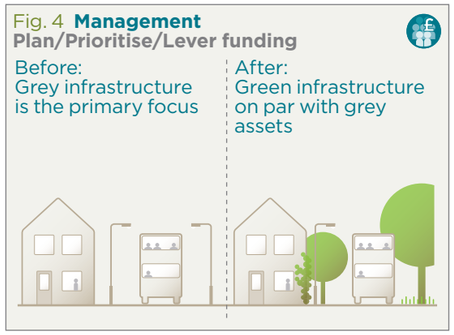
Whether resulting from authorised removal or wilful damage, tree loss prompts commensurate compensation payment, allowing adequate re-investment.

Fig. 3 **Design**
Articulate/Compare outcomes



The valuation results and the associated discussions on the benefits and uses of the proposed design yields insight into the best option and enables evidence-based design.

Fig. 4 **Management**
Plan/Prioritise/Lever funding



Whether by enabling inclusion of green features in asset registers, or providing a common language on returns, valuation brings enhanced expenditure planning and widened collaboration.

Getting Started: the Questions to Ask

Before anything else, consider[9]:

Change objective: Which decisions should the valuation influence?

Audience: Who are the key stakeholders expected to act upon valuation results?

Channels: How will the valuation results reach the target audience, in a way that is compelling for them to take action?

Scope and method: What type of asset is to be valued? Given the timeframe, audience(s), objective(s), and budget of the valuation initiative, what is the best tool? (see Table 1)

Costs, funding and resources: How much time and budget is available? What data is currently held/needed?

Partners: In light of the above, who needs to be involved in the initiative?

Tips for Impactful Valuation

Tip #1 Be specific on the decisions that need to use the valuation results. Spell out in the project brief how and when valuation will need to be used.

Tip #2 Focus on the needs of the most critical audience. Only value what the stakeholders need to know.

Tip #3 Is monetary valuation the most appropriate tool? Narratives offer nuanced and qualitative descriptions that monetary values cannot.

Tip #4 Use all data. The input and output data associated with most tools gives insights into the health or performance of the asset(s) being valued. Recognise this wider potential when recruiting partners.

Tip #5 Take communication seriously. Explaining the valuation results is as important as the numerical output, particularly when longer-term environmental benefits compete with other short-term interests.

Tip #6 Have a 'Champion'. A champion can advocate the valuation process to different stakeholder groups in order to translate valuation results into decisions.

Tip #7 Make it policy. A policy framework mandating action on the economic data will ensure consistent outcomes from valuation.

Tip #8 Get expert input or become familiar with technical guidance (see Other resources). Be wary of technical pitfalls such as *double counting*, ill-applied *benefits transfer*, lack of *sensitivity analysis*, inadequate *discounting*, or poor quality input data.

Table 1 **Tools to consider: a short selection**[10]

	Type of green asset	Valuation objective(s) supported				Strengths	Limitations
Council of Tree and Landscape Appraisers (CTLA) methods More information: Link	Individual trees	•	•			Values trees as private assets, using *cost of equivalent replacement (COR)*. Useful in common law cases and private tree disputes. Provides basis of structural value in i-Tree in USA.	Does not reflect public amenity value, community benefits or ecosystem services. Expert input needed.
Capital Asset Value for Amenity Trees (CAVAT) Full method More information: Link	Individual trees	•	•	•		Values trees as public assets, using *COR* approach. Reflects relative contributions to public amenity. Uses include planning for development and compensation for damaged or destroyed public trees.	Does not reflect value as private asset or directly estimate annual or accrued ecosystem services. Expert input needed.
Capital Asset Value for Amenity Trees (CAVAT) Short method More information: Link	Tree population				•	Values tree populations as public asset, using stripped down *COR* approach. Enables strategic management of public tree stock.	Not suitable for single trees. Expert input not required, but familiarisation with the tool needed.
i-Tree Eco More information: Link	Tree population	•		•	•	Useful to communicate benefits of trees and for strategic management. Includes annual and accrued ecosystems services and structural value based on CTLA (as default) or CAVAT (optional) methods.	Not suitable for single trees, planning for development or for compensation. Many ecosystems services not currently reflected. Expert input needed.
Benefits of SuDS Tool (W045 BeST) More information: Link	Wider range of green assets	•		•	•	Intended for sustainable drainage schemes. Provides assessment across a multiple ecosystems services.	Expert input not required, but familiarisation with the tool needed.
Greenkeeper Available from Sept. 2019. More information: Link	Wider range of green assets	•		•	•	Intended for parks and accessible green spaces. Provides assessment of health, wellbeing, amenity, carbon sequestration and air pollution removal. Easy to use by non-expert.	No user feedback yet available.
Green Infrastructure Valuation Toolkit (GI-VAL) More information: Link	Wider range of green assets	•		•	•	Provides assessment across a multiple ecosystems services. Useful for design.	Expert input not required, but familiarisation with the tool needed.
Natural Capital Planning Tool More information: Link	Wider range of green assets	•		•	•	Provides assessment across a multiple ecosystems services. Easy to use by non-expert. Useful in design and planning contexts.	Outputs are impact scores rather than monetary figures.

References

9 Osterwalder, A. and Pigneur, Y., 2010. *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, NJ, USA: John Wiley & Sons.
Link

10 For more tools, see the Ecosystems Knowledge Network Tool Assessor.
Link

Glossary

Benefits transfer.
The practice of estimating economic values for a service by taking evidence on the value of benefits from one context and transferring it to another (the site target for valuation).

Cost of equivalent replacement (COR).
Cost of replacing a tree, based on costs of buying, planting and establishing a tree, adjusted for different factors such as species, location and conditions.

Discounting.
A method used to convert future costs or benefits to present values using a discount rate.

Double counting.
An error that occurs when costs or benefits are counted twice.

Ecosystems services.
Services provided by the natural environment that benefit people.

Monetary value.
The assessed worth of an asset, good, or service expressed in currency.

Natural capital.
Our natural assets including ecosystems, species, fresh- water, land, minerals, the air and oceans, as well as natural processes and functions.

Natural capital accounting.
The process of recognising and valuing environmental benefits within the accounts produced for an entire organisation or other accounting unit (such as a specific area of land).

Sensitivity analysis.
An analysis used to determine how sensitive the results of a study or systematic review are to changes in parameters.

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11 Doick, K.J., Neilan, C., Jones, G., Allison, A., McDermott, I., Tipping, A. and Haw, R., 2018. CAVAT (Capital Asset Value for Amenity Trees): valuing amenity trees as public assets. *Arboricultural Journal*, 40(2), pp.67-91. Link

12 Rumble, H., Rogers, K., Doick., K and Hutchings, T., 2015. *Assessing the Ecosystem Services of Wrexham's Urban Trees: A Technical Report*. Farnham, UK: Forest Research. Link

13 Hölzinger, O. and Grayson, N., 2016. *Natural Capital Planning Tool (NCPT) Case Study Report Langley Sustainable Urban Extension (SUE)*. Link

14 Mersey Forest, 2011. *Wirral Waters Indicative Economic Assessment*. Link

15 See pp. 36 in: TDAG, 2014. *Trees in Hard Landscapes: A Guide for Delivery*. London, UK: TDAG. Link

Other resources

Natural England, 2016. *Putting economic values on green infrastructure improvements (EIN022)*. London: Natural England. Link

Presentations from Valuing Trees and Green Infrastructure Workshop, 19/09/18, University of Birmingham, UK. Link

Victoria Institute of Strategic Economic Studies (VISES), 2015. *Green Infrastructure Economic Framework*. Victoria University, Melbourne. Link

Guidance document produced by TDAG and the Birmingham Institute of Forest Research and the School of Geography, Earth, and Environmental Sciences of the University of Birmingham in 2019. Funded under NERC KE Fellowship MEDIATE (NE/N005325/1).

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Case studies

Elephant Park, Southwark

CAVAT protected 30% of existing trees and enabled new planting of over 350 onsite and 900 offsite trees, resulting in an award winning development.

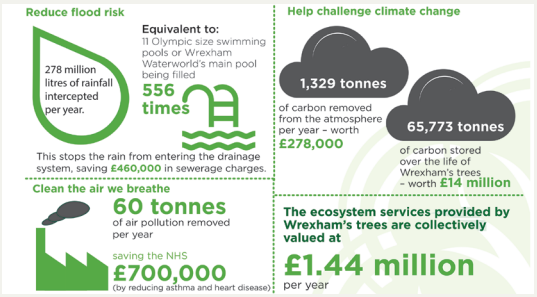
- The CAVAT full method[11] calculates a compensation replacement value for tree(s) derived from public amenity, accessibility, tree size, appropriateness, and life expectancy.
- Originally, all 406 mature trees at Elephant Park were to be felled for development. Following a CAVAT valuation from a community group, and advocacy from an environmental consultant (champion) who communicated the benefits of a new development within a 40-year old landscape, Lendlease (the developer) agreed to exceed the CAVAT value (by development end date) by five percent.
- Having a CAVAT value led to innovative design and construction in order to protect large trees despite complex building and demolition onsite. The approach also delivered tree planting throughout the borough, not just on the development site.

Retained and newly planted trees at Elephant Park.
Image: Luke Fay

Wrexham County Borough Council

An i-Tree Eco Study valued ecosystem services at £1.44m/year, and informed a new Tree Strategy, yielding increased resources for urban trees.

- i-Tree Eco monetises tree ecosystem services and develops a database of tree resources within an area to enable evidence-based decision-making.
- The i-Tree Eco Study[12] enhanced the understanding of the benefits of urban trees amongst Wrexham County Borough Council (WCBC) planners, sustainability specialists, and elected members, and increased the profile of i-Tree Eco and WCBC in professional practice.
- The robust approach and quantified benefits enlisted executive level support of the new Tree Strategy. This ensured a tree officer post within the planning team was maintained, and secured a budget for tree management that enabled more extensive and diverse planting than previously.
- It also shaped the approach to incorporating trees within Local Development Plans.

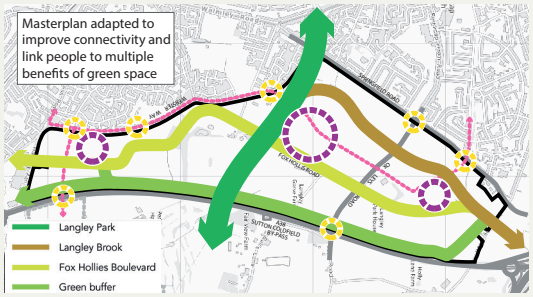


Extract from I-Tree Eco findings for Wrexham.
Image: Natural Resources Wales

Langley Sustainable Urban Extension (SUE), NE Birmingham

NCPT changed the masterplan for this politically sensitive former green belt development for <6,000-homes[13].

- The NCPT evaluates the impact of proposed plans using readily available data. It calculates a development score derived from ten *ecosystem services* over a 25-year period.
- Applying the NCPT to the original masterplan showed it delivered a net *natural capital* loss due to reduced agricultural productivity and limited benefits for local residents. This led to comprehensive revisions reflected in the Langley SUE Supplementary Planning Document.
- The NCPT showed that the site needed better connectivity to link people to the benefits and deliver multiple services in each location, rather than more green space.
- This experience fundamentally changed the local planners and applicant's view of the green infrastructure potential for the site. It also is informing other major developments in Birmingham.



Vision for Langley SUE
Image: Birmingham City Council

Wirral Waters, NW England

GI-VAL convinced the developer of the benefits of green infrastructure, enabling early investment in trees on the biggest development site in Europe.

- GI-Val collates a series of tools to evaluate the economic benefits of an existing or proposed green investment, including changes to land property values, tourism, and economic growth.
- On the Wirral Waters development, GI-Val showed that for an initial investment of £2m, green infrastructure could contribute £12.7m of gross value added and £16.7m of other economic benefits[14].
- This convinced the developer to commit early investment in green infrastructure, which secured regeneration and transport funding for large scale tree planting[15] and for the temporary and permanent greening of some sites.
- The green infrastructure investment was considered fundamental in kick-starting the development process, showing early progress to stakeholders, adding immediate value, and attracting further investment.

Planting ahead of development in Wirral.
Image: The Mersey Forest