

March 2022

Valuing green infrastructure and public spaces

What is green infrastructure?

Green infrastructure is a network of green spaces, natural systems, and semi-natural systems that supports sustainable communities. This network includes waterways, bushland, tree canopy and green ground cover, parks and open spaces that are strategically planned, designed, and managed to support a good quality of life in an urban environment.

What are public spaces?

Public spaces are all places that are publicly owned or of public use, accessible and enjoyable by all free of charge and without a profit motive. These include:

- **public open spaces:** active and passive (including parks, gardens, playgrounds, public beaches, riverbanks and waterfronts, outdoor playing fields and courts, and publicly accessible bushland)
- **public facilities:** public libraries, museums, galleries, civic/community centres, showgrounds and indoor public sports facilities
- **streets:** streets, avenues and boulevards, squares and plazas, pavements, passages and lanes, and bicycle paths.

What is the purpose of this project?

Green infrastructure and public spaces provide social, economic, cultural and environmental benefits to the NSW community. They are also vital to the provision and maintenance of biodiversity in urban areas, mitigating urban heat island effects and increasing resilience to climate change.

These benefits are not easily quantified, documented or evidenced in government decisions compared to those associated with other types of infrastructure.

What will the project deliver?

The project will develop a sector-specific framework (the framework) for valuing green infrastructure and public spaces. The final product will sit as a companion to the NSW Government's [Guide to Cost-Benefit Analysis](#). It is an important step towards quantifying the benefits of green infrastructure and public spaces to ensure benefits are integrated into capital project business cases and decision-making within government.

What will the framework include?

The framework will provide a robust, repeatable and reliable approach to valuing green infrastructure and public spaces. It will guide practitioners in developing cost-benefit analysis for projects where components of green infrastructure and public spaces are involved. The framework will include guidance on:

- asset categories
- common benefit types

Frequently asked questions

- methods to value these benefits
- guidance on applying methods
- some parameter values
- guidance on application through benefits transfer.

Who will use the framework?

The framework, once endorsed by NSW Treasury, will be a public document that can be used by NSW Government agencies to value green infrastructure and public spaces in their business cases.

What has been completed so far?

Desktop studies

The NSW Department of Planning and Environment commissioned three desktop studies:

1. Frontier Economics (2020) *Valuing the benefits of green infrastructure for future generations*
2. Deloitte (2020) *The economic value of public spaces.*
3. Deloitte (2021) *Review of public space benefits*

These studies identified existing models or valuation methods that other jurisdictions, in Australia and internationally, are using. The studies also identified some preliminary transferable benefits and conducted a gap analysis, based on a literature review, to determine the potential for other benefits to be explored.

Stakeholder consultation

- **November 2020 – March 2021:** An internal working group with practitioners and subject matter experts from the cluster was formed. This included Environment, Energy and Science, Government Architect NSW, Crown Lands, Housing and Property, Office of Strategic Lands, Place-Based Infrastructure, Sydney Olympic Park Authority, Water Utilities. Through workshops, the working group shared their knowledge and experience of existing models or valuation methods and started building an evidence bank that could be included in the framework.
- **August – September 2021:** We held meetings with experts from other NSW Government and Australian Government agencies, overseas governments and academia. They include NSW Treasury, NSW Ministry of Health, Create NSW, Infrastructure Australia, Infrastructure NSW, Transport for NSW, Department of Premier & Cabinet, Department of Education, Office of Sport, Commonwealth Scientific and Industrial Research Organisation (CSIRO), New Zealand Treasury, United Kingdom's Her Majesty Treasury, United Kingdom Department for Environment Food & Rural Affairs, University of Western Sydney, University of Western Australia, Griffith University, University of Melbourne, and University of Sydney.
- **October 2021:** We held a virtual roundtable event where leading economists and policy makers explored innovative valuation and policy approaches that capture the benefits of green infrastructure and public spaces.

What project work is currently underway?

The following pieces of work are currently underway:

- **the green infrastructure and public spaces sector-specific valuation framework**, this document will accompany the NSW Guide to Cost-Benefit Analysis. An interim framework is being trialled
- **a choice modelling study (willingness to pay study)**, to generate parameter values for green infrastructure and public spaces in NSW to be used in cost-benefit analysis
- **ongoing stakeholder engagement**, the team continues to engage with experts from other jurisdictions and academia to ensure all work is best practice.

When will the framework be finalised?

An interim version of the framework is available on the [department's website](#) on a trial basis for use and testing by the department only. Feedback received from applying the interim framework will be used to refine the final framework.

Definitions

Table 1. Key terminology

| Term | Definition |
|-----------------------|---|
| Amenity value | Characteristics that influence and enhance people's appreciation of a particular area. The idea that something has worth because of the pleasant feelings it generates to those who use or view it. |
| Base case | The scenario against which proposals are compared, and which shows baseline projections of costs and benefits 'without' the project or program. It is generally a 'business as usual' or 'no policy change' case, that is retaining the status quo. |
| Benefits | Increases in social wellbeing. |
| Benefit transfer | A method of estimating benefit based on the use of findings of previous studies on similar projects or initiatives. Commonly used for valuing health or environmental impacts for cost-benefit analysis. |
| Consumer surplus | The difference between the maximum amount that consumers are willing to pay and the actual amount they pay. |
| Contingent valuation | A survey method to place a value on a non-market good, contingent on it being available. Willingness to pay for (or willingness to accept payment for damage to or reduction of) a good or service is treated as a proxy of the value of the good or service. |
| Cost-benefit analysis | An evidence-based method to appraise and evaluate initiatives. It helps government understand economic, social and environmental impacts of policies and projects. |

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Frequently asked questions

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| Choice modelling | Model the decision process of an individual or segment via revealed preferences or stated preferences made in a particular context or contexts. Typically, it attempts to use discrete choice (A over B; B over A, B and C) in order to infer positions of the items (A, B and C). |
| Cultural services | One of the 4 categories of ecosystem services. It includes spiritual and religious values, knowledge system, sense of place, education and inspiration, recreation and aesthetic values. |
| Direct-use value | Obtained through a removable product in nature, such as food, fuel or recreation. |
| Economic valuation | The value that person places on a good or service based on the benefit that they derive from the good or service. |
| Ecosystem services | The benefits provided to humans through the transformations of resources (or environmental assets, including land, water, vegetation and atmosphere) into a flow of essential goods and services. Four categories of ecosystem services are: Provisioning services, Cultural services, supporting services, and Regulating services. |
| Existence value | Places or a resource that will never be used by current individuals, derived from the value of satisfaction from preserving a natural environment or a historic environment for future generations. |
| Hedonic pricing method | This approach uses the value of a surrogate good or service to measure the implicit price of a non-market good. For example, house prices can be used to provide a value of environmental attributes. |
| Indirect-use value | Obtained through a non-removable product in nature, such as flood control, pollination, and pest control |
| Marginal benefit | The benefit accruing to society from the production of an additional unit of a good or service. |
| Market valuation | The value of an asset that would be paid for with its market price. |
| Non-market valuation | The value of an asset that could not be easily valued through observed prices in the market place. These types of goods and services are typically not traded in markets. Non-market valuation includes revealed preference methods and stated preference methods. |
| Non-use value | Values for existence of the natural resource. |
| Option value | Placed on the potential future ability to use a resource, even though it is not currently used, and the likelihood of future use is very low. This reflects the willingness to preserve an option for potential future use. |
| Parameter value | Standard parameters to estimate costs and benefits of project of a similar nature. |

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| Public facilities | One of the 3 typologies of public space. It includes public libraries, museums, galleries, civic/community centres, showgrounds and indoor public sports facilities. |
| Public open space | One of the 3 typologies of public space. It can be active and passive space such as parks, gardens, playgrounds, public beaches, riverbanks and waterfronts, outdoor playing fields and courts, and publicly accessible bushland. |
| Provisioning services | One of the 4 categories of ecosystem services. It includes food, fuel, fibre, genetic resources, nutrients, fresh water. |
| Revealed preference | Choices that individuals have actually made (rather than what they stated that they would make). |
| Regulating services | One of the 4 categories of ecosystem services. It includes invasion resistance, pollination, climate regulation, disease regulation, natural hazard protection, water purification, herbivory, seed dispersal, pest regulation, erosion regulation. |
| Stated preference | Users' response to hypothetical situations. |
| Streets | One of the 3 typologies of public space. It includes streets, avenues and boulevards, squares and plazas, pavements, passages and lanes, and bicycle paths. |
| Supporting services | One of the 4 categories of ecosystem services. It includes primary production, provision of habitat, nutrient cycling, soil formation and retention, production of oxygen, water cycling. |
| Total economic value | A concept in cost-benefit analysis that refers to the value derived by people from a natural resource, a heritage resource made by humans or an infrastructure system, compared to not having it. |
| Tree canopy | The layer of leaves, branches, and stems of trees that covers the ground when viewed from above. |
| Waterways | Either constructed or natural waterbodies including rivers, creeks, ponds, lakes, wetlands, bays, and harbours where a significant part of their catchment either comes from or flows through urban areas. |
| Willingness to pay | The maximum amount a person or business would be willing to pay in order to consume a good or service. |