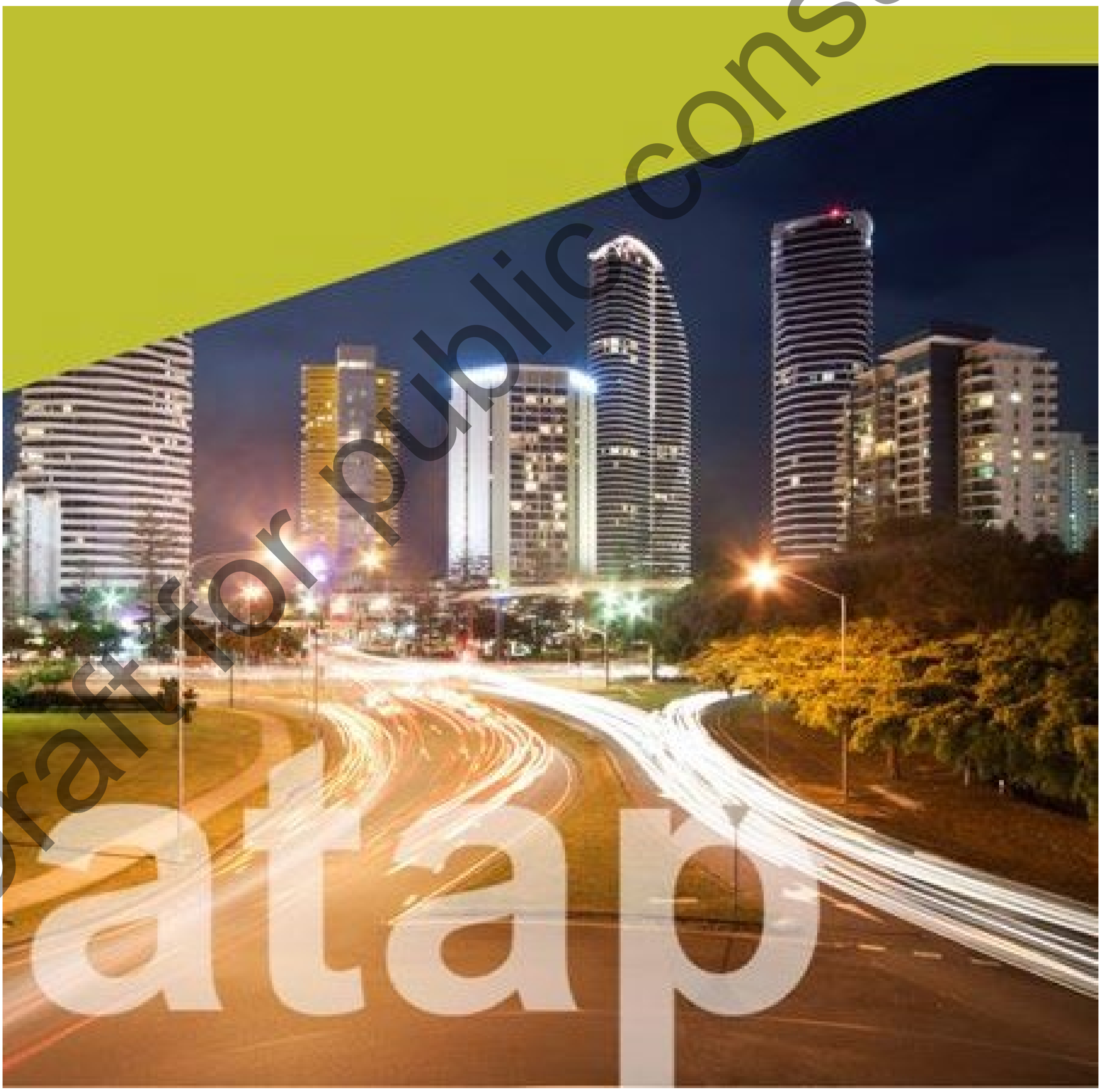
INFRASTRUCTURE AND TRANSPORT MINISTERS

Australian Transport Assessment and Planning Guidelines

Valuing Place Effects

October 2024 (v2.3)



ISBN XXX

October 2024

The contributions of the following people in the development of this report are acknowledged:

WSP: xxx

ATAP project team: Matthew Jones, Baojin Wang, Daniel Taylor, Peter Tisato, Alban Pinz, Ed McGeehan, Mark O'Reilly, Roshni Reddy, Sandy Fong

Reviewers of drafts

Members of the ATAP Steering Committee: Georgia O'Cianian, Marcia Keegan, Gilbert Ortiz, Mark Harvey, Andreas Bleich, (Australian Government), Hamish Barnet, Jennifer Jenkins, Mark O'Reilly, David Tucker (Infrastructure Australia), Alban Pinz, Josh Adams, Kieron Dauth (QLD), Matthew Jones, Baojin Wang (NSW), Tim Wyatt, Justinieta Balberona (ACT), Tim Bryant, Ed McGeehan (VIC), Danielle Hofman (TAS), Aaron Bell (SA), Des Lock, Yohana Adams (WA), Jo Cruickshank (NT), Sandy Fong (NZ), Amu Naulls (Austroads), Peter Tisato (Technical Coordinator).

Contact us

This publication was prepared by the Australian Transport Assessment and Planning (ATAP) Steering Committee and approved by the Infrastructure and Transport Senior Officials' Committee (ITSOC). The Committees cannot accept responsibility for any consequences arising from the use of this information. Readers should rely on their own skill and judgment when applying any information or analysis to particular issues or circumstances.

This publication is available in PDF format. All other rights are reserved, including in relation to any Departmental logos or trademarks which may exist. For enquiries regarding the licence and any use of this publication, please contact:

ATAP Steering Committee Secretariat

Australian Transport Assessment and Planning Guidelines

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

GPO Box 594

Canberra ACT 2601

Australia

Email: atap@infrastructure.gov.au

Website: atap.gov.au

Contents

Figures

Tables

Table of Abbreviations

Term	Abbreviation
Active Transport (walking and cycling)	AT
Carbon Dioxide	CO_2
Crash Reduction Factors	CRFs
Cost Benefit Analysis	CBA
Central Business District	CBD
Greenhouse Gas	GHG
Hydrofluorocarbons	HFCs
Integrated Land Use and Transport Planning	ILUTP
Landscape and Visual Impact Assessment	LVIA
Methane	CH_4
Nitrous Oxide	N_2O
Pedestrian Environment Review System	PERS
Perfluorocarbons	PFCs
Public Transport	PT
Sulphur Hexafluoride	SF_6
Transport for NSW	TfNSW
Urban Amenity in Pedestrian Environments	UAPE
Value Assessment System for Place	VASP
Valuing the Urban Realm Toolkit	VURT
Wider Economic Benefits	WEBs
Willingness to Pay	WTP

At a glance

- This guidance identifies place-related impacts that should be accounted for in the assessment of transport initiatives (policies, plans and projects), and provides methodologies and parameter values for assessing those impacts.
- To ensure all the impacts of transport initiatives are captured, place needs to be defined as all the spatial areas that are affected by the initiative. This includes private spaces, which are affected by the noise and pollution generated by transport, as well as public spaces that are publicly owned or of public use, accessible and enjoyable by all members of the community ~~for free~~.
- In the context of transport initiative assessment, Place encompasses spatial areas, routes or locations in urban areas that are used in daily life, especially streets. These are areas where there is human activity, used by both transport customers who interact with the public realm (e.g. alighting a bus) and other users who interact with the public realm (e.g. sitting in the public space or footpath, walking for leisure, or working and living in the neighbourhood).
- Because of their interrelated nature — where transport both serves Places and passes through or near them — most transport projects will have some interaction with Place. For this reason, Place-related impacts should be incorporated into transport initiative appraisals for both their benefits and disbenefits. Wherever feasible, they are monetised so they can be included in the cost-benefit analyses (CBA).
- This document expands the ATAP framework of benefits (and disbenefits) by introducing missing Place-related impacts for inclusion into the appraisal of transport initiatives. It supplements other ATAP Guidelines and aims to offer a holistic approach to evaluating both movement and Place outcomes in project appraisal without double counting. However, practitioners should maintain care to ensure correct application of this and other ATAP guidance and be aware of the double counting risks.
- This guidance is structured to explore how transport impacts Place, with subsequent chapters dedicated to specific valuation tools and methods, addressing urban amenity, access, green and blue infrastructure, the perception of safety and security, and case studies to demonstrate application of the benefits.

1. Introduction

1.1 Background

There is increasing emphasis on recognising and monetising Place-related impacts of transport initiatives (policies, plans and projects), and incorporating them into in their appraisal and the associated cost benefit analysis (CBA). This recognises the broader impacts of transport initiatives and represents the shift towards balancing both Movement and Place functions. Establishing comprehensive guidelines and parameters for valuing Place-related outcomes enables a more accurate assessment of the full benefits and disbenefits that transport initiatives bring, and facilitates more effective appraisal and prioritisation.

This document (ATAP **Part O10**) provides guidance on recognising Place outcomes, both benefits and disbenefits, and including them in the appraisal of transport initiatives. It complements other components of the ATAP Guidelines, applying the ATAP principles, framework, and methodologies to Place outcomes. The material will assist practitioners in planning, assessing, and developing transport initiatives.

This guidance is intentionally limited to Place outcomes which may be associated with transport initiatives, with specific focus on urban environments (see definition of Place in chapter 2). For initiatives that involve broader place outcomes not covered by this guidance, readers should seek to develop appropriate value estimates based on guidance from respective state, territory, or national bodies. For initiatives involving Place outcomes in non-urban areas, practitioners may adapt the principles in this guidance and scale benefits for the initiative as appropriate.

Figure 1-1 George St, Sydney, NSW Light Rail with outdoor seating and space

1.2 Links to other parts of the Guidelines

This guidance complements other parts of the ATAP Guidelines by specifically focusing on recognising and valuating Place effects. Table 1-1 outlines the linkages with other parts of the ATAP guidelines.

Table 1-1 Linkages to other ATAP documents

Document	Description of overlap/links
F0.2 – Integrated transport & land use planning	F0.2 contains guidance for practitioners of integrated transport and land use planning (ITLUP), which addresses a city's or region's longer-term challenges, working to a shared vision of what that city or region aspires to be in the future, and coordinating investments and policy decisions to achieve that vision in an optimal manner.
M4-Active Travel	**M4** focuses on providing guidance for active travel modes, encompassing walking, cycling and other micro-mobility modes of transport. The guidance here in O10 expands on **M4** by addressing the health benefits derived from the transformation of street spaces into recreational spaces where people might walk or exercise for recreation. It introduces a visitation-based model that quantifies benefits per visitor, capturing health improvements not directly linked to transport, such as physical health benefits from exercise facilities or mental health benefits from social spaces.
O3- Urban Amenity and Liveability	**O3** provides guidance on assessing urban amenity and liveability in transport planning, which includes a wide range of aspects such as Place quality, aesthetics, design, and support for quality of life. It offers monetised parameters for noise and urban separation, non-market methods for monetising urban amenity and liveability, and when monetisation isn't possible, it provides a non-monetised quantification of amenity and liveability values. Urban amenity and placemaking are interconnected concepts that focus on enhancing the quality of life and well-being of communities. Given this, overlaps may exist with O10 guidance, particularly in chapters 5 (amenity and use), 6 (access and connection), 7.4 (noise), 8 (character and design), and 9 (safety and security).
O8- Land-use benefits	**O8** focuses on estimating the land-use benefits of transport initiatives. Transport infrastructure can impact land use, and lead to additional benefits beyond those traditionally considered. This may include higher value land use, secondary transport benefits, sustainability improvements and public health savings. No new guidance is provided here in O10, just cross-references to O8.
T2- Cost Benefit Analysis	**T2** provides a structured approach for the appraisal and prioritisation of transport initiatives using CBA. It includes initiative specification, benefits and costs identification, expenses estimation, demand forecasting, user benefits evaluation, cross-modal and safety effects assessment, externalities consideration, discounting, risks assessment, and analysis adjustment. The O10 guidance and parameter values align with **T2** principles and should be used holistically to avoid double counting of benefits and ensure robust economic estimation.
T3- Wider Economic Benefits	**T3** provides guidance on considering Wider Economic Benefits (WEBs) in transport initiative appraisals, capturing benefits beyond traditional CBA. It focuses on four WEBs: • Agglomeration economies **(WB1**): Productivity benefits from proximity, like in a central business district. • Labour Market and Tax Impacts **(WB2)**: Shifts in perceived work returns due to transport cost changes, leading to more productive job shifts. • Output change in imperfectly competitive markets **(WB3)**: Increased production in transport-dependent goods or services due to reduced transport costs. • Change in competition **(WB4):** Improved transport links bringing outside competition, enhancing efficiency and consumer service, especially in rural areas. Place outcomes may contribute to WEBs. No new guidance is provided here in O10, just cross-references to O8.
PV5 – Environmental Parameter Values	**PV5** provides environmental unit costs of transport initiatives across eight impact categories, including air pollution, greenhouse gas (GHG) emissions, and noise pollution. It provides parameter values for various transport modes in both urban and rural settings. Separately, this O10 document discusses the environmental benefits of green and blue infrastructure in section 7.3, focusing particularly on the effects of tree addition or removal on GHG sequestration, urban cooling, and air pollution.

1.3 Structure of this guidance

The guidance provides a suite of options for assessing Place-related impacts. Practitioners should select the most appropriate method depending on the context, scale and type of initiative, and the information available. Options include:

Table 1-2 Summary of Place valuation methods

Type	Place valuation method	Section
General valuation approaches and tools	Value Assessment System for Place (VASP) Pedestrian Environment System Review (PERS) Urban Amenity in Pedestrian Environments (UAPE)	4.1 4.2 4.3
Amenity and use	Use value (recreational benefits) Use value (health benefits)	5.1 5.2
Access and connection	Urban severance Active Transport (M4)	6.1 6.2
Green and blue infrastructure	Urban cooling Air quality GHG sequestration Noise	7.1 7.2 7.3 7.4
Character and form	Cultural and heritage value Visual interest and impact Land use benefits	8.1 8.2 8.3
Safety and security	Covered in other guidance	9.0

This document follows the structure outlined below:

- **Chapter 2** defines the concept of Place in the context of transport initiatives, explores how transport impacts Place, and discusses the challenges of quantifying and valuing (monetising) these impacts in a CBA.
- **Chapter 3** introduces Place-related benefits (and disbenefits) for inclusion in the ATAP benefits framework, laying the foundation for subsequent chapters in the report. It also discusses how the benefits should be applied and how to avoid potential double counting of impacts.
- **Chapter 4** outlines general valuation approaches and tools for Place outcomes, focusing on Value Assessment System for Place (VASP), Pedestrian Environment Review System (PERS), and Urban Amenity in Pedestrian Environments (UAPE).
- **Chapter 5** discusses the valuation of improvements to amenity and use in urban spaces, focusing on the value of stay time, recreational use benefits, and health benefits.
- **Chapter 6** provides guidance on valuing access and connection including urban severance and active transport benefits.
- **Chapter 7** covers the valuation of green and blue infrastructure benefits including GHG sequestration, urban cooling, air quality improvements, and noise reduction.
- **Chapter 8** provides guidance on the valuation of character and form of a Place, including cultural and heritage value, and visual interest.
- **Chapter 9** addresses the perception of safety and personal security, and its impacts on behavioural demand.
- **Chapter 10** notes other relevant considerations for assessing Place: social impact; First Nations considerations; distributional and equity effects.

2. Place

2.1 What is Place?

All the impacts that a transport initiative has on spatial areas need to be accounted for in an appraisal. For this guidance, place is therefore defined as all public and private spaces of the spatial area impacted by a transport initiative.

'Public spaces are all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive' (UN Habitat, 2019). Streets are the public spaces that are often used the most intensely in people's daily lives and comprise a significant portion of public space in Australia's urban areas. The impact of transport initiatives on streets and Place is therefore significant.

Appendix A provides a full discussion of possible aspects of place. For assessing transport initiatives, we can think of Place as:

- Related to a **spatial area**, route or location and can be defined by paths, edges, spaces, nodes, precincts, landmarks, and
- Where there is a reasonable volume of **human activity,** and
- Where there may be **users of the space** who are not transport customers. For example, they may be sitting in the public space or footpath, walking for leisure, or working and living in the neighbourhood, and/or
- Where transport customers **interact with the public realm**. For example, bus customers who alight from the bus in that location, rather than remaining in the vehicle and passing all the way through; or people who are walking and cycling who can readily stop.
- Including private spaces (e.g. houses, buildings), in order to account for noise and pollution impacts on transport initiatives on the people living and working in the impacted spatial area.
- By contradistinction a spatial area that is only accessible to transport 'customers' (in a vehicle or paying to use a space) is not a 'place' for the purposes of this guidance.

  * *Professional judgment is required about what is a reasonable volume of human activity – rural roads outside towns for example would generally not be included, even if an occasional cyclist uses that road. As a rule of thumb, areas with greater than 200 people are classified as 'localities' by ABS and should be considered.*

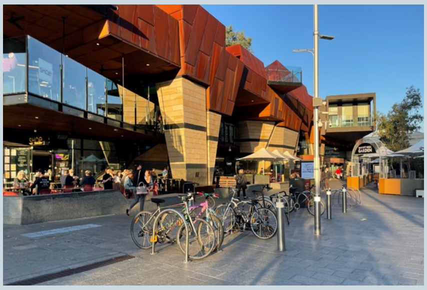
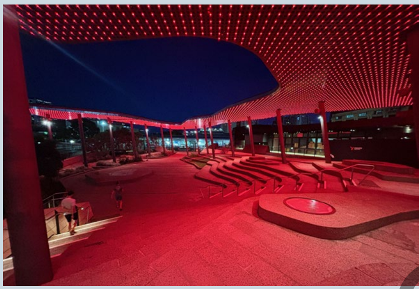
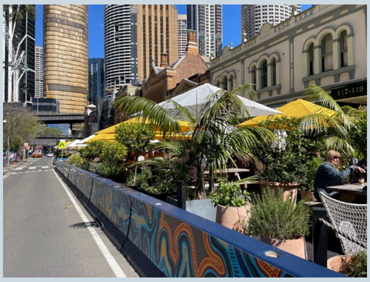
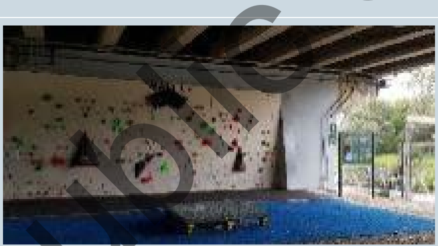
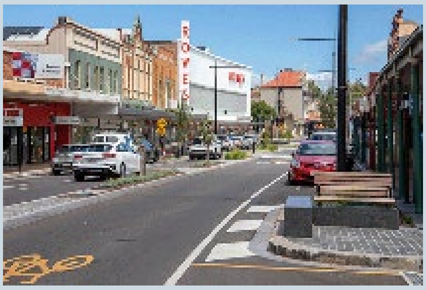
2.2 Transport's impact on Place

A key challenge in urban and transport planning is to balance the efficient movement of people and goods with the ongoing operation and use of accessible and attractive public spaces. Streets and associated transport systems need to meet transport demand while also serving as public realms that encourage social interaction and community engagement.

Most transport initiatives will have some interaction with Place, even where no Place benefits are specifically targeted, because Place impacts may occur. Assessments of transport initiatives should consistently recognise and monetise the impact of interactions with Place, both during construction and post-opening, as a component of their impacts. Consistently and accurately valuing Place effects/impacts will enable a more accurate assessment of the full benefits and disbenefits associated with transport initiatives, resulting in better appraisal and prioritisation.

In many cases, transport initiatives create new or enhanced Places. Table 2-1 on the following page illustrates examples of transport projects in Australia that have delivered new or improved Places. These examples range from large scale precincts to short term activations, reallocations of road space, and minor interventions such as widened footpaths. Additional examples and case studies are illustrated throughout this document.

Table 2-1 Examples of transport projects that have delivered new or enhanced Places

Example	
Perth CityLink, WA A train track was relocated underground, and 13.5 hectares of land created for Yagan Square at ground level. The project created new public open space including an outdoor amphitheatre and removed severance between the CBD and Northbridge district.	 
The Rocks, Sydney, NSW Conversion of traffic lanes to outdoor dining in the CBD. **McKeown St, Maroubra, NSW** Permanent closure of street to traffic, replaced by play equipment, seating and markets.	 
Streets as Shared Spaces, NSW The NSW Streets as Shared Spaces Program (Transport for NSW, 2022) funded around 90 projects to convert street space into places for people including trial activations, widened footpaths, outdoor dining, and traffic calming (Wijayaranta, et al., 2022).	 
Bouldering Wall, CityLink, VIC Burnley bouldering wall located under the M1 freeway. **Basketball courts, Sky Rail, Melbourne, VIC** Place spaces created under the Sky Rail. Image: Peter Bennetts Photography.	 
Pitt Street, Sydney CBD, NSW Parking and traffic lanes were converted to a bi-directional cycleway and widened footpath that is used for outdoor dining, seating and vegetation.	
Russell Street Refresh, Toowoomba, QLD Traffic calming and speed limit changes to change road user behaviour and make cycling safer and more comfortable, including new benches, build-outs, tree planting and courtesy crossings.	 

2.3 Consideration during transport planning and appraisal

Where Place impacts are expected to be material, the assessment of a transport initiative should account for Place-related costs and benefits in accordance with this Guide. This applies to all transport projects, irrespective of whether they occur in, or pass through or near, town centres and suburbs. Place attributes should be included in their base case, and then measure the change in those attributes in project cases to determine whether there are impacts (refer to 3.2.1 below).

Where a place-based program exists in a jurisdiction, also incorporate integrated decision-making as recommended by the Infrastructure Australia framework (Infrastructure Australia, 2021).

For more guidance on materiality, refer to section 2.3.3 below.

2.3.1 Place disbenefits

A persistent criticism of standard transport assessment has been that the negative impacts on Place associated with some transport projects have been overlooked. Table 2-2 outlines types of negative impacts on Place that may be experienced during and after the construction of a transport project.

A Place may experience significant detrimental impacts during and immediately after the construction phase, and it is important to consider:

- Temporary impacts such as loss of trade due to diverted traffic and changes to visual amenity.
- Longer-term impacts, such as the removal of mature trees, the slow growth of newly planted juvenile trees, and the associated effects on providing tree canopy to the local area, as these aspects take time to restore to or above their original state.

Table 2-2 Examples of negative impacts or disbenefits on Place

Quantifiable Impacts on Place	Construction Phase Impact	Operation Phase Impact
Severance	Temporary severance, diversions.	Severance from accessing destinations due to changes in transport infrastructure (e.g. a new rail line or motorway) or changes in traffic flows.
Road safety (for pedestrian, bicycle rider)	Loss of facilities (e.g. temporary footpath closures, loss of buffers, limited wayfinding)	Reduction in safety due to increase in traffic volume or speed.
Increased noise, reduced air quality	Noise and dust impact on communities and street-based economic activity (e.g. outdoor dining)	Reduction of people using or accessing a Place, and reduced street-based economic activity due to traffic noise and pollution.
Forgone walking and cycling opportunities	Walking and cycling benefits foregone.	Walking and cycling benefits foregone because of the project (e.g. shifting modes into driving or forgoing walking and cycling trips due to reduced access or amenity).
Reductions in tree canopy	Loss of urban cooling, shading and aesthetic benefits due to loss of trees.	Diminution of urban cooling, shading and aesthetic benefits until mature tree canopy is achieved, which may take several years.
Local economy	Loss of trade due to reduced access, amenity, visibility, and loss of employment.	Loss of trade and loss of employment.
Decreases in land value	Temporary sterilisation of land fronting the project.	Opportunity cost of land for other purposes. Permanent impact on bequest value of construction sites due to the destruction of a legacy, such as the removal of significant trees, or community-led bush regeneration.

Adverse visual impact	Visual impact of hoarding, fencing, light pollution / intrusion – (see Section 8.2 and Table 8-4 for a valuation method of these impacts, per person per month)	Permanent visual impact of new infrastructure on 'receptors', such as a flyover near houses. This is typically dealt with through a LVIA with impacts mitigated by design, rather than through quantification.
Cumulative impact	Cumulative Place impacts of multiple or sequential projects.	Cumulative impacts of multiple projects in and around the same Place.

Note: While the above examples are provided as disbenefits for illustrative purposes, projects could also be designed to create opposite positive impacts each of these areas leading to benefits instead of disbenefits.

2.3.2 Place benefits

In some cases, transport initiatives may include the development of infrastructure or facilities for public use where there are recreational or amenity Place-based benefits that are not directly related to transport or movement functions. While these may involve large 'city shaping' benefits or creation of major open space, a range of smaller Place benefits can also result. Examples of interventions, ordered from large to modest, are outlined in Table 2-3, with some of these examples illustrated in Table 2-1.

Table 2-3 Examples of positive impacts on Place delivered by transport initiatives

Examples of Place Benefits	Provision of Place	Examples
New community facility or public open space	Outdoor plazas, sports courts, exercise equipment and facilities (e.g., skate ramps, BMX pump tracks, climbing walls, outdoor gyms), playgrounds and parks. These may be located above, below, or adjacent to train lines, motorways, arterial roads, bridges, and tunnels.	The Rozelle Parklands in Sydney restored 10 hectares of former railway yards into public space adjacent to a new motorway interchange, with parks, playgrounds, and community facilities. See also *Perth CityLink; bouldering wall in Yarra; basketball courts under the Skyrail in Melbourne*.
Road space reallocation to a Place for recreation	Conversion of on-street parking bays, traffic lanes, or closing whole sections of a street to outdoor seating, play areas, outdoor dining, and parks.	See *Streets as Shared Spaces* in The Rocks and Maroubra in Sydney and evaluation reports (Transport for New South Wales, 2022), (Wijayaratna, et al., 2022)
Amenities to support people walking, cycling, or dwelling.	Streetside or roadside facilities such as benches, shade, vegetation, barbeques, drinking fountains and outdoor dining.	Many regional roads include barbeque, picnic, and toilet facilities. In urban areas the addition of seating, vegetation and drinking fountains increases amenity along streets and pathways.
Temporal use of street space	Restricting vehicles for a period so that people can gather for street festivals, sporting events and community events.	The annual street closure of the Gold Coast Highway and Main Beach Parade for the Gold Coast 600 event is worth c.$40m per year in tourism benefit to QLD (Transport and Public Works Committee, 2020). The annual street closure of Oxford Street, Sydney for Mardi Gras is worth c.$30m per year in tourism benefit to NSW (Deloitte., 2023).
Greater quality of the public realm or comfort moving around a Place	Wider or higher quality footpaths, crossings and cycleways that (as well as any increase in active travel) create a more amenable environment and hence improve the sense of Place.	Upgrading zebra crossings to raised threshold crossings can make it easier for people to cross with wheelchairs and prams, in addition to safety benefits. Wider footpaths are more comfortable and inviting to walk, sit and socialise. See *Pitt Street, Sydney.*
Conversion of local streets to shared streets	Shared zone streets can be used for a range of non-transport purposes, such as children playing or people sitting or gardening outside their homes. These provide more inclusive, equitable and safe access for people walking, cycling, and driving.	See example of Notts Avenue, Bondi Beach, which converted a street to a 10kmh shared zone. It is of limited value from a transport perspective but impacts on pedestrian stay time, amenity, and tourism.

2.3.3 Materiality of considering and valuing Place effects

Often a consideration of Place effects in the assessment of a transport initiative is hampered by lack of familiarity with measuring Place benefits and disbenefits, including:

- Difficulty in estimating magnitude of impacts, including the number of people impacted.
- Estimating Place benefits requiring resource-intensive and costly methods of analysis (in the absence of standard guidance and evidence).
- Difficulty in accurately monetising each impact as they are based on a combination of perception, health, willingness to pay, and so on, or perceived to be double counting of traditional benefits.

In response to these challenges, this Guide proposes that practitioners consider whether Place benefits or disbenefits are either objectives or likely to change the decision matrix (particularly, by altering the BCR) for a given initiative. Where this is unknown, a rapid assessment of the likely Place benefits and disbenefits should be undertaken to determine whether to undertake a full assessment, as follows:

Figure 2-1 Place assessment materiality assessment

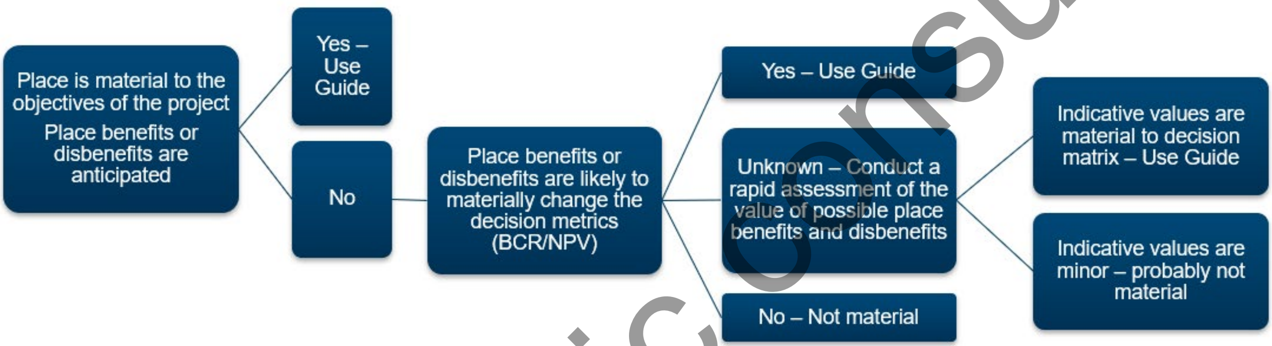


Figure 2-2 Milton, NSW. The Milton-Ulladulla Bypass is intended to improve Place outcomes because through-traffic on the Princes Highway will be diverted away from the town centre. See Table 2-4.

Source: TfNSW Milton Ulladulla bypass – Community Update

2.3.4 Examples of materiality of transport projects impacting Place

Table 2-4 provides examples of three regional bypass transport projects and assesses their materiality in considering and valuing Place.

Table 2-4 Examples of regional bypass projects affecting Place

Example materiality assessment	Milton-Ulladulla Bypass (NSW)	Bulla Bypass (VIC)	Tiaro Bypass (QLD)
Does the project interface with specific spatial areas with human activity (non-customers)	Yes – existing Princes Highway through Milton and Ulladulla town centres, and Mollymook urban area	Yes – existing Sunbury Road through Bulla town centre	Yes – existing Bruce Highway through Tiaro urban area
Extent of Place to be considered	Milton (ABS Area Code UCL 115104) and Ulladulla Locality (ABS Area Code UCL113017)	Bulla Locality (ABS Area Code UCL222010)	Tiaro Locality (ABS Area Code UCL322121)
Are Place benefits identified in the project outcomes (as well as movement)	Yes – 'supports tourism', 'enhancing liveability and amenity of Milton and Ulladulla' by moving traffic away from town centres	Not identified	Not identified
What Place benefits may be material here?	Reduced severance, better air quality and less noise along existing Princes Highway through towns. Potential for greater local movement (more frequent crossings, comfortable cycling on detrunked road)	Reduced severance, better air quality and less noise on Sunbury Road through Bulla. Regional growth unlocked	Reduced severance, better air quality and less noise on Mayne Street (Old Bruce Highway), Tiaro.
What Place disbenefits may be material here?	Urban severance, air quality, noise impacts on Burrill Lake	None anticipated	None anticipated
Should project value Place (benefit or disbenefit)?	**Yes – due to objectives**. Quantify Place benefits aligned to project objectives. Consider rapid assessment of Place disbenefit for materiality	Consider rapid assessment of Place benefit for materiality. **Possibly** (due to the value of growth unlocked)	Consider rapid assessment of Place benefit for materiality. **Unlikely** due to the relatively minor Place benefits compared to overarching costs and transport benefits.

2.4 Economic basis for Place benefits

CBA measures net benefits as changes in economic welfare. Net benefit is the sum of gains and losses to the various parties affected by an initiative (Infrastructure Australia, 2021), namely:

- Change in consumer surplus — user benefits
- Change in producer surplus — net benefits to service providers and government
- Change in third party (externality) effects
- Any resource cost corrections for unperceived user costs.

The Place benefits presented in this Guide are predominantly a result of a change in consumer surplus (user benefits) or a change in third party (externality) effects.

2.4.1 Application of the rule-of-half in Place benefit estimation

The rule-of-half is a simplifying assumption used in standard CBA to calculate the benefits for users who modify their behaviour due to changes in cost or quality. The rule-of-half is important when assessing the benefits of Place, where the project changes have led to changes in user behaviour, such as additional time spent in the Place, or changes in travel to access the Place.

As described in **ATAP T2** and **M4** (section 6.3), the rule-of-half applied to travel behaviour reflects that:

- Users derive benefits from their current travel behaviours. If users opt to modify their behaviour, it's due to a perceived change and indicates that the new conditions provide greater benefits.
- Upon changing their behaviour, users must forego the benefits associated with their previous arrangements - this represents their opportunity cost. This results in users receiving only the incremental benefits between the original and the new activity scenarios.
- The rule-of-half reflects that, on average, users will obtain half of the incremental benefits after altering their travel behaviour. This is based on the variability among users — some may benefit significantly, while others gain minimally from the change.
- For users who change their behaviour, if it is assumed that users are distributed evenly along the demand curve, the average new user gains half of the maximum incremental benefits. The overall benefit for new users is then estimated by multiplying half of the maximum incremental benefit by the number of new users.

It's important to consider how the rule-of-half may apply to Place improvements, some examples include:

- An increase in stay time because of a project Place improvement. The marginal utility from their extended time spent in that Place is assumed to be higher than from any alternative activity. Hence, they receive half the benefit for the extra time spent in the improved Place.
- New visitors to an improved Place derive higher marginal utility compared to their other options (e.g. spending time elsewhere). These individuals receive half the benefit for the entire duration of their stay in the project area.
- It is important to note that existing users of the space, i.e. those who visit or dwell in the Place in the base case as well as the project case, will receive the full benefit/impact of the project or intervention.

3. Valuing Place

3.1 Framework for valuing Place

The ATAP guidelines provides an overall framework of benefits (and disbenefits) of transport initiatives (policies, plans and projects), and guidance for their assessment. To date, the Guidelines framework has included a wide range of benefits. Many of those are monetised, whilst some can only be assessed in non-monetised terms.

One gap has been Place-related benefits. The aim of this is Valuing Place Effects (VPE) guidance has been to bring in missing Place-related benefits, making the ATAP benefits framework more comprehensive.

Figure 3-1 shows the part of the overall ATAP benefits framework that is Place-related. Note that some of these benefit types are already covered elsewhere in the Guidelines. Where that that is the case, this guidance notes that and provides relevant cross-references. The categorisation of Place-based benefits here aims to minimise overlaps and ensure clear distinctions in the evaluation process.

Figure 3-1 Framework for valuing Place in transport assessments, linked to the Built Environment Indicators

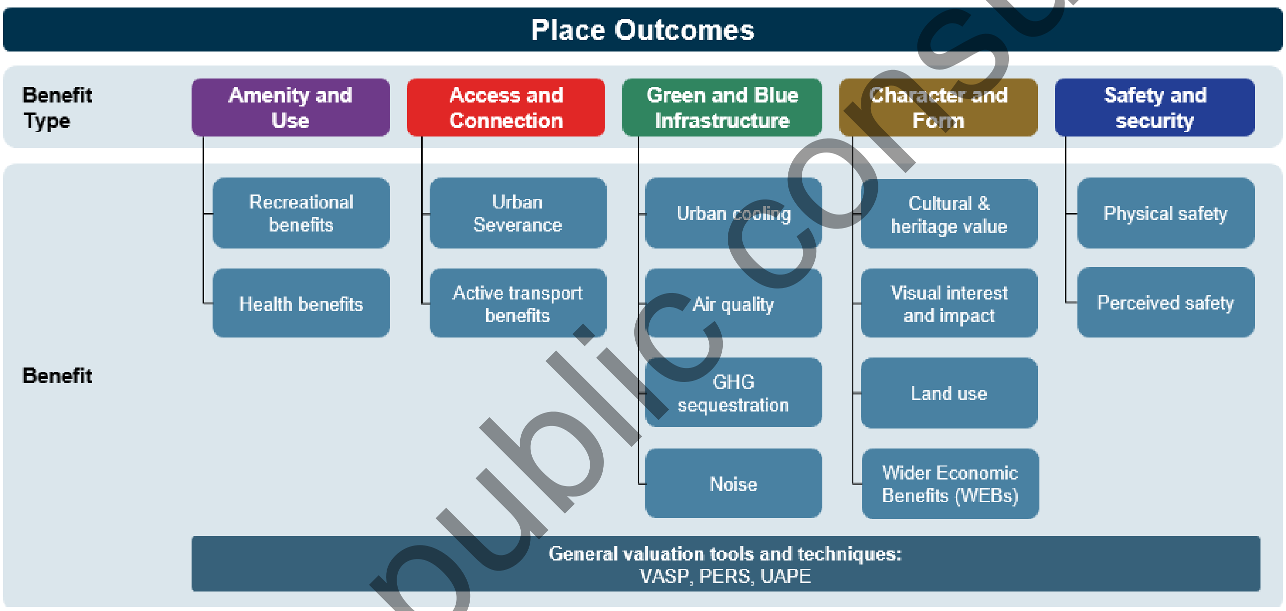
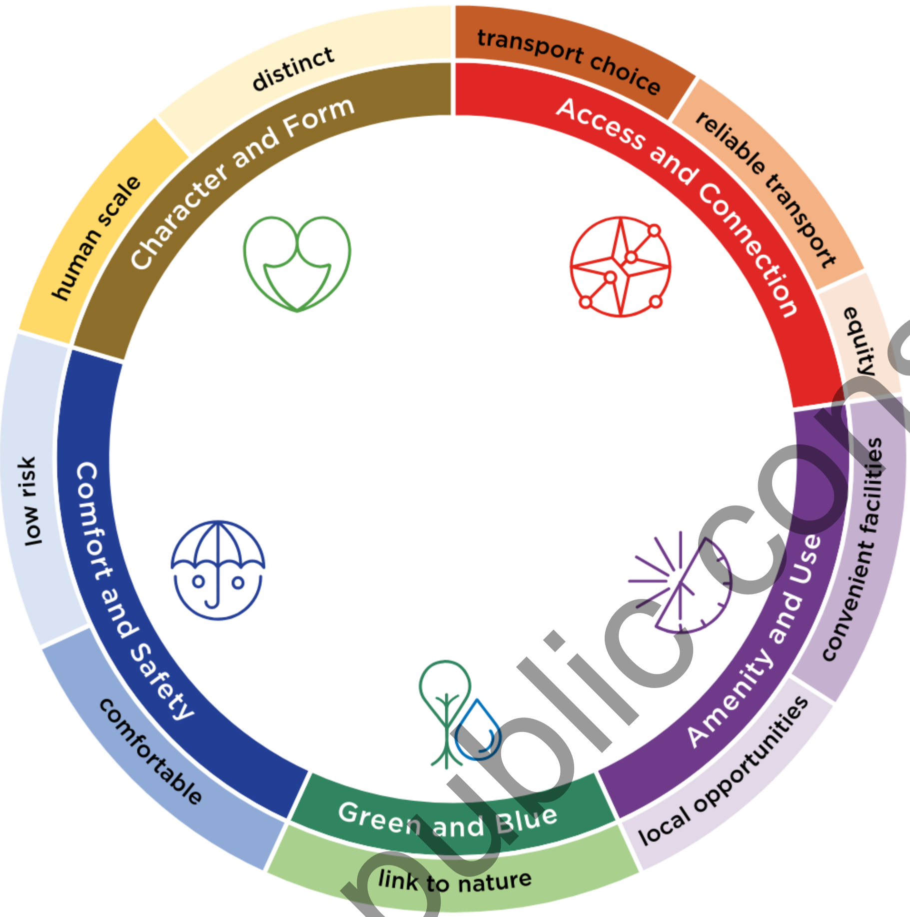


Figure 3-1 is reflects the diverse aspects of urban environments. It is derived from the TfNSW Movement and Place Evaluators Guide (Transport for NSW, 2020) and Built Environment Indicators (Figure 3-2), which aim to capture the qualities that contribute to a well-designed built environment.

Figure 3-2 Built Environment Indicators (BEIs)

Permeability (walk, cycle)
Building height
Street enclosure
Dwellable street space
Culture and heritage
Land division
Legibility
Building density

Mode share
Cycling attractiveness (access to cycleways)
Walking attractiveness (directness)
PT attractiveness (journey time comparability)
Journey time reliability (freight, PT)
Public transport frequency
Equitable access
Steepness



Safe System assessment
Casualty crash rate
Pedestrian crowding
Safe speed for environment
Community safety
and security
Environmental quality
Urban heat
Solar access
Heavy vehicle separation

Tree canopy
Biodiversity
Vegetation cover
Waterways
On-site water
management

Public space
Local living
Primary schools
End-of-trip facilities
(by mode)
Places to stop and rest
Mix of uses
Population density
Housing diversity
Local jobs
Economic development
and regeneration

General valuation tools and techniques (see chapter 4)

There are valuation tools available which encompass several aspects of the '**urban quality'** of a Place, some of which are unique and some of which overlap other benefit types. These use people's willingness to pay (WTP) for specific improvements in the urban environment. They vary in their approach by either:

- Parameter values applied to **changes in score of each place elements / theme** audited by trained professionals reviewing the existing and future schemes (e.g. VASP / PERS) or
- Separate parameter **values for types of improvement** (e.g. Urban Amenity in Pedestrian Environments).

Amenity and use (chapter 5)

This category covers the enjoyment derived from using a Place, including the time spent there and the opportunities it offers for leisure and wellness.

- **Recreational benefits** – the opportunities for leisure and recreation that a Place offers to the community, based on the types of activities they may undertake (e.g. picnic, play sport, etc).
- **Other health benefits** – the psychological and physical wellness enhancements created by a Place.

Access and connection (chapter 6)

Relates to Place outcomes which change how easy it is to get to and move around within an urban space, focusing on reducing barriers and enabling non-motorised travel.

- **Urban severance** – the reduction of barriers created by infrastructure, or enhancement of accessibility and connectivity within urban spaces.
- **Active travel benefits** – the health, environmental and economic advantages of facilitating non-motorised travel such as walking, cycling and scooting.

Green and blue infrastructure (chapter 7)

This category considers the benefits derived from trees, vegetation, and bodies of water in urban spaces, and how they influence the climate, air quality, and noise levels.

- **GHG sequestration** – the capacity of urban greenery and soil to absorb GHGs, reducing atmospheric concentration.
- **Urban cooling** – the health, energy cost and GHG emissions benefits associated with a reduction in temperature due to the presence of trees and vegetation in urban areas.
- **Air quality** – the improvement of urban air quality through natural filtration by trees and vegetation.
- **Noise** – the mitigation of urban noise pollution through strategic use of landscape elements.

Character and form (chapter 8)

These benefits cover the intrinsic qualities that give a place its unique identity. Character and form encompass aspects such as the aesthetic appeal, the connection to history and culture, and the non-use values that contribute to the overall community value. It also considers the benefits derived from the land use and the wider economic implications.

- **Cultural and heritage value** – relates to the aspects of a place that connect individuals to their community's history and culture, enhancing a sense of belonging and identity.
- **Visual interest and impact** – the aesthetic qualities of a place that make it visually appealing and engaging for both residents and visitors.
- **Land use benefits** – refers to shifts in the type or intensity of activities in a place, often reflected in changes in population, employment, or developed floor space.
- **WEBs** – refer to the broader economic impacts that a place can have, such as stimulating local economic growth, attracting investment, and supporting job creation.

Safety and security (chapter 9)

This category focuses on aspects of a Place that contribute to both the actual and perceived safety. It considers how the design and physical features can mitigate risks, enhance public safety, and influence individuals' sense of security, thereby shaping their use and enjoyment of the area.

- **Physical safety** – the physical features of a place designed to enhance public safety and reduce injury.
- **Perception of safety and security** – the influence of a place's physical attributes on individuals' perceptions of security, impacting their use and enjoyment of the area, and hence their behaviours in that Place.

Other considerations (chapter 10)

Other considerations for future guidance including equity, broader social impact, and First Nations.

3.2 How to use this Guide

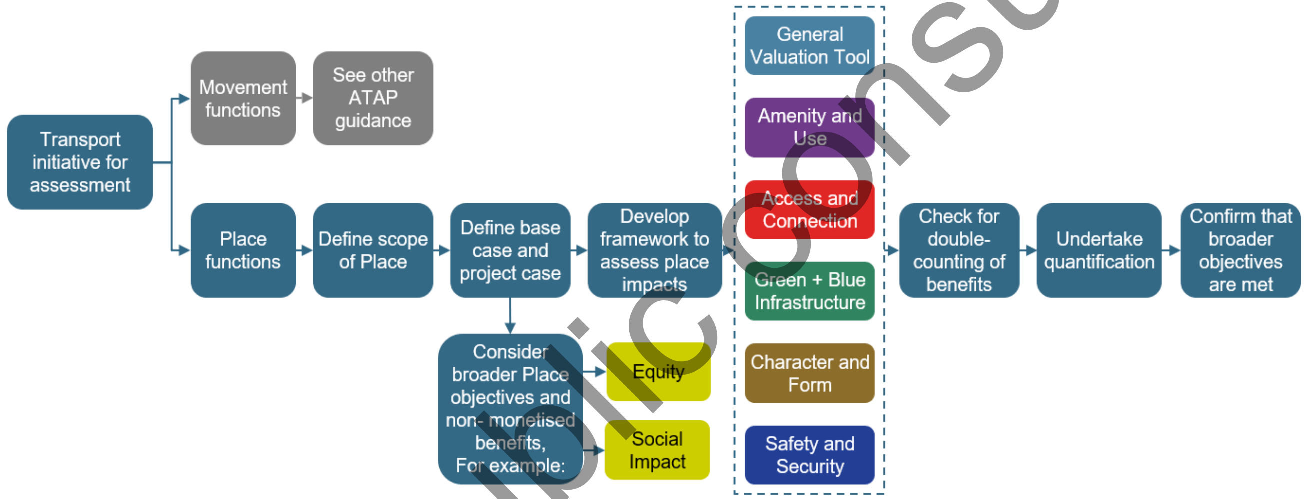
3.2.1 Process for valuing Place

Figure 3-3 outlines the recommended steps to estimate Place impacts of a transport initiative. The Place functions of the project are confirmed as distinct from the Movement functions which are covered by other ATAP guidance. The scope of the Place is then determined, such as the location within or surrounding the project area, the area that the Place covers, and its various uses (for the base and project case).

At this point, the project assessment should consider the broader objectives of the Place to confirm the vision of the Place for local communities, liveability, equity, First Nations and so on (see chapter 10). These may not necessarily be quantifiable or monetised.

The next step is to develop approaches to assess Place impacts, selecting from the range of assessment approaches available (Chapters 4 to 10 of this Guide), and ensuring that double-counting of benefits is mitigated. Once quantification is completed, it is important to confirm that the broader Place objectives are met in the assessment, including non-monetised benefits.

Figure 3-3 Recommended process for valuing Place in a transport initiative



3.2.2 Estimating Place impacts

Define the base case

The base case consists of a 'real world assessment' of what would be done in the absence of the Project Case being implemented. The base case should align with a 'do-minimum' situation and include committed and funded projects (**ATAP T2**). The base case should consider all aspects of Place that will be impacted by the project. For example, a project that has mature trees in the base case that are removed for construction in the project case, should account for the impact of increased urban heat and reduced amenity for people walking in and living in that Place. This process allows for the measurement of project benefits and disbenefits to the situation that existed before the project was implemented.

Defining the base case in a wider program

Where project benefits, and therefore overall project merit, are interdependent with other unfunded projects within a wider program, it may be relevant to include these projects in the base case (Infrastructure Australia, 2021). This consideration is particularly relevant for precinct or greenfield developments where several delivery agencies (transport, education, health) may be involved to deliver an overall vision for a Place.

For example, a transport project that is considering a transport connection for a new education precinct, a base case that does not include demand impacts of the education precinct proceeding will not sufficiently allow for benefits of providing the transport connection. Practitioners should discuss these interrelationships with relevant agencies and consider whether the base case should include other projects that have not been committed and funded.

Consider broader impacts

The overall Place vision and broader objectives should be confirmed (noting that this may not have been undertaken in earlier stages of the business case development for a transport project). This vision setting may include consideration of how the Place(s) will improve liveability and attractiveness for local communities, visitors, and businesses; achieve equity of access and opportunity; embed Country and First Nations considerations; and achieve broader greenhouse gas emissions targets. These may not necessarily be quantifiable or monetised. See chapter 10 which addresses some of these further.

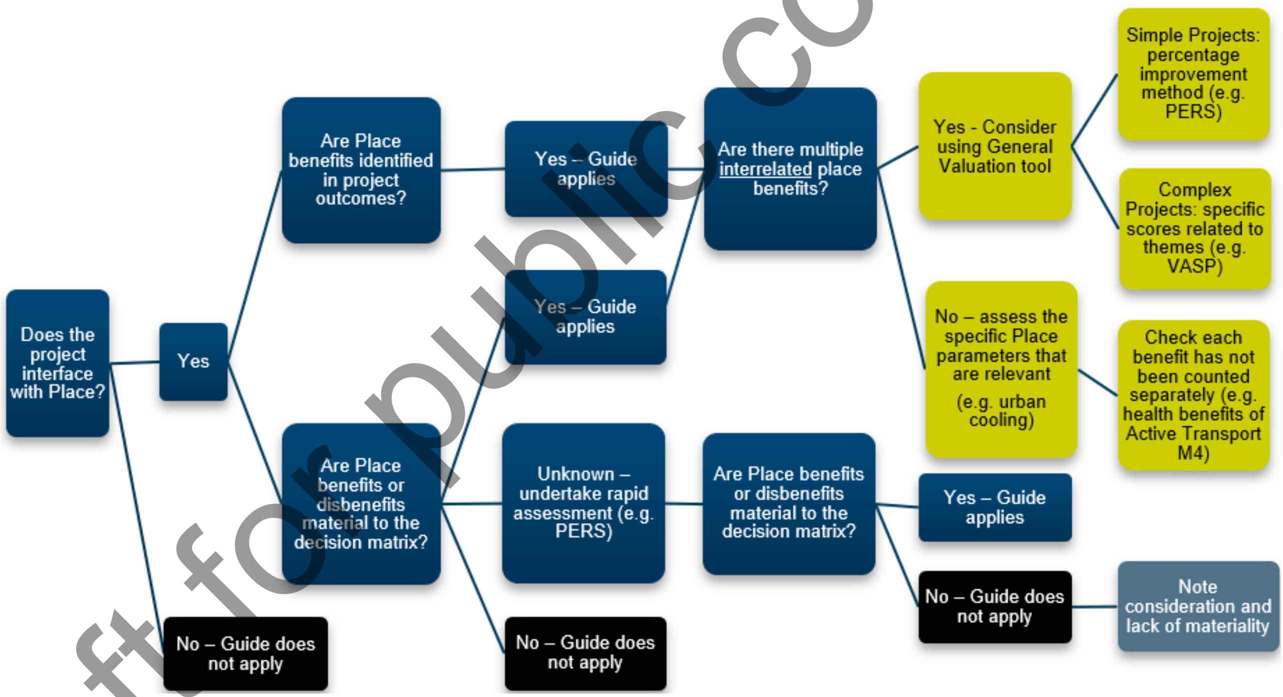
Develop a framework for assessment and quantify positive and negative impacts

The next step is to develop a framework to assess place impacts, selecting from the range of assessment approaches available (see Table 3-1 and (Chapters 4 to 10 of this Guide), and ensuring that that double-counting of benefits is mitigated (Section 3.2.3).

Using the approach or approaches identified in the assessment framework, measure or estimate the changes to the Place base case that the project case(s) will impact. Separate calculations are recommended of Place impacts with and without mitigation, so that the cost of mitigation methods is clearly captured (and preferably ringfenced to avoid benefit erosion).

Account for the temporal nature of benefits – for example the maturity of trees over time and their relative carbon sequestration, or the cumulative benefit of emissions avoided over time. Impact assessment must take account of change over time including construction-stage impacts that are subsequently rectified.

Figure 3-4 Decision Tree to inform the assessment of place impacts



3.2.3 Double counting of benefits

When valuing Place benefits and disbenefits in a CBA, the possibility of double counting needs to be carefully considered. Place benefits may overlap with other benefits that the CBA already includes, or they may overlap when practitioners apply multiple place-based benefit approaches. This Guide provides advice on the underlying benefit components of the parameter values provided and notes where there is the potential for double counting.

As a general principle, the most accurate measurement of benefits and costs can be achieved by measuring them as close to their sources as possible (**ATAP O8**). In practice, this means it is preferable to identify and estimate primary benefits rather than secondary or flow-on benefits. For Place benefits, there are two key potential sources of double counting:

- **Inclusion of both primary and secondary impacts:** Primary impacts refer to the direct and indirect benefits attributable to an infrastructure initiative. Secondary or flow-on impacts are the benefits and costs that are passed on, or redistributed, within the economy. For example, if Place benefits are quantified using land value uplift (where land value is increased because the area is more accessible or attractive to live or work in), this is a secondary impact that largely reflects the capitalisation of primary impacts included in standard CBAs, such as improved use or amenity values. Counting both primary and secondary impacts that reflect the same underlying benefit driver would double count benefits and lead to distorted results. If at all, secondary benefits should only ever be considered as part of a sensitivity testing scenario and should not form part of the core analysis.
- **Place-based change in transport modelling:** Transport models may occasionally include amenity within the generalised cost of active travel. For example, if cycling mode choice within a model is influenced by the relative attractiveness of an on-road cycle lane compared to no separation with traffic, the model may estimate induced cycling demand based on the improvement. A separate calculation of use-value would therefore risk double counting with the transport benefits estimated from the modelling outputs. However, it should be noted that, at time of writing, most transport models used in scheme appraisal in Australia do not take account of cycling amenity when forecasting travel demand, therefore this risk of double counting is low.

Reading Table 3-1

Table 3-1 provides a detailed breakdown of the benefits included within the Guide and identifies potential areas where double-counting may occur. To understand and effectively use the table, readers should:

1. **Identify the Valuation Approach**: Start by locating the specific valuation approach of interest. These are listed in both the rows and columns of the table. To avoid duplication, only half of the table is presented with information on overlaps and requires the reader to read across the rows as well as the columns.
2. **Read across the row**: Read across the entire row for the corresponding valuation approach to see where it overlaps with other approaches. The text in grey cells describes where there is overlap with another valuation approach and why. Green cells indicate where there is no overlap.
3. **Read down the column**: Read down the column for the valuation approach of interest. This will show you the overlaps with other approaches listed in the rows.

By reading both horizontally and vertically, readers can identify all the combinations of approaches and determine where overlaps exist.

For example, if a reader is interested in the Use value (recreational benefits), find its row and read across to see there is overlap with Use value (health benefits), Urban cooling, and Air quality and Visual interest and impact. Then, read down the column for Use value (recreational benefits) and see that there is also overlap with VASP, PERS and UAPE. Therefore, in total, Use value (recreational benefits) overlaps with 7 other approaches, with the text in cells describing the overlap in more detail.

Once double counting risks of different approaches are understood, practitioners should carefully select valuation approaches to avoid or otherwise account for overlaps between valuation approaches.

Table 3-1 Table of overlaps for Place valuation methods

No overlap | **Overlap in approaches (potential risk of double counting)**

Place valuation method		PERS	UAPE	Use value (recreational benefits)	Use value (health benefits)	Urban severance	Active Transport (M4)	Urban cooling	Air quality	GHG	Noise	Cultural and heritage value	Visual interest and impact	Safety and security
General valuation tools and techniques	VASP	VASP / PERS attributes overlap.	VASP (Personal Safety and Moving in the Space attributes) overlap with UAPE	General overlap with use values.	VASP (Opportunity for Activity attribute) overlaps with health benefits.	VASP (Moving in the Space attribute) overlaps with urban severance	PERS / VASP / UAPE frameworks overlap with a range of approaches presented in M4 Active Travel related to amenity, safety, and health.	VASP (Feeling Comfortable attribute) overlaps with urban cooling	VASP (Feeling Comfortable attribute) overlap with air quality health benefits		VASP (Feeling Comfortable attribute) overlap with noise benefits.	VASP (Sense of Place attribute) overlaps with cultural and heritage valuation	VASP (Sense of Place) overlaps with Visual interest / impact.	VASP (Moving in Space, Personal Safety attributes) overlaps with safety valuation
	PERS		Several PERS link attributes overlap with UAPE approach	General overlap between PERS and use values.		Several PERS link attributes overlap with severance approach		WTP for Quality of the Environment overlap with urban cooling.	WTP for Quality of the Environment attribute overlap with air quality benefits.		WTP for Quality of Environment attribute overlap with noise benefits.	Potential overlap with PERS (Quality of the environment attribute)	WTP for attributes (Quality of environment + Maintenance) overlap	Overlaps with several PERS attributes
	UAPE			Overlap between approaches if pedestrian link is in a public park area		Overlap in traffic speed / volumes component		UAPE attributes (covered route and street planting) overlap						
Amenity and use	Use value (recreational benefits)				WTP for additional facilities overlaps with health benefits			WTP for facilities may overlap with urban cooling health benefits	WTP for facilities may overlap with air quality health benefits				WTP for facilities may overlap with visual interest and impact	
	Use value (health benefits)						Health benefits overlap							
Access and connection	Urban severance						WTP values may overlap with benefits of increased walking						WTP values overlap with benefits of visual impact	
	Active transport (M4)													WTP values may overlap with benefits of safety and security
Green and blue infrastructure	Urban cooling													
	Air quality													
	GHG sequestration													
	Noise													
Character and form	Cultural and value													
	Visual interest and impact													

4. General valuation tools and techniques

This chapter describes a range of tools that provide general approaches to valuing Place, based on the urban qualities that they address. These tools cross several Place attributes and value them in aggregate. These tools should therefore be used carefully in CBA to ensure that there is no double-counting of place impacts, and that other impacts not covered by these tools are accounted for separately (see Table 3-1).

As the field of measuring urban quality is relatively new, there is no agreed standard approach for Australia and New Zealand. Three methods are presented in Table 4-1, outlining their relative strengths, limitations, and use cases.

Table 4-1 Overview of general valuation techniques

Method	Strengths	Limitations	Use cases
VASP Value Assessment System for Place	• **Applicable to various scales**: Can be used for projects of different scales as values are linked to broader attributes. • **Broad application**: Designed to apply to earlier stages of project planning and design. • **Quantifiable using WTP values**: Benefits are quantifiable using willingness-to-pay (WTP) values, allowing for a clear economic assessment of place attributes. • **Quantifiable metrics**: 7-point scale from -3 (very poor) to +3 (very good), makes it easy to quantify and compare different pedestrian environments.	• **Stay time limit:** Assumes all visitors stay for the same time (around 15 minutes) and purposes are uniform. • **Requires SME judgment:** Typically requires the input of a subject matter expert, such as an urban designer, which can limit scalability and efficiency. • **Jurisdiction-specific**: Developed for metro and rail in urban environments in NSW. WTP values are specific to Sydney and may need to be converted for values. Other jurisdictions may not have the capacity to adapt this tool.	• Strategic planning stages of projects where order-of-magnitude estimates are of interest. • Large scale projects where resource limitations prevent application of a more detailed approach. • Where user stay time is uniform and relatively short (e.g. 15 minutes).
UAPE Urban Amenity in Pedestrian Environments	• Provides specific **WTP values for discrete changes** to the urban environment that go beyond the pavement, such as routes through parks, CCTV or benches.	• **Varying confidence in the WTP values** quoted as they are aggregated from a range of international sources. • The method and the list of WTP values are **not exhaustive**.	• For targeted interventions, specific to pedestrian environment and footpath improvements
PERS Pedestrian Environment Review System	• **Specific and tangible:** PERS values are linked to specific and tangible improvements in the pedestrian environment, such as the accessibility of dropped kerbs. • **Detailed assessment**: Provides a comprehensive audit of the pedestrian environment, assessing attributes on a detailed block-by-block basis. This allows for precise identification of areas needing improvement.	• **High level of detail required:** Requires a detailed survey of the current and future built environment, which can be labour-intensive (depending on how PERS is used). • **Requires trained professionals:** Should be applied by a trained professional, or proprietary software, potentially adding to the cost and complexity of the assessment (depending on how PERS is used). • **Limited suitability for large projects**: More suitable for smaller projects and might be impractical for larger-scale assessments.	• May be used for rapid assessment. • Where stay time varies amongst users (e.g. people walking through a park vs spending a long time enjoying the park). • To assess pedestrian environments for small projects or focused segments of larger projects.

Method	Strengths	Limitations	Use cases
	• **Quantifiable metrics**: 7-point scale from -3 (very poor) to +3 (very good), makes it easy to quantify and compare different pedestrian environments.		

Introduction to VASP and PERS

As illustrated in Table 3-1, both VASP and PERS cover a broad spectrum of place considerations in the one tool, which makes them a valuable method for assessment. As with all tools, however, there are some limitations to be aware of. Both methods:

- Use Willingness to Pay (WTP) for different attributes.
- Are scored against a wide range of metrics on a 7-point scale from -3 (very poor) to +3 (very good). A zero score represents the minimum standard.
- Are intended to be prepared by a subject matter expert on place (such as an urban design professional) to assess the environment and apply the scores.

PERS (Pedestrian Environment Review System) was developed by Transport for London with the Transport Research Laboratory. The tool assesses the quality of pedestrian environments on a block-by-block basis. This Guide provides PERS WTP values for walking link attributes, expressed in cents per person per minute. For example, the width of the pathway, the removal of obstructions, and the sense of personal security are all monetised.

VASP (Value Assessment System for Place) was developed by TfNSW by adapting the PERS ‘public space’ review framework for valuing place benefits at the project planning and development phase. The framework uses the same 7-point scale but applies it to a specific set of attributes with their own definitions, indicators, descriptions of scores, and visual imagery as a supporting mechanism.

Unlike PERS, VASP assumes that all users spend a similar amount of time in a Place and are visiting for the same purpose. For example, a person walking through a park is willing to pay the same amount as a person who spends several hours enjoying that park. Because it was developed for metro and rail projects, it assumes that up to 15 minutes is spent in that location.

The selection of VASP or PERS depends on the scope of analysis, expected use of a Place, and the level of design maturity that a project is at. It is suggested that practitioners should use:

- **VASP** for larger projects, for strategic planning, where there is a design strategy or high-level reference designs available, or where there is limited pedestrian demand modelling. This would apply for projects at an early stage of development or larger scale projects for which doing detailed PERS assessments would not be feasible. It is also most suitable where it expected that visitors will stay for around 15 minutes.
- **PERS** where there amount of time spent in the Place will be highly variable, or for detailed assessments of pedestrian environments of small projects, or focused segments of larger projects. It may also be suitable for rapid assessments – see the PERS section for further details.

Both approaches apply a WTP factor which is multiplied by person-minutes. To calculate PERS values, the number of people and their average dwell / stay time in minutes must be modelled or robustly estimated[1].

[1] The example given is the ‘Zanon’ model described in “A Computationally Efficient Model for Pedestrian Motion Prediction” by Batkovic, Zanon, Lubbe and Falcone, 2018 [(PDF) A Computationally Efficient Model for Pedestrian Motion Prediction (researchgate.net)]

VASP/ PERS estimates the WTP for a use value that is associated with being in that space. This differs from the non-use values such as the endowment value of heritage items, or urban cooling benefits. Care should be taken to avoid overlap between two parameters that both measure the use value to pedestrians as this may constitute double counting.

4.1 Value Assessment System for Place (VASP)

The attributes used by VASP are:

- Moving in the space
- Interpreting the space
- Personal safety
- Feeling comfortable
- Sense of place
- Opportunity for activity.

These benefits are then quantifiable using WTP values. In the case of TfNSW these are obtained from (Sydney Metro, 2023), which is applied in the TfNSW Economic Parameter Values 2023.

> VASP values are estimated from a number of rail and metro stations in Greater Sydney. An alternative set of values for VASP for links and spaces, as well as the PERS values below, are obtained by converting UK WTP 2013 values into AUD 2022 values using purchasing power parity.

VASP is a tool developed by TfNSW for assessing place impacts in urban environments within New South Wales. The values used in VASP are based on research conducted on rail and metro stations in Greater Sydney. Practitioners should evaluate the applicability of these values to their specific projects. If possible, practitioners should derive WTP values that are specific to their own projects or jurisdictions. In cases where local WTP values are unavailable, practitioners should be aware of the risks associated with directly applying NSW values and document these considerations accordingly.

VASP assesses the base and project cases using the VASP themes and written and photographic descriptions of a +3, zero and -3 score in each theme. The audit is expected to be undertaken by a suitably trained person – i.e., qualified urban designers or specialists in the relevant fields, with experience in transport infrastructure projects and independent to the project under the evaluation.

Estimating VASP impacts

The amenity benefits at transport precincts can be estimated using the formula:

$$Amenity\ benefit = D * R_i\ (Project\ Case - Base\ Case) * V_i$$

Where:

- D = demand, measured by the number of trips or households in the catchments
- $\boldsymbol{Ri}$ = Quality rating by VASP attributes
- $\boldsymbol{Vi}$ = Value by attributes (Table 4-2 or Table 4-3)

The calculation steps are outlined below:

- Step 1: Estimate the number of trips (visitation method) or households (catchment method) for the transport precincts to be assessed. The number of trips can be sourced from strategic travel demand model, train station entries and exits counts and project-specific traffic survey. If sourcing demand for non-car trips from strategic models, a sense check using an alternative data source (for example, historical survey data) should always be applied due to the limitations of these modelling platforms.
- Step 2: Assess the change in quality of attributes in accordance with the VASP framework.
- Step 3: Apply the economic parameter values provided below.

Valuing VASP impacts – visitation method

Two PERS methods are available for assessing the amenity benefits of transport precincts. One method is based on the number of visitors to a precinct, while the other is based on the number of households within a precinct catchment. The visitation method is preferred, while the catchment approach is acceptable if data limitations prevent the visitation method from being used.

Under the visitation method, the PERS economic parameter values are available for PT users and non-PT users of rail station, metro station and/or multi-modal interchange precincts. PT users are defined as customers that have used the precinct to get on or off a transport service, while non-PT users are customers that have come to the precinct for other purposes without onboarding to a transport service.

Table 4-2 Average WTP for a one-unit improvement to a VASP theme, rail users ($/trip)

VASP themes	-3	-2	-1	0	1	2	3
Personal safety	$0.00	$0.08	$0.17	$0.25	$0.34	$0.43	$0.51
Opportunity for activity	$0.00	$0.07	$0.16	$0.23	$0.30	$0.38	$0.46
Moving in the space	$0.00	$0.06	$0.13	$0.20	$0.26	$0.32	$0.39
Feeling comfortable	$0.00	$0.09	$0.18	$0.27	$0.35	$0.45	$0.53
Sense of place	$0.00	$0.06	$0.12	$0.19	$0.25	$0.31	$0.37
Interpreting the space	$0.00	$0.03	$0.06	$0.09	$0.13	$0.17	$0.20
Total	**$0.00**	**$0.40**	**$0.82**	**$1.22**	**$1.64**	**$2.04**	**$2.45**

Source: TfNSW (2022), Sydney Metro (2023). Values are in AU$, June 2024 prices.

Table 4-3 Average WTP for one-unit improvement to a VASP theme, non-rail users ($/visit)

VASP themes	-3	-2	-1	0	1	2	3
Personal Safety	$0.00	$0.09	$0.20	$0.29	$0.39	$0.49	$0.59
Opportunity for Activity	$0.00	$0.04	$0.08	$0.12	$0.16	$0.20	$0.24
Moving in the Space	$0.00	$0.04	$0.07	$0.11	$0.15	$0.19	$0.22
Feeling Comfortable	$0.00	$0.04	$0.09	$0.13	$0.19	$0.23	$0.28
Sense of Place	$0.00	$0.02	$0.05	$0.07	$0.09	$0.12	$0.15
Interpreting the Space	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$0.00**	**$0.25**	**$0.49**	**$0.74**	**$0.98**	**$1.22**	**$1.46**

Source: TfNSW (2022), Sydney Metro (2023). Values are in AU$, June 2024 prices.

Valuing VASP impacts – catchment method

Table 4-4 and Table 4-5 present the PERS economic parameter values for the catchment method. The catchment method is based on estimates of the number of households impacted by a project. While the size of the catchment may vary depending on specific characteristics (e.g., station size, transport accessibility or proximity to other stations), a catchment area of 1.2 km network distance can be used as a baseline.

Census data from the Australian Bureau of Statistics can be used to estimate the number of households within the catchment of a precinct. Table 4-5 presents PERS economic parameter values for the catchment method. Values are available for both PT users and non-PT users. To differentiate between two transport users, the percentage of non-PT households within the catchment will need to be derived based on the available data based on the project's location.

Table 4-4 Average WTP for a one-unit improvement to a VASP theme, rail users ($/household/month)

VASP themes	-3	-3	-1	0	1	2	3
Personal Safety	$0.00	$2.28	$4.57	$6.85	$9.13	$11.42	$13.70
Opportunity for Activity	$0.00	$2.06	$4.11	$6.17	$8.22	$10.28	$12.33
Moving in the Space	$0.00	$1.75	$3.51	$5.26	$7.02	$8.77	$10.53
Feeling Comfortable	$0.00	$2.40	$4.80	$7.19	$9.59	$11.99	$14.39
Sense of Place	$0.00	$1.66	$3.32	$4.98	$6.64	$8.30	$9.96
Interpreting the Space	$0.00	$0.88	$1.76	$2.65	$3.53	$4.41	$5.29
Total	**$0.00**	**$11.03**	**$22.07**	**$33.10**	**$44.14**	**$55.17**	**$66.20**

Source: TfNSW (2022), Sydney Metro (2023). Values are in AU$, June 2024 prices.

Table 4-5 Average WTP for a one-unit improvement to a VASP theme, non-rail users ($/household/month)

VASP themes	-3	-3	-1	0	1	2	3
Personal Safety	$0.00	$1.10	$2.20	$3.30	$4.40	$5.50	$6.60
Opportunity for Activity	$0.00	$0.45	$0.89	$1.34	$1.79	$2.23	$2.68
Moving in the Space	$0.00	$0.42	$0.83	$1.25	$1.66	$2.08	$2.49
Feeling Comfortable	$0.00	$0.52	$1.04	$1.56	$2.08	$2.60	$3.11
Sense of Place	$0.00	$0.27	$0.54	$0.81	$1.08	$1.35	$1.62
Interpreting the Space	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$0.00**	**$2.75**	**$5.50**	**$8.25**	**$11.00**	**$13.75**	**$16.50**

Source: TfNSW (2022), Sydney Metro (2023). Values are in AU$, June 2024 prices.

Case study: VASP precinct renewal

A precinct renewal program will revitalise an area through:

- A range of permanent works including upgrades to promenades, public transport interchanges and surrounding public places.
- Ongoing operational activities including a new approach to precinct management, maintenance, activation management and improved systems.

The programs objectives are to:

- Improve the customer and visitor experience
- Create a vibrant place with a unified identity that is well integrated to the transport interchange
- Improve connectivity and accessibility of the area
- Support and grow the local and tourist economy, further activating the area.

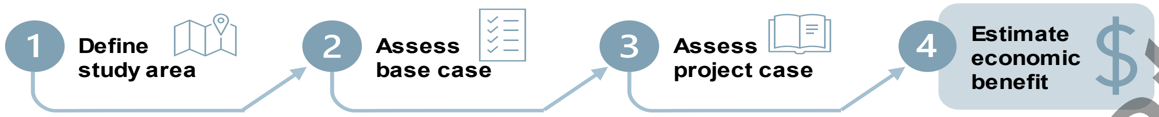
Project benefits

The project is expected to result in an improvement in the quality of the pedestrian environment in a range of areas within the precinct. Based on an assessment of the project area there are two distinct areas identified for having a significant Place impact, including a promenade and a public transport interchange were identified to be assessed for Place impacts. Based on an assessment of the level of information available and the size and scale of the project a VASP assessment will be completed with the intent of being able to monetise urban amenity outcomes. The project also includes a range of conventional transport project benefits associated with movement, land use change, and WEBs which are covered by other ATAP guidance.

Assessing the quality of the pedestrian environment (VASP assessment)

The VASP approach requires specialist expertise in urban design and transport infrastructure to undertake the scoring assessment. The assessment is divided into key steps (refer Figure 4-1), starting with defining and documenting the study area. This is followed by an evaluation of the base and project cases, where each area's public space quality is scored across standardised themes and indicators. These scores, ranging from -3 to 3, are integrated through a consensus method, culminating in a comprehensive VASP Report that is used to inform the economic benefits.

Figure 4-1 VASP assessment steps



Estimating benefits

Applying the visitation method by:

- **Step 1:** Estimate the number of trips applying the visitation method, where the number of trips can be sourced from transport modelling data. The data will need to include forecasts for both the base and project case over the length of the appraisal period (refer Table 4-6)
- Under the visitation method, the public transport users are defined as customers who have used the precinct to get on or off a transport service, while non-public transport users are users who have arrived on foot or bicycle, or private car. Apply volume expansion factors described in **ATAP M4** section 6.6 and **ATAP M1** Section 2.4.
- **Step 2**: Assess the change in quality of attributes in accordance with the VASP framework. The scores are provided in Table 4-7 and Table 4-8, with the base case scores shaded in yellow and project case cells shaded in blue.
- **Step 3**: Apply the economic parameter values in Table 4-7 and Table 4-8 to estimate the annual economic benefit.

Table 4-6 Pedestrian volumes

	Base case 2030 annual demand	Project case 2030 annual demand
Rail users	4,000,000	6,000,000
Non-rail users	3,000,000	7,000,000

Table 4-7 Average WTP for a one-unit improvement to a VASP theme, rail users ($/trip)

VASP themes	-3	-2	-1	0	1	2	3	Change
Personal safety	$0.00	$0.08	$0.17	$0.25	$0.34	$0.43	$0.51	**$0.26**
Opportunity for activity	$0.00	$0.07	$0.16	$0.23	$0.30	$0.38	$0.46	**$0.23**
Moving in the space	$0.00	$0.06	$0.13	$0.20	$0.26	$0.32	$0.39	**$0.06**
Feeling comfortable	$0.00	$0.09	$0.18	$0.27	$0.35	$0.45	$0.53	**$0.27**
Sense of place	$0.00	$0.06	$0.12	$0.19	$0.25	$0.31	$0.37	**$0.31**
Interpreting the space	$0.00	$0.03	$0.06	$0.09	$0.13	$0.17	$0.20	**$0.17**
Total	$0.00	$0.40	$0.82	$1.22	$1.64	$2.04	$2.45	**$1.30**

Source: TfNSW (2022), Sydney Metro (2023). Values are in AU$, June 2024 prices.

Table 4-8 Average WTP for a one-unit improvement to a VASP theme, non-rail users ($/visit)

VASP themes	-3	-2	-1	0	1	2	3	Change
Personal Safety	$0.00	$0.09	$0.20	$0.29	$0.39	$0.49	$0.59	**$0.30**
Opportunity for Activity	$0.00	$0.04	$0.08	$0.12	$0.16	$0.20	$0.24	**$0.11**
Moving in the Space	$0.00	$0.04	$0.07	$0.11	$0.15	$0.19	$0.22	**$0.03**
Feeling Comfortable	$0.00	$0.04	$0.09	$0.13	$0.19	$0.23	$0.28	**$0.13**
Sense of Place	$0.00	$0.02	$0.05	$0.07	$0.09	$0.12	$0.15	**$0.12**
Interpreting the Space	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
Total	$0.00	$0.25	$0.49	$0.74	$0.98	$1.22	$1.46	**$0.71**

Source: TfNSW (2022), Sydney Metro (2023). Values are in AU$, June 2024 prices.

The benefits for existing and induced users are:

- Benefits to existing rail users per year = ($1.30/trip) x 4,000,000 users per year = $5,200,000
- Benefits to existing non-rail users per year = ($0.71/trip) x 3,000,000 non-users per year = $2,117,520
- Benefits to induced rail-users per year = 0.5 (rule of half) * ($1.30/trip) x 2,000,000 additional users per year = $1,300,000
- Benefits to induced non-rail-users per year = 0.5 (rule of half) * ($0.71/trip) x 4,000,000 users per year = $1,420,000
- Total benefit per year = $10,037,520.

The process can be repeated for future year forecasts and for other areas with significant Place impacts.

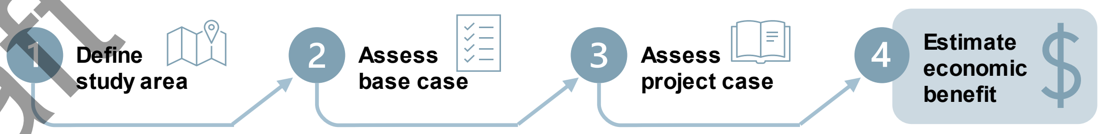
4.2 Pedestrian Environment Review System (PERS)

PERS (Pedestrian Environment Review System) was developed by Transport for London with the Transport Research Laboratory. The tool assesses the quality of a range of pedestrian environments through a range of attributes.

The environments are assessed block-by-block and scored against a wide range of metrics on a 7-point scale from -3 (very poor) to +3 (very good). A zero score represents the minimum standard.

In the Australian context, ATAP recommends that only the pedestrian link aspects of the PERS tool be used, as there are more appropriate methodologies for public spaces, namely VASP and UAPE.

PERS is intended to be applied to a specific area of amenity uplift, which may be a series of spaces for large projects. It explores a series of 14 attributes (for links), each with specific sub-attributes that are all scored on the 7-point scale. A PERS audit of a street may be broken up into areas of one or several blocks and can take up to 2 hours for a qualified practitioner to audit a single area.



The correct application of PERS requires a trained practitioner to audit a pedestrian environment or non-vehicular road space. It can then be entered into a scoresheet which is part of a proprietary system owned and operated by the Transport Research Laboratory. The handbook, scoresheets and software 'streetaudit', as well as training, must all be purchased.

In practice, it is possible alternatively to do this manually, particularly for a rapid assessment of a small-scale project. In such cases, expected improvements can be assessed in a workshop format where attendees rate them based on their best judgement along the point scale presented in Table 4-9 below. Practically, discussions can focus on anticipated deviations from an average expected level of amenity and scores be attributed depending on whether they are high (value of 3), medium (2) or low (1) enhancement (positive sign) or reductions (negative sign). Scores can be allocated in this way overall or by indicator. The WTP value in Table 4-9 can then be applied to derive cents per minute changes to which typical dwell times can be applied.

Once the audit has been undertaken using the PERS system, amenity benefits are calculated on a sub-set of PERS attributes. The formula for calculating benefits is:

$$Amenity\ benefits_t = \sum_i \frac{(Dem_{P,i,t} * Time_{P,i,t} + Dem_{B,i,t} * Time_{B,i,t}) * (PERS.WTP_{P,i} - PERS.WTP_{B,i})}{2}$$

Where:

- $Dem_{X,i,t}$ is the annualised pedestrian demand under scenario X (B = base case, P = project case), for pedestrian space i, in year t
- $Time_{X,i,t}$ is the average time in minutes for each pedestrian under scenario X (B = base case, P = project case), spent in pedestrian space i, in year t
- $PERS.WTP_{X,i}$ is the sum of individual WTP values for PERS indicators under scenario X (B = base case, P = project case) for pedestrian space i

The individual WTP values have been calculated by TfNSW for PERS link attributes as shown in Table 4-9

Table 4-9 WTP for PERS link attributes (cents per person per minute, AU$2024)

Indicators	-3	-2	-1	0	1	2	3
Effective width	0	0.019	0.037	0.052	0.070	0.088	0.217
Dropped kerbs/gradients	0	0.044	0.088	0.133	0.144	0.155	0.166
Obstructions	0	0.019	0.037	0.059	0.077	0.096	0.114
Permeability	0	0.118	0.237	0.354	0.398	0.442	0.491
Legibility	0	0.033	0.070	0.103	0.140	0.174	0.207
Lighting	0	0.066	0.133	0.199	0.237	0.273	0.310
Personal security	0	0.107	0.210	0.317	0.403	0.480	0.561
Surface quality	0	0.092	0.188	0.281	0.376	0.285	0.414
User conflict	0	0.100	0.202	0.303	0.365	0.425	0.487
Quality of environment	0	0.221	0.442	0.665	0.793	0.908	1.022
Maintenance	0	0.077	0.155	0.237	0.281	0.328	0.376
Total	**0**	**0.896**	**1.801**	**2.702**	**3.284**	**3.653**	**4.366**

Source: Values are based on (Buchanan & Accent, 2006). Values converted from GBP to AUD using World bank PPP conversion factor (hhttps://data.worldbank.org/indicator/PA.NUS.PPP). Values are indexed from June 2006 to June 2024.

4.3 Urban Amenity in Pedestrian Environments (UAPE)

Waka Kotahi (NZ Transport Agency) developed a technical paper on valuing Urban Amenity in Pedestrian Environments (**UAPE**) to support its monetised benefits and costs manual, with guidance and values for urban amenity for pedestrian and footpath improvements derived from 25 sources (Waka Kotahi, 2020).

Under the UAPE approach benefits relate to improved quality of experience which are distinct from parameter values for user benefits of faster and more direct routes, health benefits of added walking, and reduced crash risk. This methodology considers four categories of elements as shown in Table 4-10.

Table 4-10 Elements of the pedestrian environment used in UAPE, and application to transport projects

Category	Examples of specific aspects	In scope for transport investment?
Surrounding land use	• Active retail frontages • Parks and open space	Yes, if pedestrian routes are impacted by land use change
Traffic environment	• Street width/number of lanes • Traffic volumes • Traffic speed	Yes, although this has broader impacts on other road users
Footpath links	• Presence and width of footpaths • Footpath condition, quality, and clutter • Seating and street furniture • Street trees and plantings • Wayfinding and signage • Lighting and CCTV • Footpath activity/ crowding • Pedestrianisation/ shared spaces • Conflict with bicycle riders on paths	Yes
Pedestrian crossings	• Dropped kerbs (kerb ramps) at crossings • Median islands • Zebra / raised crossings • Signalised intersections • Overbridges/ underpasses	Yes

Source: Waka Kotahi (2020)

4.3.1 Valuing impacts using UAPE

WTP for an improved pedestrian facility can be calculated by summing together applicable benefit valuation parameters presented in Table 4-11:

$$WTP_{new} = \sum_{j \in J} WTP_j$$

Where:

- j identifies each distinct attribute improvement provided by the new facility
- WTP_j is the WTP for improved facility attribute j, measured in terms of percentage increase in walk time that an average user would be willing to incur to access this improvement

These parameter values are shown at Table 4-11 and are expressed as a **ratio of the increase in walking time because of the intervention**. This is effectively a WTP (expressed as willingness to increase walking time) for increased urban amenity in the pedestrian environment. For example, a 1-minute walking route in the base case has no footpath or lighting, while the project case adds a footpath (increase ratio of 1.59) and lighting (increase ratio of 0.06) along the whole route. A person would then be indifferent between walking 1 minute in the base case route or 2.65 minutes in the project case route due to the improved quality of the walking experience.

The tables include an additional column categorising the confidence level in using these parameters outside of the original context in which they were derived. No parameter values are provided for improved pedestrian crossings as this represents a double counting of pedestrian delay and crash risk parameters. Instead, practitioners are recommended to use the Austroads *Australasian Pedestrian Facility Selection Tool* (Austroads, 2023) which takes account of these factors to recommend a facility.

Table 4-11 Parameter values for relative increase in walking time due to improved urban amenity (UAPE)

Attribute	Description	Ratio increase in willing walk time	Level of confidence to apply to local conditions
Traffic environment			
Traffic volume	Reduce AADT by 1000 vehicles	0.05	Medium confidence
Traffic speed	Reduce average traffic speed by 1km/hr	0.03	Medium confidence
Footpath links			
Presence of footpath	Basic 1.2m wide footpath available, relative to no footpath/walking on the side of the road	1.59	Medium confidence
Footpath width: Crowded conditions	Increase width by 1 meter Crowded conditions defined as a flow rate equal to or above 33 pedestrians per meter of usable width per minute	0.14 (capped at 0.56)	Medium confidence, to be updated after local research
Footpath width: Uncrowded conditions with narrow footpath	Increase width by 1 meter 'Narrow footpath' defined as two meters or less and 'Uncrowded conditions' defined as below 33 pedestrians per meter of usable width per minute	0.07 (capped at 0.14)	Low confidence, to be updated after local research
Footpath width: Uncrowded conditions with wide footpath	No benefits apply Wide footpath defined as greater than 2 meters' and 'uncrowded conditions' defined as below 33 pedestrians per meter of usable width per minute	0.00	Low confidence, to be updated after local research
Pavement condition	Smooth pavement without cracks, relative to cracked or uneven	0.03	Medium confidence
Pavement quality	Attractive/high quality paving relative to basic asphalt paving	0.08	Low confidence, to be updated after local research
Covered route	Awnings, verandas, or canopies are present	0.28	Low confidence, to be updated after local research
Dropped kerbs (kerb ramps)	Crossings are level with streets or offer dropped kerbs	0.02	Medium confidence
Footpath amenities			
Lighting or CCTV	Route is it and or/monitored by CCTV	0.06	Medium confidence
Street trees or plantings	Trees or plantings are present on or adjacent to footpath	0.20	Low confidence, to be updated after local research
Seating	Seating is available on link	0.01	Medium confidence
Signage and wayfinding	Signs and wayfinding devices are available	0.02	Medium confidence
Activity and conflict			
Remove conflict with cyclists	No or few cyclists are present on the link, relative to a shared path with reasonable cycle volumes	0.10	Low confidence
Surrounding land use			
Routes through parks	100% route through park, relative to routes in other areas	0.24	Medium confidence

Retail frontages	100% active retail frontage, relative to 0% active frontage	0.35	Medium confidence

Source: Waka Kotahi (2020)

4.3.2 Estimating impacts using UAPE

Where induced demand cannot be modelled, user benefits can be calculated using a modified version of the consumer surplus formula, as follows:

$$UAPE\ Benefits = D_{existing} * VOT * \left(T_{existing} - \frac{T_{new}}{1 + WTP_{new}}\right)$$

Where:

- VOT is the value of travel time savings (in $/minute) for walking facility users
- $D_{existing}$ is the future existing number of facility users, or the number that would be expected in the future regardless of intervention
- $T_{existing}$ is the travel time to use the existing facility, in minutes
- T_{new} is the travel time to use the improved facility, in minutes
- WTP_{new} is the WTP for improved facility quality, which is multiplied by the time spent using the new facility to obtain total user benefits from improved quality

Where induced demand can be modelled, the following formula is used to calculate user benefits:

$$UAPE\ Benefits = 0.5 * \ (D_{existing} + D_{new}) * VOT * \left(T_{existing} - \frac{T_{new}}{1 + WTP_{new}}\right)$$

Where:

- VOT is the value of travel time savings (in $/minutes) for facility users
- $D_{existing}$ is the future existing number of facility users
- D_{new} is the predicted total number of users for the improved facility
- $T_{existing}$ is the travel time to use the existing facility, in minutes
- T_{new} is the travel time to use the improved facility, in minutes
- WTP_{new} is the WTP for improved facility quality, which is multiplied by the time spent using the new facility to obtain total user benefits from improved quality

The benefit to new walk trips is half the number of existing users (the rule of half). In both formulas, the time on a facility is estimated by dividing the length of the facility by the average walking speed. Walking time may be adjusted for slopes, stairs[2] or crossing delay[3].

[2] Fruin measured average stair-walking speeds at 0.59 – 0.63m/s for women and men respectively, when ascending, and 0.67 to 0.88m/s for women and men respectively, descending (Fruin, 1971). So, if a typical speed of 1.33 (400m in 5 minutes) is used, then any part of a crossing that is stairs should be doubled for walk time.

[3] Half of the signal cycle between pedestrian green signals should be applied to represent average delay.

4.3.3 Case study: Providing a new footpath where one does not exist

This case study assesses an improvement to a 1.2km stretch of road that currently has no footpath. There are three options for upgrading this facility. Option 1 would provide a basic 1.2m footpath, Option 2 would provide a 2.4m footpath, and Option 3 would provide a 2.4m footpath with high quality paving. At present, 100 people per day walk on the road, and it is predicted that user volumes would rise by 20% if a footpath was available.

The following table shows how benefits can be calculated for this project. The amount of time users spend travelling on the facility does not change, as facility length remains the same under all options. However, all three options provide benefits from improved quality of experience. Total WTP parameters are larger for Options 2 and 3 than for Option 1, indicating that these options provide increased user benefits. Total user benefits are calculated by multiplying WTP for improved facilities by walking time on the facility and then multiplying by user numbers, with a rule of half adjustment for new users.

Total benefits are calculated using the consumer surplus formula in equation 2 and monetised using an average value of travel time of $12/hr, or $0.20/minute. Total daily user benefits are equal to $560 for Option 1, $619 for Option 2, and $673 for Option 3. This indicates that the benefits of providing a footpath in the first place are large relative to marginal improvements to that facility.

Table 4-12 Calculating user benefits for options to provide a new footpath on a road that currently lacks one

Option definition	**Ratio increase in walk time factor**	**Base Case**	**Option 1**	**Option 2**	**Option 3**
Description		Current state	Add a basic 1.2m footpath	Add a wider (2.4m) footpath	Add a wider (2.4m) footpath with high quality paving
Facility length (meters)		1200	1200	1200	1200
Facility characteristics					
Footpath presence (basic, 1.2m wide)	1.59	False	True	True	True
Added footpath width (meters)	0.14		0	1.2	1.2
Pavement quality (high)	0.08	False	False	False	True
User characteristics					
Daily user volumes		100	120	120	120
Share of link used by typical user		100%	100%	100%	100%
Model workings					
Walking time on facility (min)		16.0	16.0	16.0	16.0
Walking time saving (min)			0.0	0.0	0.0
WTP parameter (% increase in walk time)			1.59	1.76	1.84
Total WTP for improvements (min)			25.4	28.1	29.4
Total daily benefits (min)			**2798**	**3094**	**3235**
Total daily benefits ($)			$560	$619	$647

Source: Waka Kotahi (2020)

5. Amenity and use

Public space benefits

The NSW Framework for Valuing Green Infrastructure and Public Spaces (DPE, 2023) (the VGIPS Framework) provides guidance on estimating place-related benefits attributable to urban amenity improvements. It divides these into new facilities and changes to existing facilities:

- New facilities and urban parks: Valued on a $ per household basis within a determined catchment area.
- Changes to existing facilities: Estimates value of varying quality by applying a scaling factor based on CAPEX spend relative to base case.

The VGIPS Framework outlines a range of benefits of green infrastructure and public space. Table 5-1 summarises the Place benefit categories that would most likely apply to transport-related interventions.

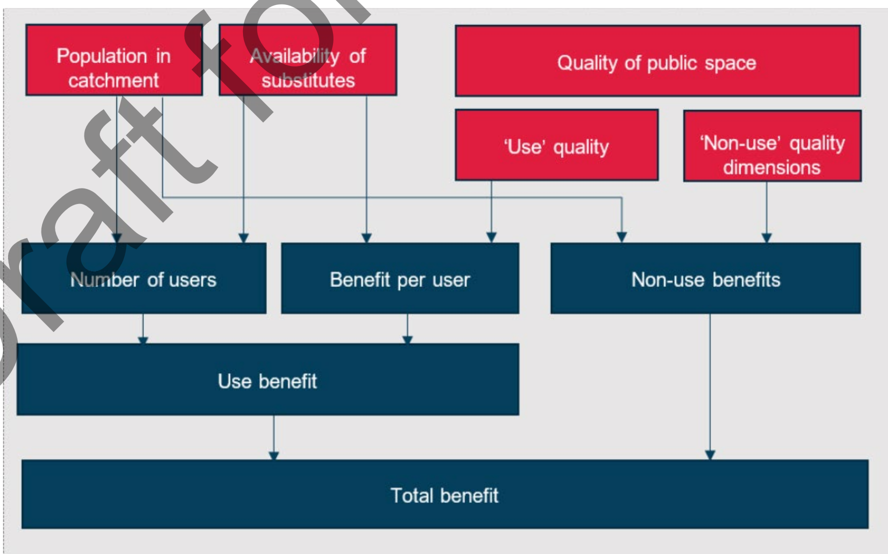
Table 5-1 Place benefit categories and applicability to transport-related interventions

Benefit category	Description	Applicability to transport-related interventions
Use value (recreational benefits)	User benefits reflect the value derived from individuals directly interacting with public space. This is based on the amount consumers are hypothetically willing to pay for the use of the amenity, even if no actual payment is made. For instance, the value to an individual of visiting a public park or plaza is determined by the perceived benefit they receive, akin to how much they would be willing to pay to enjoy the amenity if a fee were required.	Potential application. See section 5.1
Use value (health benefits)	The use of public open space may be associated with improvements in health, due to regular active and passive recreation, and social connection. These may be physical or mental health benefits.	Potential where not already counted in ATAP Guidance (e.g., walking and cycling for transport purposes). See section 5.2
Other	Air quality, active transport, biodiversity, GHG impacts, stormwater management.	See chapter 7

Source: (NSW Department of Planning and Environment, 2023)

The VGIPS Framework argues that benefits of public space are driven by a range of features, as shown in Figure 5-1, and that use value will be highest where the public space has a large population in the catchment (which defines the area where infrastructure users typically come from), there are few available substitutes, and the facility is of high quality.

Figure 5-1 The major factors of the value of a public space



Source: (NSW Department of Planning and Environment, 2023).

5.1 Use Value (recreational benefits)

Use value (recreational benefits) measures the change in consumer surplus because of improvements to an existing public open space, such as a street or park. The key determinants of the use value of new or improved public open space include the:

- types of uses and diverse functions that the Place allows
- number of people within a catchment, which determines the number of users
- quality of a Place, which could include improved facilities, functional size, accessibility and connectivity
- availability (quantity), quality and capacity of other substitute facilities.

The recommended parameter values for new urban parks or green space are derived from the base value, the value of additional facilities (built on top of the base park), and an adjustment for the value of the quality of the park or facility. Note that ascribing a base value based on surrounding property values can lead to inequity and therefore needs consideration to ensure this risk is mitigated - see the callout box below and discussion in section 10.1.

- **Base value** — relates to changes in property values within a certain catchment area, as a result of the changes in area of public open space. The benefit is measured by applying a percentage increase in property prices per percentage point increase in the share of open space in the surrounding catchment area. A base value of 0.3% increase in property prices for each 1% increase in share of open space is recommended (Varma, 2003). The **base value catchment area** depends on the park size. As an approximate guide, the VGIPS Framework recommends 200 metres catchment for a small local park of less than 0.5 hectares: 400 metres catchment for a local park of 0.5 ha to 5 hectares, and 1600 metres for a district park of up to 25 hectares (NSW Department of Planning and Environment, 2023). While the benefit for the base value is measured through a once-off change in property values, this is simply a proxy for the value of the annual services provided to users of a park, which is then incorporated into the value of the property.
- **Value of additional facilities** — applies WTP estimates, by households located within the catchment, for each additional characteristics of the public open space. These characteristics, and their WTP value, are shown in Table 5-2. The VGIPS Framework argues that, if a similar substitute is closer to a household than the additional facility, it is not counted in the WTP estimate for that household.
- **Base value quality of park adjustment –** this approach is aimed at comparing the quality of an improvement, based on the extent or cost of augmentation. This scales the base park amenity factor by the level of expenditure on improving its amenity. For example, if a new park has a capital expenditure of $100 per m^2, compared to a standard capital expenditure of $200 per m^2, then the base park amenity factor would be halved from 0.3% per additional percentage share of open space to 0.15%.

Equity in valuation methods

Ascribing a base value based on surrounding property values and adding percentage uplift in value because of an intervention is problematic for social equity. Such a method will result in investments in more affluent areas being valued more highly – and therefore seen as more worthwhile investing in – than areas of lower affluence.

This is particularly problematic when comparing multiple locations of different socio-economic status or affluence.

See section 10.1for further discussion on adjustments based on user need.

Table 5-2 Household WTP by characteristic at an urban park or sports field (AU$2024)

Characteristic	Urban Park $/household	Sports field $/household
Picnic shelter and BBQ facilities	31.9	37.5
Play space (standard)	32.2	33.0
Cycling or walking track	25.3	n/a
Lighting	13.8	n/a
Outdoor fitness area	18.2	27.5
Skatepark	10.3	18.3
Event space	13.8	n/a
Dog off-leash area	32.2	n/a
Basketball and netball court	n/a	22.2
Bike tracks	n/a	25.6
Basketball court	n/a	9.6
Cricket nets	n/a	6.6

Source: ((Community and Patient Preference Research, 2022)) indexed to 2024 values

Table 5-3 outlines the recommended valuation methods for new and existing park space.

Table 5-3 Recommended approach for valuing parks and public spaces

Type of space	New	Existing
Urban parks	• Apply base value approach to estimate the benefit derived from the increase in the share of area that is park - applied to an approximate catchment. • Note that caution should be used from an equity perspective if comparing multiple locations of different socio-economic status. • Apply WTP for additional facilities for new assets	• If facilities are known, apply the WTP for additional facilities provided at existing assets. • If less defined or facilities provided do not align with those in Table 5-2, apply the base value quality of park adjustment approach.

Figure 5-2 Southbank, Brisbane QLD with a wide range of facilities including seating and playgrounds

5.2 Use Value (health benefits)

Current ATAP guidance provides methods and parameter values for the health benefits of transport projects. These may include health benefits of walking and cycling for transport, or the reduction of pollutants from switching modes. However, there may be health benefits to users of a Place which are not directly attributable to transport. For example, if a street space is converted into a recreational space that people use for exercise (e.g. skate ramp, children's play area, dance space, outdoor gym) or to provide additional green space or social space that improves mental health, then it may provide additional health benefits that are not already covered by the ATAP guidance for transport infrastructure. A visitation-based model which applies a benefit parameter per visitor, is the most suitable for this application.

The visitation-based method is applicable if estimates of use are available, such as for new or improved protected areas or improvements to parks where visitation information is available. The method to calculate health benefit is implemented as follows (NSW Department of Planning and Environment, 2023):

$$\begin{aligned} Health\ benefit\ =\ & (Number\ of\ visits) \times (Time\ spent\ exercising\ per\ visit) \\ & \times (Factor\ for\ additional\ activity) \times (Conversion\ to\ walking\ equivalent\ kilometres) \\ & \times (ATAP \frac{\$}{km} for\ walking) \end{aligned}$$

- Measure the amount of expected use (or change in use) in number of visits.
- Estimate the average time spent doing moderate-intensity exercise per visit.
- Apply a factor for how much of the activity is additional. This will be higher where there are few alternatives.
- Convert additional minutes of activity into walking-equivalent kilometres, based on 5 kilometres per hour of activity.
- Apply the ATAP dollar value per additional km of walking to the walking-equivalent kilometres.

6. Access and connection

6.1 Urban severance

Severance means the separation of people from facilities and services they use within their community, caused by substantial changes in transport infrastructure or by changes in traffic flows. Severance occurs where high numbers of vehicles significantly impede pedestrian movement, requiring them to walk long distances or wait a long period of time to cross; or where infrastructure is a physical barrier to movement (such as a train line or motorway).

6.1.1 Estimating and valuing severance impacts

Table 6-1 provides a range of WTP values for the inclusion of severance effects in the appraisal of interventions to change road design and traffic controls (Anciaes, 2018). The values apply per pedestrian trip.

Table 6-1 Values of interventions to reduce community severance ($ per person per walking trip).

Estimate	2 to 1 lane	3 to 2 lanes	Central reservation	Medium to low density traffic	High to medium density traffic	Speed below 30 mph
Low	1.59	2.16	1.82	1.17	2.07	0.46
Central	2.30	2.95	24.87	1.75	2.49	1.04
High	3.02	3.73	3.16	2.35	2.90	1.61

Notes: Values presented in AU$2024 terms, and low and high values are the limits of the 95% confidence interval.

Source: (Anciaes, 2018)

Severance effects relating to additional travel costs from new transport infrastructure can also be quantified using transport modelling programs. This modelling should include the impact on pedestrian, cycling and local vehicle movements affected by the project, ensuring that impacts on local connectivity are appropriately factored into the CBA. It should be noted that, at time of writing, most transport demand modelling undertaken in Australia does not adequately account for non-car modes, in particular active transport, therefore first principles approaches should be employed as a sense check even where transport models are available.

Note that ATAP PV5 provides severance values on the broader per km travelled basis.

6.2 Active transport benefits

Refer to ATAP M4-Active Travel for specialist Mode Specific Guidance on active transport. M4 provides guidance for estimating the following active transport benefits:

- User benefits to active travellers (safety, travel time, private health benefits from physical activity, walking environment amenity benefits)
- Any resource cost corrections required for unperceived user costs, and
- External benefits from reductions in external cost to third parties (road decongestion, reduced emissions and improved air pollution, reduced health system costs).

Refer to section 3.2.3 for further information on the potential double-counting of benefits between M4-Active Travel and this document.

7. Green and blue infrastructure

The benefits outlined in this chapter, including improved air quality, GHG sequestration, and urban cooling, are associated with tree canopies. Green infrastructure refers to vegetation and trees, while blue infrastructure relates to water bodies such as lakes, rivers and oceans.

> **Double counting**: To prevent double counting for urban tree canopies the benefits for improved air quality, GHG sequestration, and urban cooling should not be accounted for if they are otherwise included in other amenity benefits relating to trees in urban environments. Refer to ATAP **PV5**.

7.1 Urban cooling

Urban environments often suffer from higher temperatures due to the heat island effect, where artificial surfaces absorb and re-radiate heat more than natural landscapes. This increased heat can lead to direct health impacts, such as heatstroke and respiratory difficulties. It can also drive-up energy consumption for cooling which results in associated financial costs, as well as GHG emissions from increased energy use.

Benefits and disbenefits in urban planning

Urban cooling refers to strategies that reduce ambient temperatures in urban areas, thereby mitigating the urban heat island effect. These strategies often involve increasing green infrastructure such as parks, green roofs, and particularly tree cover, which provide shade and cool the air through evapotranspiration.

Urban cooling benefits derive from the implementation of specific features that alter the local microclimate. These benefits can vary significantly depending on several key factors:

- **Proximity to green infrastructure**: The closer the green infrastructure, such as parks or street trees, the more pronounced the cooling effect. This proximity reduces local temperatures by providing shade and facilitating evapotranspiration.
- **Local climate conditions**: The baseline climate of an area greatly influences the potential for urban cooling. Regions with naturally higher temperatures and more intense solar radiation are likely to experience more significant temperature reductions from the same urban cooling measures compared to cooler areas.
- **Types of vegetation**: Different species of trees and plants have varying abilities to provide shade and transpire water. For example, large, leafy trees typically offer more cooling than smaller shrubs due to their extensive canopy and greater leaf surface area.
- **Existing and projected temperature extremes**: Areas that experience higher peak temperatures are more likely to benefit from temperature reductions from urban cooling, especially during heatwaves. Conversely, regions with milder or more steady climates may see smaller relative benefits.

The impact of urban cooling is quantified using the equation below (NSW Department of Planning and Environment, 2023):

$$\begin{aligned} &Health\ benefits\ from\ urban\ cooling \\ &\quad = number\ of\ people\ in\ catchment\ area\ \times number\ of\ days\ over\ 30°C\ per\ year \\ &\quad \times reduction\ in\ temperature\ (°C)\ \times health\ impact\ per\ change\ in\ 1°C\ per\ person\ per\ year \end{aligned}$$

$$\begin{aligned} &Cooling\ energy\ costs \\ &\quad = number\ of\ households\ in\ catchment\ area\ \times\ reduction\ in\ temperature\ (°C\ ) \\ &\quad \times energy\ impact\ per\ change\ in\ 1°C\ per\ household \end{aligned}$$

$$GHG\ emissions\ costs = number\ of households\ in\ catchment\ area\ \times\ reduction\ in\ temperature\ (°C\ ) \times GHG\ impact\ per\ change\ in\ 1°C\ per\ household$$

Estimating tree canopy size

(NSW Department of Planning and Environment, 2023) presents categorisations of trees by size, as shown in Table 7-1 alongside typical growth rates and canopy spreads for each size of tree. The parameters are indicative only, and projects for which urban cooling is expected to be a primary benefit require additional detailed analysis to improve the accuracy of estimates.

Table 7-1 Typical properties of trees of different sizes

Tree size	Mature tree height (m)	Canopy spread diameter (m)	Canopy spread area (m^2)	Years to mature tree height (years)		
				Slow growth	Medium growth	Fast growth
Small	6-9	6	28	25	17	13
Medium	10-15	8	50	42	28	21
Large	16+	12	113	53	36	27

Estimating temperature differences

To estimate the temperature differences attributed to urban cooling, the following steps should be followed:

- **Assess urban layout and existing greenery:**
  - map existing green infrastructure and its distribution relative to residential and commercial areas.
  - evaluate the density and type of vegetation currently in place.
  - Determine the catchment area – the geographic area that will benefit from the urban cooling.
- **Estimate temperature reductions:**
  - Utilise climate modelling software to simulate potential temperature reductions based on different scenarios of increased greenery or altered urban surfaces.
  - Compare these simulations to a baseline scenario without the proposed changes.
  - The following parameters may be used as a guide for estimated temperature reductions within a catchment area (NSW Department of Planning and Environment, 2023):
    - 1.13°C for every additional 10% of catchment area covered by tree canopy, compared to no vegetation.
    - 0.63°C for every additional 10% of the catchment that converts from green open space to tree canopy cover
    - 0.50°C for every additional 10% of the catchment that converts from no vegetation to green open space (not canopy cover).
  - When calculating the tree canopy cover in each year, practitioners should account for the growth rate of new trees by assuming constant growth rates of canopy cover until mature canopy cover is achieved.
- **Collect data and analyse:**
  - Gather temperature data in similar urban settings to establish a baseline.
  - Monitor and analyse temperature changes in pilot areas where urban cooling measures have been implemented.
  - Include predictive modelling to assess how future climatic conditions could impact the effectiveness of current urban cooling strategies.

Valuing urban cooling benefits

Valuing the benefits of urban cooling involves quantifying the economic and health advantages resulting from temperature reductions in urban areas (NSW Department of Planning and Environment, 2023), including:

- **Reduced heat-related health issues**: Cooler temperatures help mitigate the risk of heat-related health problems. The health benefits from reduced exposure to excessive heat are valued at $3 per person per year for each day the temperature exceeds 30°C[4].
- **Energy savings**: For every degree Celsius reduction in temperature, households can save approximately $13.50 annually on cooling costs. These savings accrue from the decreased need for air conditioning and other cooling systems[5].
- **GHG emissions reduction**: Reduced reliance on air conditioning lowers energy consumption, which in turn decreases GHG emissions. The amount of GHG reduction is estimated at 37 kg CO2-e (0.037 tCO2-e) per household per year for each degree of temperature reduction[6]. The total estimated emissions savings should be multiplied by the emissions value presented in Table 7-3 respective to the year in which they are estimated to be realised. This estimate is based on 0.81 kg CO2-e per kWh of electricity used for cooling and is expected to reduce over time as the emissions associated with Australian and New Zealand energy generation reduce over time.

The total impact of urban cooling can be derived by multiplying the savings per unit (household or person) by the number of units affected within the catchment area for each of the relevant categories listed above.

It is important to note that the GHG emissions savings discussed here result from reduced energy consumption for cooling purposes. This is distinct from carbon sequestration by vegetation, which removes carbon dioxide (CO2) directly from the atmosphere. Therefore, these two types of GHG benefits should be considered separately in analyses and valuations.

7.2 Air quality

In addition to the air quality impacts valued in PV5, trees and vegetation in urban environments may influence air quality, positively or negatively, through various mechanisms such as:

- **Pollutant capture**: Trees capture particulate matter on their surfaces, reducing the concentration of harmful particulates in the air.
- **Gas absorption**: Harmful gases like ozone and nitrogen dioxide are absorbed into tree leaves.
- **Organic particle emission**: Trees emit organic particles such as pollen which can affect local air quality.
- **Disruption of pollution dispersion**: Trees can alter wind patterns, impacting pollutant dispersion.

Benefits and disbenefits in urban planning

The role of trees in improving air quality directly influences public health by reducing the incidence of conditions associated with poor air quality. Improved air quality can decrease the prevalence of respiratory disorders, cardiovascular diseases, and allergies, among other health issues. Specifically, air quality changes can impact:

[4] Based on incidence rate per degree and cost of heat related incident per person (NSW Department of Planning and Environment, 2023)

[5] Based on retail electricity price of 30 cents per kWh (NSW Department of Planning and Environment, 2023)

[6] Based on 0.81 kg CO_2-e per kWh of electricity.

- **Respiratory Health**: Reduction in particulate matter and harmful gases lower the rates of asthma, bronchitis, and other respiratory conditions (Australian Government Department of Health and Aged Care , 2023).
- **Cardiovascular Health**: Cleaner air reduces the risk of heart attacks and strokes associated with long-term exposure to pollutants (United States Environmental Protection Agency, 2023).
- **Allergies and Discomfort**: While trees mitigate many forms of air pollution, pollen emissions from certain species can exacerbate allergies. This represents a disbenefit that needs consideration in urban planning.

The primary factors influencing the air quality benefits from trees include the population density within the affected area, the extent of air pollution reduction achieved through changes in tree canopy, and the current and anticipated levels of air pollution.

Estimating air quality changes

The impact of trees on air quality in urban environments is distinct from the air pollution typically associated with transport activities such as vehicle emissions, which are covered in **ATAP PV5**. To estimate the changes in air quality due to urban tree cover in urban areas with over 10,000 people, practitioners should estimate the tree's:

- **Canopy size:** Evaluate the total area and density of tree canopy within urban settings. The effectiveness of trees in air quality improvement is largely dependent on the canopy coverage area, which filters air by capturing particulates and absorbing gases.
- **Potential for reducing pollution:** Calculate the potential reduction in air pollutants by assessing the types of trees and their respective abilities to capture and absorb various pollutants. This involves considering factors such as the species' leaf surface area and the typical pollutants in the area.

The NSW Department of Planning and Environment recommends estimating the health benefits associated with urban tree canopy by using the formula:

$$Health\ benefits\ (urban) = Area\ of\ tree\ canopy\ in\ m^2 \times Benefit\ per\ m^2\ of\ tree\ canopy$$

Where:

$$\begin{aligned} Benefit\ per\ m^2 of\ tree\ canopy \\ &= grams\ of\ PM_{2.5}\ reduced\ per\ m^2\ of\ canopy\ cover \\ &\times Avoided\ damage\ cost\ per\ gram\ of\ PM_{2.5} \end{aligned}$$

The parameters in Table 7-1 may be used to estimate the area of tree canopy.

(NSW Department of Planning and Environment, 2023) recommends 0.25 grams of $PM_{2.5}$ reduction per m^2 of tree canopy area per year, based on the average reduction in air pollution estimated in identified studies.

This approach encompasses all tree cover within significant urban areas, excluding impacts from other forms of greenery such as grassed areas (NSW Department of Planning and Environment, 2023). The approach described in this guidance should only be used to estimate air quality changes for urban areas with over 10,000 people. Where projects require estimation of air quality changes for less populated areas, a separate methodology should be justified, detailed, and used.

Valuing air quality changes

The value per square metre of tree canopy varies by location, reflecting regional differences in air quality improvement potentials and population density.

Based on the values developed by (PAEHolmes, 2013) and adopted by (NSW Department of Planning and Environment, 2023), an average value of $381.9 per tonne of $PM_{2.5}$ reduced per unit of population density may be used (measured in number or people per km^2).

$$Avoided\ damage\ cost\ per\ gram\ of\ PM_{2.5} = \frac{\$381.9}{Population\ density\ (measured\ in\ number\ of\ people\ per\ km^2)}$$

The value applied will therefore vary by the population density in the areas in scope of a project or investment option.

7.3 Greenhouse gas sequestration

[Drafting note for ATAP: Although GHG Sequestration is not strictly a Place benefit (climate change impacts are aspatial), the benefits follow on from the approach used to estimate urban cooling and air quality benefits from changes in tree canopy. For this reason, and that it is not covered in other ATAP Guidance, we have included this benefit category in the draft report.]

GHG and climate change

GHGs are atmospheric compounds that contribute to the greenhouse effect, a natural phenomenon that heats the Earth's surface and atmosphere. The major types of GHGs, as identified under the Australian National Greenhouse and Energy Reporting Scheme, include CO2, methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

Human activities have significantly increased the concentrations of these gases and intensified the greenhouse effect. The resultant climate change poses a range of hazards such as heightened air and sea temperatures, melting polar ice and rising sea levels, alongside an increase in the frequency and severity of extreme weather events like droughts, floods and cyclones. These climate-related events inflict considerable harm on communities and natural ecosystems, and result in an economic, environmental and social costs.

Natural GHG sequestration

GHG sequestration is the process of capturing GHGs from the atmosphere, predominantly through the conversion of CO2 into other chemical forms. Trees, vegetation and soil are effective natural agents for GHG sequestration, primarily through photosynthetic processes where CO2 is fixed during photosynthesis and stored as biomass.

Benefits and disbenefits in urban planning

The addition of trees to urban environments can yield benefits associated with the reduction of GHGs through carbon sequestration. These benefits can be quantified and included in CBA. Conversely, the removal of significant tree cover may result in disbenefits due to the loss of these sequestration capabilities and should also be considered in project appraisal.

The GHG sequestration outcomes discussed here focus on tree-based sequestration and do not extend to other emissions associated with transport such as direct vehicle emissions, embodied emissions, or end-of-life emissions of materials. The inclusion of these broader GHG emissions should follow the guidance outlined in **ATAP PV5**.

Estimating GHG sequestration impacts

To quantify the impact of sequestration, ATAP adopts the approach as outlined below (NSW Department of Planning and Environment, 2023).

$$GHG\ impact\ (\$) = area\ of\ tree\ planting/removal\ m^2 \times tonnes\ of\ CO_2e\ sequestered\ per\ m^2 \times value\ per\ tonne\ of\ CO_2e$$

While grasses, garden beds and soil also sequester GHGs, evidence for accurately quantifying their sequestration in urban settings is limited. Therefore, this guidance recommends estimating GHG sequestration based on the number of trees added or removed, the volume of the tree canopy impacted, and the age of the trees over the appraisal period.

Table 7-1 may be used to estimate the area of tree canopy (canopy spread) based on different sized trees. (NSW Department of Planning and Environment, 2023) provides standard parameters on the mass of GHG sequestered per area of tree canopy for most projects, as outlined in Table 7-2 below. In projects where the main objective is carbon sequestration, it is advisable to employ specialised tools to develop more robust estimates of carbon sequestration.

Table 7-2 Guide on kilograms of GHG sequestered per canopy area per year for different tree sizes

Tree Age	GHG sequestration per year (kg of CO2-e per m^2 of area covered by tree canopy)
0-5 years	0.88
5-10 years	$\frac{671}{300} = 2.23\overline{6}$
10-20 years	$\frac{517}{300} = 1.72\overline{3}$
20+ years	0.30

Valuing GHG emissions

The economic value of GHG emissions is internationally quantified in terms of dollars per tonne of CO2 equivalent ($/tonne CO2-e). Historically, Australian studies have suggested a value of approximately A$71 per tonne of CO2-e (indexed to December 2023 dollars). Infrastructure Australia's updated Guide to Assessing GHG Emissions recommends an escalating value for carbon based on the cost of meeting Australia's GHG emission targets to 2050, as shown in Table 7-3.

Table 7-3 Economic value of GHG emissions (AU$2024)

	Central estimates	Lower bound estimates	Upper bound estimates
	Expected value (mean)	**50% confidence interval**	**50% confidence interval**
Year	**$/tCO2e**	**$/tCO2e**	**$/tCO2e**
2024	56	44	66
2025	66	56	77
2026	76	62	95
2027	88	69	107
2028	104	76	132
2029	123	87	152
2030	148	107	180
2031	171	124	210
2032	192	144	227
2033	209	159	258
2034	222	166	262
2035	234	172	280
2036	244	184	293
2037	254	191	308
2038	264	193	319
2039	273	206	329
2040	282	210	340
2041	291	212	351
2042	300	215	361
2043	309	228	370
2044	318	246	375
2045	326	267	380
2046	335	272	403
2047	344	274	421

2048	354	276	429
2049	363	284	437
2050	377	287	469

Source: (Infrastructure Australia, 2024)

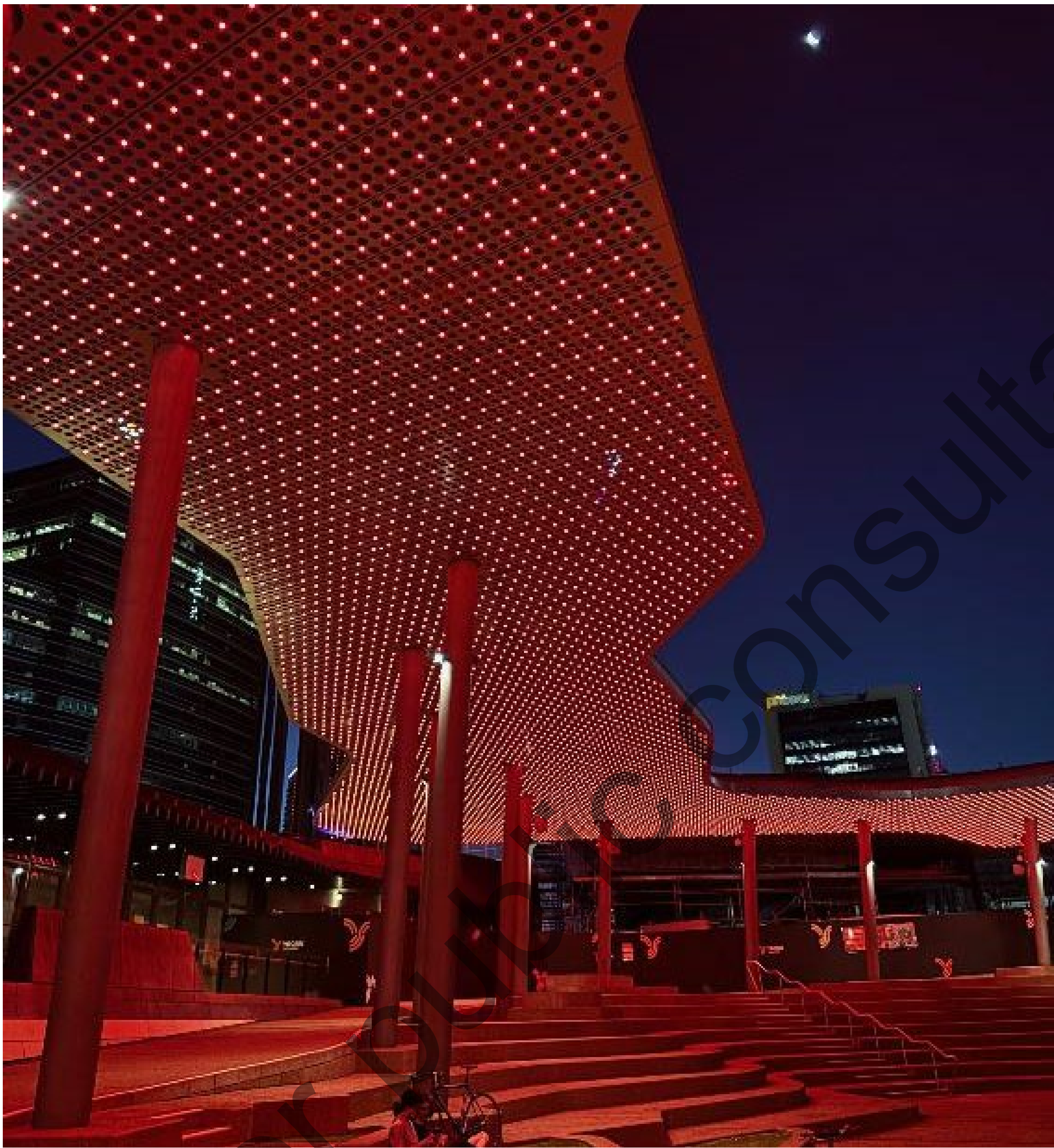
ATAP recommends aligning GHG emissions valuation (central estimates) with Infrastructure Australia's guidelines for Commonwealth Government investment decisions. For state, territory, or local investments, practitioners should first align with their respective state's GHG valuation guidance or, if unavailable, refer to Infrastructure Australia's values.

7.4 Noise

Noise is typically considered in transport business cases (with parameters set out in **O3 Urban Amenity and Liveability, section 4.3.1 and PV5 Environmental Parameter Values**), and takes account of 'annoyance' impacts that can be regarded as a Place attribute because it impacts on people in that local area, whether or not they are users of the transport mode. In traditional business cases, consideration of environmental noise including transport noise would therefore appear to, on its face, already take account of this Place impact. The disbenefit of environmental noise generally relates to health and wellbeing impacts where that noise cannot be avoided or mitigated such as cardiovascular disease, child cognitive abilities and sleep disorder.

Distinct from this is the impact of noise on the pleasure of spending time in an urban environment, which is 'elective' in the sense that people can choose to avoid that urban environment and walk or dwell elsewhere. This kind of disbenefit (and the corresponding benefit of noise reduction) is quantified in WTP terms as part of the general 'urban amenity' methods set out in chapter 4. However, no literature was identified with a parameter value for noise reduction alone, outside of the 'urban amenity' benefit. Noise reduction has also been called out as a currently non-monetised benefit for green infrastructure generally in (NSW Department of Planning and Environment, 2023).

Figure 7-1 Karak Walk at Yagan Square in Perth, where the train line was sunk underground to create a large public space above ground, adjacent to Perth's central train and bus station



8. Character and form

One way of understanding Place is through people's attachment to Place – the 'meaning' within the conceptualisation of Place as form, activity and meaning.

8.1 Cultural and heritage value

Cultural heritage and cultural landscapes include physical and built forms, archaeological values, and intangible aspects of cultural heritage and cultural landscapes.

The Burra Charter and practice notes set out how to assess cultural significance (Australian ICOMOS, 2013). The practice notes call for all aesthetic, historic, scientific, social, and spiritual values to be assessed, which includes the spatial relationship of items in a particular Place (i.e. the 'cultural landscape').

Transport projects should therefore not only capture, record and value heritage items and known archaeological sites, but also conduct a detailed assessment of the project area and identify whether or not a conservation management plan is required. This may include identifying and valuing the physical and visual links between specific items of aboriginal heritage within a project, such as scar trees that form markers on a songline, or the visual impact of a transport project on the heritage 'curtilage' of a European heritage item.

Figure 8-1 Steps for understanding and assessing cultural significance

1 Understand the place
Define the place and its extent
Investigate the place, its history, use, associations, fabric.

2 Assess cultural significance
Assess all values using relevant criteria
Develop a statement of significance

3 Identify all factors and issues
Identify obligations arising from significance
Identify future needs, resources, opportunities, constraints, and conditions

4 Develop Policy

Source: ICOMOS Practice Note 'Understanding and Assessing Cultural Significance', Steps 1 to 4

Valuing heritage

Where the relevant transport agency is also the custodian of a heritage item, it may have a legal obligation to maintain the heritage quality and status of a heritage item, and therefore the value (and cost) of doing so must form part of the base case for assessment.

The value of heritage related benefits and disbenefits is dependent on the type of heritage site and its attributes. Heritage sites can be buildings, landscapes or other historic sites. The attributes of these sites include:

- **Age** of site, ranging from 1803 to present
- **Condition** of site, ranging from excellent to very poor
- **Significance** of site, ranging from being of national significance to only local significance

- **Heritage protection** of site, ranging from no permits required to no further development permitted
- **Distance** to site, measured in km and limited to the catchment area (defined further below)
- **Controls** available, including controls of visitation, traffic, noise and security
- **Access** available, ranging from free public access to private access only.

> **Heritage obligations**: If the heritage item is listed, the mandatory obligations of the asset owner should be included in the base case, as legal obligations, and not the project case. However, heritage benefits may still accrue, such as the benefit of opening up that site to public access.

The value of a heritage site is the sum of society's willingness to pay for the attributes of the site (Table 8-1), plus an adjustment factor specific to the type of site (Table 8-2).

$$
\begin{aligned}
&Value\ of\ heritage\ site \\
&\quad = WTP_{age} + WTP_{condition} + WTP_{significance} + WTP_{protection} + (WTP_{distance} \times distance\ to\ site) \\
&\quad + WTP_{controls} + WTP_{Access} + Site\ specific\ adjustment\ constant
\end{aligned}
$$

To apply a value to heritage site, appropriate population catchments must be applied:

- For heritage assets in a state register, either municipal population catchments (LGA area), or 3-kilometre population catchments are the most appropriate catchment to use for generating a valuation.
- For locally significant heritage assets, a smaller catchment should be applied.
- For valuing an individual asset (not in a state register), the appropriate catchment is the area in which there are no other substitutable/similar heritage assets.

The 'Relevant Population' method for determining catchment is commonly used in valuations. This method selects a catchment area that includes only people affected by the decision. Since people's willingness to pay (WTP) for an additional item is minimal, the catchment for any project is the population for whom the distance to the project site is shorter than to a nearby substitute. In other words, the catchment should only include people who are closer to the heritage asset being considered than to another alike heritage asset.

For listed sites where maintaining the site to a certain condition is mandatory, the primary heritage benefit for considering in project options would be:

- Maintaining the site to a better condition than that required by the listing (for example 'excellent' condition may involve restoring a site to full working order), and
- Enabling access to that site (for example, enabling free public access to a historic bridge that was previously fenced due to the site condition).

When a project purchases a building or land with heritage value that is subsequently diminished or destroyed by the project, this value may be capitalised into the purchase price. As the purchase cost is a project cost, this could result in double counting the cost or disbenefit. Methods to avoid double counting should be considered, such as separately valuing the land without its heritage component and applying a distinct valuation for the heritage aspect. Additionally, this approach can also be adapted for changes in service quality if the heritage asset's service level is improved by a project.

In Table 8-1 and Table 8-2, negative WTP values indicate that survey respondents associated a cost or disutility with certain heritage attributes, meaning that they preferred not to invest in the preservation of those attributes, or perceived them as detracting from overall heritage value. This contrasts with positive WTP values, which reflect a willingness to pay for the preservation or enhancement of certain attributes. These negative values should not be considered in isolation, as the overall valuation approach requires summing all WTP values, both positive and negative, to accurately determine the total value of a heritage site.

Table 8-1 Willingness to pay for heritage site attributes ($ per person within catchment area – once off)

Attribute		Building	Landscape	Historic
Age	19th century (1803-1900)	$57.47	$97.36	$43.26
	Early 20th century (1901-18)	$37.16	$42.77	$23.64
	Interwar period (1919-45)	$28.13	$5.54	$14.41
	Post war (1946-70)	$10.05	$22.55	$29.68
	1971 to present	**$0.00**	**$0.00**	**$0.00**
Condition	Excellent condition	$88.67	$53.25	$26.19
	Good condition	$42.11	$44.15	$22.51
	Poor condition	$22.57	$4.67	$3.52
	Very poor condition	**$0.00**	**$0.00**	**$0.00**
Significance	National Significance	-$7.69	$2.56	-$17.56
	State Significance	$27.16	-$0.98	-$35.07
	Local Significance	**$0.00**	**$0.00**	**$0.00**
Protection	Sympathetic alterations subject to approval	$18.38	-$7.14	$1.80
	No permit required for interior alterations	$34.70	$9.42	-$23.21
	No further development permitted	**$0.00**	**$0.00**	**$0.00**
Distance	Distance (per 100km)	-$37.11	-$45.77	$0.00
Controls	Control of visitation	$0.00	$0.00	$35.58
	Control of traffic	$21.47	$26.08	$39.30
	Control of noise	$17.78	$0.00	$0.00
	Security measures	**$0.00**	**$0.00**	**$0.00**
Access	Public access - free	$26.48	$31.23	$6.88
	Public access - with entry fee	$16.92	$2.09	$56.03
	Public access - for commercial purposes	$29.51	$14.94	$25.70
	Private access only	**$0.00**	**$0.00**	**$0.00**

Source (Heritage Victoria, 2017)

Values are presented in AU$2024 terms

Care should be taken when considering point estimates of WTP for a single attribute. Nevertheless, an interpretation of an individual estimate can be made with the implicit assumption of all other attributes being at the reference base level having been set to zero dollars WTP.

Depending on type of building, landscape or historic site, the total willingness to pay for attributes of the site needs to be adjusted by adding the adjustment constants in Table 8-2. These adjustment constants represent the base value of the site if it had baseline attributes (reflecting a WTP of $0.00) of:

- **Age**: 1971 to present
- **Condition**: Very poor condition
- **Significance**: Of local significance
- **Distance**: Less than 1km from you
- **Controls**: No further development permitted
- **Access**: Private access only.

Table 8-2 Site specific adjustment constants for heritage (AU$2024 per person within catchment area – once off)

Attribute		Site specific adjustment constant ($)
Heritage buildings	Residential Building	-$91.85
	Commercial/Retail Building	-$87.05
	Industrial Building	-$54.69
	Place of Worship	-$65.94
	Hotel	$19.15
	Hall	-$66.32
	School	-$24.50
	Bank	-$70.07
	Garden	-$14.59
	Transport Station	$19.68
	Hospital	-$49.83
	Police/Gaol	$23.50
	Post Office	$8.01
	Courthouse	$23.32
	Theatre	$0.06
	Sports Centre	-$130.00
	Gallery	$32.87
	Library	-$30.55
Heritage landscapes	Residential Landscape	-$183.11
	Industrial/Mining Landscape	-$96.49
	Agricultural Landscape	-$97.16
	Natural Landscape	-$72.89
	Trees	-$21.20
	Bridge	$17.08
	Wall	-$98.18
	Lighthouse	$106.60
	Roadway/Avenue	-$69.86
	Pier/Wharf	-$53.12
Historic sites	Settlement Site	-$37.83
	Military Site	$62.49
	Goldrush Site	$65.82
	Mining Site	-$75.88
	Shipwreck	$7.11

Source (Heritage Victoria, 2017), values adjusted to AU$2024.

- Heritage Value Example

Table 8-3 provides an example WTP calculation for the protection of a heritage building:

- **Step 1:** Find the closest category to the asset – in this case a heritage building.
- **Step 2**: For each attribute of the asset (TYPE, AGE etc), look up the closest WTP from Table 8-1.
- For the linear attribute of distance the WTP value will need to be calculated by multiplying the lookup WTP value with the relevant unit proportion. In this case the unit WTP for distance is -$37.11 per 100km. so for 25km the value is -$29.61 * 0.25 = -$9.28
- **Step 3**: Enter the unit site specific adjustment constant from Table 8-2.
- **Step 4**: Sum the total calculated WTP to calculate the total WTP for the described asset of $89.83.

Table 8-3 WTP example for heritage building (AU$2024)

Attribute		Value ($)
Age	19th century (1803-1900)	$57.47
Condition	Good condition	$42.11
Significance	State Significance	$27.16
Protection	No permit required for interior alterations	$34.70
Distance	25km	-$9.28
Access	Public access - for commercial purposes	$29.51
Site specific Adjustment Constant	*Residential Building*	-$91.85
Total WTP		**$89.83**

8.2 Visual interest and impact

The form and character of the urban environment influences the sense of Place, welcome and identity. For example, when communities resist changes to their local area (often referred to as NIMBYism, Not In My Backyard), it's usually because the changes challenge their emotional connections to their neighbourhood and seek to protect them. (AHURI, 2013) uses changes in property values as a proxy for the overall quality of life in a neighbourhood. This includes the impact of streetscapes or Places that are unattractive or poorly maintained, which can negatively affect the area's character.

Applying this to transport projects, the overall impact or visual interest of a project, even if not quantified, should form part of qualitative decision making (for example, when valuing aesthetics in bridge design), as already set out in section 4.4 of **O3 Urban Amenity and Liveability**. This is typically done through a Landscape and Visual Impact Assessment (LVIA) which identifies the effects of new developments on views and on the landscape.

It is also possible to quantify some aspects of visual interest and impact. (UK Department for Environment, Food and Rural Affairs (DEFRA), 2013) applied stated preference to value different attributes of the local environment, so that projects can establish current situation for each attribute and willingness-to-pay to improve it. (UK Department for Environment, Food and Rural Affairs (DEFRA), 2013) estimated WTP for an improvement on a 5-point scale per person per month (Table 8-4): Expected improvements can be assessed in a workshop format where attendees rate them based on their best judgement along the 5-point scale. The WTP values in Table 8-4 can then be applied to estimate WTP per person per month.

Table 8-4 WTP for improvement in various urban qualities

	WTP for [20%] improvement (per person per month) stated in AU$2024		
	Central	Low	High
Litter	$10.12	$8.98	$11.24
Trees	$16.10	$14.72	$17.50
Fly-tipping (Dumping)	$5.94	$5.18	$6.64
Quiet Areas	$8.30	$7.42	$9.06
Odour	$2.42	$1.82	$3.12
Graffiti	$2.72	$1.30	$4.16
Light Pollution	$1.48	$0.08	$2.86
Light Intrusion	$10.12	$8.98	$11.24

Note: Figures converted to AUD using purchasing-power-parity tables https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm#indicator-chart. To align with a 5-point scale for ease of application, the values are doubled from the source document to represent WTP for a 20% improvement, rather than a 10% improvement. If a 10-point scale is more appropriate for a project appraisal, practitioners may halve the values in the table reflecting a 10% improvement.

The Sydney Central Business District (CBD) South East Light Rail project measured amenity changes based on visual improvements and noise reductions using a Stated Preference survey (Transport for NSW, 2020). The survey asked about pedestrian experiences with travelling to Sydney's CBD, walking on George Street, and the quality of shared street environments. The findings indicated that pedestrians place a high value on the quality of the walking environment and demonstrate a substantial willingness to invest in these enhancements. The Stated Preference survey calculated a WTP of 1.2 cents ($2020) per minute walked per pedestrians for improvements in visual amenity relative to a base case example (Transport for NSW, 2020).

Stated Preference studies require detailed survey design, administration, and analysis, and can be expensive and time-consuming to undertake. In the absence of consistent national parameters, the WTP value of 1.2 cents ($2020) per minute walked per pedestrian may be used for similar projects to measure visual amenity impacts. However, practitioners are encouraged to undertake their own research and consider factors that may alter this valuation for their project, where appropriate and achievable.

8.3 Land use benefits

A transformation in the form of a Place can enhance a location's accessibility or increase its capacity to support anticipated expansions in land use. The treatment of land use benefits of transport initiatives is addressed in **ATAP Part O8** and summarised in Table 8-5.

Table 8-5 Land Use Benefits Summary

Benefit	Description
Higher value land use	When a transport improvement unlocks additional land use supply, the change in land use will generate a net economic benefit if the value of the additional land supplied exceeds the resource cost of achieving the change.
Second round transport benefits	By changing land use, a transport project can change transport user patterns and external costs (crowding, congestion, pollution, crash costs, etc.). These second-round effects are considered as benefits of a transport initiative.
Public infrastructure cost impacts	Connecting and providing public infrastructure services such as utilities (water, electricity, and gas), transport and larger scale social infrastructure (e.g., schools and hospitals) in less dense urban environments tends to be more expensive per dwelling or per capita than providing or expanding the same infrastructure in denser environments
Sustainability impacts	Changes in built form may result in sustainability benefits or costs where they have upstream or downstream environmental impacts.
Public health cost savings	Transport projects that result in a denser pattern of urban development have grounds to claim public health cost savings associated with net increased incidence of trips using active travel.

8.4 Wider economic benefits (WEBs)

Place-based transport and planning projects can change the form of an area enabling more firms and workers to locate in proximity to each other can generate agglomeration economies, a key part of WEBs. The treatment of WEBs is addressed in **ATAP T3**.

Figure 8-2 Knotts Avenue at Bondi Beach was converted to a shared space with lookout deck overlooking Bondi Beach. It has millions of visitors every year, walking along the Coastal Walk

9. Safety and security

Safety benefits arise when there is a reduction in the safety risk from a transport or Place initiative, or when the initiative improves the public perception of safety. Some safety benefits related to Place-based transport initiatives are related to impacts on pedestrians and bicycle riders described in **ATAP M4** chapter 6 and **M4-BR** chapter 5.

(Transport for NSW, 2021) presents guidance on physical design and management treatments that can be used in combination to improve road safety for users. The Safe System approach applies the following three elements:

- **Exposure** - number of road users that have the potential to be involved in the crash type (the number of users in relation to the length of road segment)
- **Likelihood** - probability that an individual road user will be involved in a crash (physical treatments and design interventions)
- **Severity** - likely severity in the event of a crash: minor, moderate, serious, or fatal (vehicle speed).

To assess different major crash types (those identified as the predominant contributors to fatal and serious crash outcomes) against the exposure to that crash risk, designers need to assess the likelihood of it occurring and the severity of the crash should it occur.

Table 9-1 lists primary safety treatments against their contribution to or impact on Place – noting that the table is only part of the overall original diagram. For example, pedestrian overbridges detract from good Place outcomes whereas lower speed limits improve Place outcomes.

Table 9-1 Safe System treatment summary

Elements impacted	Supporting Place outcomes	Neutral to Place outcomes	Detracting from Place outcomes
Exposure	• Restrict vehicle access • Encourage mode shift through land use changes • Reduce number of vehicle lanes		
Exposure & Likelihood		• Provide Grade Separation	• Provide vertical crossing separation
Likelihood	• Provide a footpath • Provide horizontal and raised separation for cycling • Provide horizontal separation for cycling • Introduce pedestrian signal phase • Introduce cycling signal phase		
Likelihood & Severity	• Install controlled crossing		
Severity	• Install controlled and raised crossing • Lower signed speed limit • Shorten block length • Raise intersection • Provide mid-block vertical deflection • Reduce loading/delivery vehicle size	• Install a mini roundabout	

Source: (Transport for NSW, 2021)

Interventions that improve perceptions of road safety

Perceptions of road safety are distinguished from observed crashes and casualties. Infrastructure that separates different modes of transport and points of conflict can significantly enhance road safety perception, and people adjust their movement behaviour accordingly. For example:

- People riding bicycles or micromobility devices feel safer – and are much more likely to ride – when they are separated from larger and faster vehicles. The introduction of a separated cycleway and wider footpath space in Pitt Street in the Sydney CBD resulted in a 500% increase in people riding.
- The removal of slip lanes, the addition of pedestrian crossings, and reductions in traffic speeds increase the likelihood that people will walk and interact with nearby places. For example, parents feel more confident that their children can walk unaccompanied (Giles-Corti, et al., 2010), or elderly people may feel more comfortable walking to access local services or public transport.

Estimating and valuing safety benefits

ATAP M4 chapter 6 and **M4-BR** chapter 5 provide a series of Crash Reduction Factors (CRFs) used in evaluating and forecasting the effectiveness of road safety measures commonly applied during Place-base transport projects. CRFs quantify the expected reduction in crashes following safety interventions and are essential for providing a quantitative basis for assessing the impact of traffic safety interventions common in Place-based transport and planning initiatives. The tables present only a sample of potential CRFs, and it is recommended that practitioners consult with state and national transport agencies for relevant CRFs for their analysis. To estimate crash reduction benefits, follow the process described in **ATAP T2** Section 8:

- Analyse historical crashes, subject to data availability (5 or 10-years), occurring within treatment area.
- Estimate annual average economic cost of crashes using **ATAP PV2** WTP values for relevant crashes.
- Apply applicable CRFs to estimate expected change in crashes and the associated economic benefits.

Behaviour modifiers

An example of improvements to perceived road safety while cycling is captured within improvements to cycling journey ambience outlined in Table 9-2 (Transport Analysis Guidance Data Book, UK Department for Transport). The parameter values capture the improved level of enjoyment, improved wayfinding and perceived safety associated with the use of cycle lanes and separated cycleways relative to travelling with mixed traffic.

Table 9-2 Value of journey ambience benefit of cycle facilities relative to no facilities (AU$2024)

Scheme type	Value (cents/minute)	Value (cent/kilometer)
Off-road segregated cycle track	17.11	68.42
On-road segregated cycle lane	7.28	29.11
On-road non-segregated cycle lane	7.22	28.90
Wider lane	4.40	17.60
Shared bus lane	1.87	7.47

Note: Values are presented in AU$ June 2024 terms. Assumes an average cycling speed of 15km/hr.
Source: Transport Analysis Guidance Data Book, UK Department for Transport

Double-counting

However, there is a major impediment in their use in the CBA of active travel initiatives, as there is the potential of double-counting of crash benefits. The surveys that estimated the value differential between one facility type and another will capture the difference in all aspects of benefits. Unless the survey specifically aims to do so, it is not possible to determine how much the relative preference for off-road paths is influenced by perceptions of safety and how much by other factors such as reduced stress from less interactions with motor vehicles and drivers, or the enjoyment of cycling in a pleasant environment.

10. Other considerations

10.1 Social Impact

Social impact assessment (SIA) is a process to identify, analyse, assess, manage and monitor the potential or perceived social impacts of a project, both positive and negative. The social impacts of a project are the direct and indirect impacts that affect people and their communities during all stages of the project lifecycle and can include impacts like disruption or improvements to daily living practices, impacts to health and wellbeing, and changes in access to employment options. This can apply to the use of public places and streets.

10.2 First Nations

Designing with Country, accounting for culturally-specific use patterns, preserving Indigenous heritage, and engaging with Traditional Land Owners are crucial to Place value in transport infrastructure projects. Although there are currently no established parameters for quantifying the monetary impact of these aspects, their valuation is an emerging area of research. Therefore, these considerations should always be included in the design process. Projects should integrate Indigenous cultural knowledge and practices, collaborate with Indigenous architects, designers, and artists, and ensure that sites of cultural, historical, and spiritual significance are protected. Meaningful and ongoing engagement with Traditional Land Owners is essential, along with providing cultural competency training for all stakeholders. While these elements may not be quantitatively measured at present, their inclusion ensures respect for Indigenous cultures and contributes positively to their communities and Country.

10.3 Distributional and equity effects

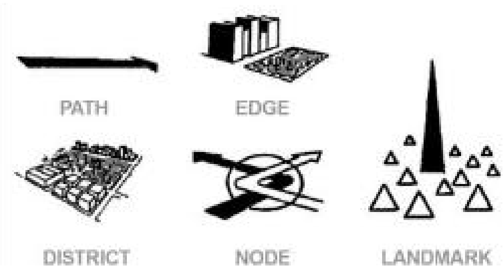
ATAP Part T5 provides guidance on considering and assessing the distributional and equity effects of transport initiatives. T5 is suitable for assessing the impacts of transport initiatives irrespective of whether the place effects of the initiative are small or large.

Appendix A Place concepts

This appendix provides a background discussion on the place concept, from which we draw a summary in section 2.1. The definition used for this guidance needs to relate specifically to the appraisal of transport initiatives, and accommodate the full range of impacts of those initiatives.

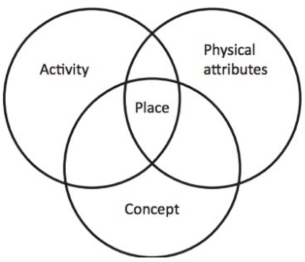
Place can be defined as comprising a specific spatial area that has a ‘sense of place’ to people.

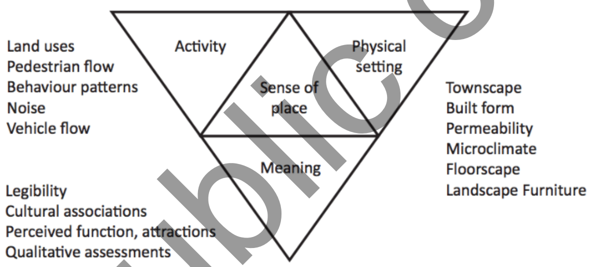
A **specific spatial area** can be described as a mental map that people create in their minds to understand their surroundings in a consistent and predictable way. (Lynch, 1960) states that people do this using the five elements of paths, edges, districts, nodes, and landmarks.



Elements or components of place (Lynch, 1960)

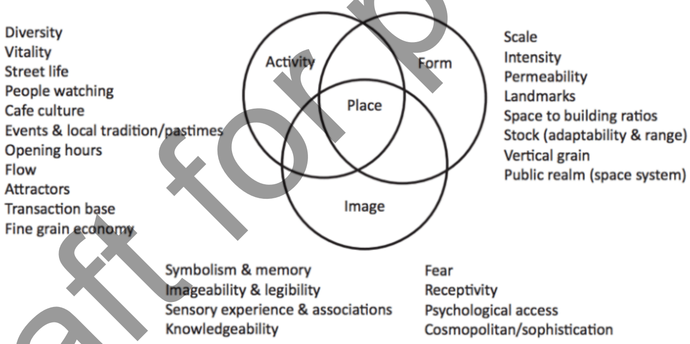
A **‘sense of place’** comprises three elements: built form, human activity and meaning. This is illustrated in (Canter, 1977), (Punter, 1991), Montgomery (1998) and adopted in the NSW Government’s Better Placed and the Movement and Place Framework (2018):



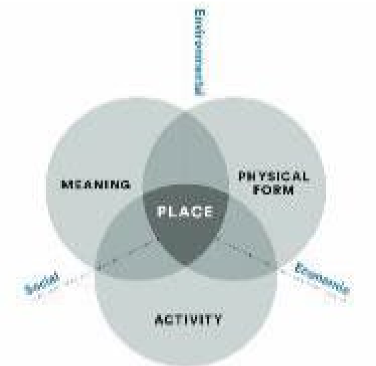


Place - *(Canter, 1977)*

Sense of Place – *(Punter, 1991)*



Policy Directions to Foster Placemaking - *(Montgomery, 1998)*



Factors of Place - *(NSW Government, 2023)*

In this definition of a sense of place, 'meaning' or 'identity' requires individuals to have a specific attachment to that place and so a necessary precondition is human activity.

A transport initiative may have place impacts to both public and private areas. All of these, both public and private, need to be accounted for in the project appraisal.

In some cases, a transport initiative may specifically involve place-making, with the place typically being located within or connected to the public realm. That is, it is accessible, or at least visible, from public space.

Thus place, for the purpose of this guidance, can be defined as:

- Related to a **spatial area**, route or location and can be defined by the five elements of paths, edges, spaces, nodes, precincts, or landmarks, and
- Where there is **human activity**, and
- Where there may be **users of the space** who are not transport customers. For example, they may be sitting in the public space or footpath, walking for leisure, or working and living in the neighbourhood. or
- Where transport customers **interact with the public realm.** For example, a bus customer who alights from a bus or train in that location, rather than passing through.
- Including private spaces (e.g. houses, buildings), in order to account for noise and pollution impacts on transport initiatives on the people living and working in a spatial area.

In many cases of transport initiatives, assessment of the impact on place is specific to the street. 'Streets' in this context include squares, bus stops, train station forecourts etc, being defined by UN-Habitat as:

- *thoroughfares that are based inside towns, cities and neighbourhoods; and are commonly lined with houses or buildings and offer an essential urban function for both pedestrians and vehicles – mobility.*
- *public spaces by virtue of their being publicly-owned and maintained, accessible and enjoyable by all, mostly without charge and at all hours.*
- *versatile in the nature of activities they host, which range from social and economic to cultural and political uses.*
- *The main elements included within the street-space are avenues and boulevards, squares and plazas, pavements, passages and galleries, bicycle paths, sidewalks, traffic islands, tramways and roundabouts.*
- *Elements excluded from street-space include plots (built-up or unbuilt up), open space blocks, railways, paved space within parking lots and airports and individual industries*'. (Notwithstanding these exclusions from a 'street' definition, these element still need to be captured as part of place so that all potential impacts of a transport initiative area fully captured.

To determine the extent to which the place is impacted by a transport initiative, a few factors to consider may include:

- The extent to which the initiative relates to the public realm, which would determine the degree of public impact (density/intensity, geographic pull, or national/state significance) as opposed to, say, impact on a private or commercial space.

The more public the place is, and the more people are affected, the higher the impact on place is. For example, a motorway or rail project that severs one part of the community from another would have a higher place impact in an area of high urban density compared to a sparsely populated area.

Some specific examples that illustrate this definition are:

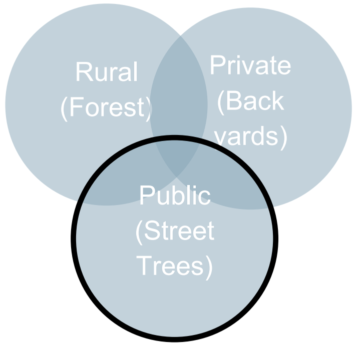
- Travel Time Saving is excluded because is accrue to transport customers only (not walking as leisure) and generally does not involve interacting with the public realm (as this signal a pause or end of the trip).
- Urban Cooling benefit would be included because it benefits a broad range of users, including people walking or cycling for transport. Urban cooling effects extends beyond the project boundary which may benefit adjacent homes and businesses. To ensure there isn't double counting there needs to be a level of nexus between the place benefit (e.g. trees in this location, SA1, TZP) and broader benefit.
- The definition includes both place disbenefits and place benefits – for example traffic volume (noise, air quality effects) impacts on a specific spatial area, the broader community and those interacting with the public realm (street) – even though the cause of the traffic volume may not be a 'place user'.

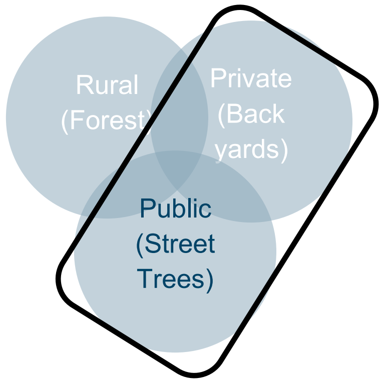
Some additional points to consider include the following:

- We can make a contradistinction between place for a transport initiative and 'everywhere as a place'. This conception excludes place as beautiful rural views, or farmland, but conversely can include privately-owned public space (POPS), and community facilities attached to public space.
- The places of shared or collective attachment that would be considered 'place' under this definition include major public buildings (Sydney Opera House) and public spaces (George Street in Sydney or Bourke Street in Melbourne) – which can be divided further into elements of physical form (or 'hardware') and activities (or 'software') that give rise to attachment (meaning).
- In this respect, some existing business case values, like 'urban severance' of rail infrastructure, can be understood as 'place-based', because they concern (only) specific urban areas where human activity (cross-movement) is interrupted. Ideally, the severance value should also be adjusted to recognise density of the urban area (the 'degree of impact on the public').

An example of how 'place' could be applied to tree canopy to avoid double counting is where a project which only delivers tree canopy (such as street trees on a linear infrastructure project) could count the urban cooling benefit of the street trees as a placemaking benefit as it relates to a specific geographic area, with human activity (beneficiaries of the cooling), and in public space.

However, if the project was part of a precinct plan which already established a precinct-scale target of say 40% public space delivered through a combination of private and public space (including street trees) (a wider 'place') then the urban cooling benefit could not be separately counted in an individual local street project in that precinct. Conversely, projects in the precinct that deliver *less than* the projected canopy (e.g., 70% street trees) should recognise that as a disbenefit (or impact) of the project.





Other definitions of place

ATAP Guidelines - O3 Urban Amenity and Liveability, 2.1

The quality of a place, including the aesthetics, the physical design and how the place is used. This includes transport amenity, which is classified into two broad categories:

- **Transport user amenity** – which refers to the amenity experienced directly using the transport network, such as public transport, road design and the presence of pathways (Handy, 2002).
- **Community amenity** – which refers to how accessibility and connectivity affect the community, particularly community cohesion (Handy, 2002).

Amenity is a term referring to 'the pleasantness or attractiveness of a place or to 'the desirable or useful features or facility of a place'. Areas with high levels of amenity are more 'pleasant' or 'attractive' places to live, work or visit. The concept of urban amenity includes not only the visual and aesthetic qualities of a place, but also a range of more functional considerations such as safety, comfort, and convenience.

Amenity generally means access to shops and other services required for daily living, including access to employment, health care, educational services, transport, cultural and leisure services, and green spaces.

Victorian Movement and Place Framework

- **Places of Activity (PA)** – which capture places that have human activity on the street. In our M&P framework we scale everything from 1, state significant, to 5, local importance. PA picks up everything from the Hoddle Grid (PA1), Sydney Road (PA3) to a local residential street (PA5), we even capture our rural roads because humans are still out using them to walk, move stock, ride horses or bikes etc.
- **Places of Off-Street Activity (PO)** – these are places that are significant and important to Victoria but maybe have the hustle and bustle on the street like the above examples. PO often have a transport driver / impact to our network. PO came about after we mapped PA and the MCG and Chadstone shopping centre came out as PA4 (neighbourhood significant) because they don't have the street activity, but they are clearly much more significant. PO is manual mapped, based on visitor numbers. To date it is an incomplete data set, but we have picked up places like shopping centres, zoos, and sporting facilities.
- **Freight Places** – is a placeholder currently, but it is something we will complete when Plan for Victoria comes out. Freight Places will capture, Ports, industrial zones, Wift and Bift etc.
- **Cultural Places** – is also a placeholder but as we have developed PA and PO we have recognised that cultural places such as the shrine are underrepresented. It would be possible to capture places with European heritage significance and aboriginal cultural heritage.

Appendix B Crash Reduction Factors

The safety effectiveness of an initiative is measured by the per cent reduction in risk that it delivers. The tables below provide crash reduction factors common in Place initiatives, with additional factors reported in M4-BR section 5.3.

Table 11-1 Common urban midblock CRFs

Treatment	Sub type	Crash Reduction Factor	Confidence	Comment
Medians	Flush median	15%	Low	
	Solid median	45%	Medium	
Parking ban (both sides of the street)	Midblock	20%	Low	Research indicates that banning parking on one side only may increase crashes.
Parking - convert angle to parallel (NEW)	All environments	40%	Low	There is a lack of Australasian research on this treatment and there is a significant discrepancy between the results. Hence, this is only an indication of the likely level of crash reduction that could be expected from this treatment.
Road diet: Four lanes to two lanes plus flush median	All	35%	Low	
New route lighting	Road - Nighttime only	20-40%	High	
	Rail - Nighttime only	20%	High	
Traffic calming	All environments	20%	Medium	Where available use CMFs and CRFs that are specific to each treatment used in traffic calming.
Bus lanes (taxis permitted)	All	25% increase	Low	There is no Australasian research available on this treatment. This risk may be mitigated by suitable design.
High occupancy vehicle lanes	All	60% increase	Low	There is no Australasian research available on this treatment. This risk may be mitigated by suitable design.

Source: Crash Estimation Compendium, New Zealand crash risk factors guidelines, Waka Kotahi, 2018

Table 11-2 Common Urban Cyclist CRFs (cyclist crashes only)

Treatment	Sub type	Crash Reduction Factor	Confidence	Comment
On-road cycle lanes	Standard	10%	Low	Less than 1.4 meters wide
	Wide	20%	Low	Greater than 1.4 meters wide
Advanced cycle stop boxes	Intersections	35%	Low	The limited research available on cycle paths indicates that intersection and access crashes may increase as a result of these treatments and may cancel the benefits that occur along mid-block sections. Where paths can be provided away from intersections and accesses crash benefits are likely. Where there are a lot of intersections and accesses without suitable mitigation of crash risk there may be an increase in cycle crashes. The main benefits of such facilities are a reduction in the perceived risk of cycling by the public.
Separated cycle paths alongside roads – one way for cyclists	All crashes	0%	Low	
Shared path (cycle and pedestrian) alongside roads (NEW) – one way for cyclists	All crashes	0%	Low	

Source: Crash Estimation Compendium, New Zealand crash risk factors guidelines, Waka Kotahi, 2018

Table 11-3 Common Urban Pedestrian CRFs (pedestrian crashes only)

Treatment	Sub type	Crash Reduction Factor	Confidence	Comment
Improved lighting at mid-blocks and intersections	>= 0.50 cd/m2	55%	Medium	When upgrading lighting from one level to another pro rata the factors provided
	>= 0.75 cd/m2	70%	Medium	
	> 1.0 cd/m2	80%	Medium	
Add exclusive pedestrian phase at signals (Barnes dance) (NEW)		55%	Low	Should only be applied to intersections with high pedestrian volume in major commercial areas (like city centres)
Improve signal timing to reduce pedestrian delays (NEW)		35%	Low	Only applicable if major reductions in pedestrian delay can be gained.
Install pedestrian overpass		85%	Low	Where there are strong at grade desire-lines the benefit may be less.
Install raised platform		20%	Low	Treatment unsuitable for major roads. Normally introduced as part of area wide traffic calming schemes.
Install pedestrian refuge	When kerbside parking	15%	Low	Higher reductions may be achieved on high volume roads. Crash reduction is likely to be lower when traffic lanes are 4m wide or greater (excluding cycle lanes). Based on lane width of around 3.5m.
	When no kerbside parking	45%	Low	
Install kerb extensions		35%	Low	Kerb extension must bring waiting pedestrians out beyond the line of parked vehicles, where inter-visibility between through traffic and pedestrians is adequate. Based on a traffic lanes of around 3.5m (excluding cycle lane where present). Crash reductions are likely to be reduced as traffic lanes width increase beyond 4m

Treatment	Sub type	Crash Reduction Factor	Confidence	Comment
Install pedestrian refuge and kerb extensions		45%	Medium	Based on urban traffic lanes of around 3.5m (excluding marked cycle lanes). Crash reductions are likely to be reduced as traffic lanes width increase beyond 4m.
Install zebra crossing	Two-lane roads	0%	Low	Where speed limit is 50km/h or less. An increase in crash risk is likely on 2-lane roads with speed limits in excess of 50km/h
	Multi-lane roads (NEW)	90% increase in pedestrian crashes	Low	Research indicates that crash rates increase on multi-lane roads when the AADT is 12,000 or greater. Also, that the difference in pedestrian crash risk is not significant different in marked zebra crossings vs unmarked crossings on multi-lane roads with an AADT below 12,000.
Install mid-block traffic signals	All	45%	Low	Benefits are lower on multilane roads and where speed limit is above 50km/h.
Install fencing and barriers (NEW) to direct pedestrians	All	20%	Medium	Not applicable in all circumstances. Where pedestrian crossing desire-lines are strong pedestrians may jump the fence and crash reductions will be lower.

Source: Crash Estimation Compendium, New Zealand crash risk factors guidelines, Waka Kotahi, 2018

Table 11-4 Urban pedestrian CRFs for New Zealand

Treatment	Crash Reduction Factor
Raised platform	20%
Kerb extension	35%
Pedestrian refuge	15% if parking and 45% if no parking
Kerb extension with pedestrian refuge	45%
Zebra	0%
Zebra with platform (raised zebra)	20%
Zebra with kerb extension	35%
Zebra with platform and kerb extension	35%
Zebra with pedestrian refuge	15% if parking and 45% if no parking
Zebra with kerb extensions and pedestrian refuge	45%
Signals	45%
Signals with kerb extensions	45%
Grade separation	85%

Source: Australasian Pedestrian Facility Selection Tool v2.2.0 User Guide, Austroads, AP-R625-20.

References

AHURI, 2013. *Understanding and addressing community opposition to affordable housing.* [Online] Available at: https://www.ahuri.edu.au/sites/default/files/migration/documents/AHURI_Final_Report_No211_Understanding-and-addressing-community-opposition-to-aff

Anciaes, P. R. e. a., 2018. A stated preference model to value reductions in community severance caused by roads. *Transport Research Part A: Policy and Practice.*

Australian Government Department of Health and Aged Care , 2023. *Air quality.* [Online] Available at: https://www.health.gov.au/topics/environmental-health/what-were-doing/air-quality [Accessed 30 April 2024].

Australian ICOMOS, 2013. Burra Charter for Places of Cultural Significance, s.l.: s.n.

Austroads, 2023. *Australasian Pedestrian Facility Selection Tool.* [Online] Available at: https://austroads.com.au/network-operations/active-travel/pedestrian-facility-selection-tool

Buchanan, C. & Accent, 2006. *Valuing the Urban Realm - Business Cases in Public Spaces,* London: s.n.

Canter, D., 1977. *The Psychology of Place.* s.l.:Architectural Press.

Community and Patient Preference Research, 2022. *Willingness to pay for green infrastructure and public spaces in NSW,* s.l.: NSW Department of Planing and Environment .

CROW, 1998. *ASVV: recommendations for traffic provisions in built-up areas.* Ede, Netherlands: Centre for Research and Contract.

Deloitte., 2023. *The economic and social impact of Sydney WorldPride.* [Online] Available at: https://www.deloitte.com/au/en/about/people/economic-social-impact-sydney-worldpride-2023.html

Department for Transport, 2022. *Transport Business Cases: The Levelling Up Toolkit,* London: Great Minster House.

Douglas, N., Jones, M. & Whatley, J., 2022. *Valuing the Walk Environment.* Adelaide, Australasian Transport Research Forum.

Fosgerau, M., Lukawska, M. & Paulsen Mads, R. T. K., 2023. Bikeability and the induced demand for cycling. *PNAS.*

Giles-Corti, et al., 2010. School site and the potential to walk to school: The impact of street connectivity and traffic exposure in school neighborhoods. *Health and Place,* 17(2), pp. 545-550.

Handy, S., 2002. *Accessibility- vs. Mobility-enhancing strategies for addressing automobile dependence in the US.* Paris, s.n.

Heritage Victoria, 2017. *Valuing Victoria's Heritage,* s.l.: Victorian Government.

Hughson, M., Adams, D., Pink, R. & Ye, H., 2022. *The economic value of stay time.* Adelaide, Aurecon Australasia Pty Ltd.

Infrastructure Australia, 2021. *Guide to Program Appraisal.* [Online] Available at: https://www.infrastructureaustralia.gov.au/sites/default/files/2021-07/Assessment%20Framework%202021%20Guide%20to%20program%20appraisal.pdf

Infrastructure Australia, 2021. *Guide to Program Appraisal,* s.l.: s.n.

Infrastructure Australia, 2024. *Valuing emissions for economic analysis.* [Online]
Available at: https://www.infrastructureaustralia.gov.au/sites/default/files/2024-05/24IA_Guidance%20note%20-%20Applying%20emissions%20values_1.pdf

Jones, M. & Douglas, N., 2022. *Valuing the Walk Environment.* Sydney: Australasian Transport Research Forum.

Lynch, K., 1960. *The Image Of The City.* Massachusetts: Joint Center for Urban Studies.

Montgomery, J., 1998. Making a city: Urbanity, vitality and urban design. *Journal of Urban Design,* p. 98.

NSW Department of Planning and Environment, 2023. *Framework for Valuing Green Infrastructure and Public Spaces.* [Online]
Available at: https://www.planning.nsw.gov.au/sites/default/files/2023-10/framework-valuing-green-infrastructure-public-spaces.pdf

NSW Department of Planning and Environment, 2023. *Framework for Valuing Green Infrastructure and Public Spaces.* [Online]
Available at: https://www.planning.nsw.gov.au/sites/default/files/2023-10/framework-valuing-green-infrastructure-public-spaces.pdf
[Accessed 30 April 2024].

NSW Government, 2023. *Aligning Movement and Place.* [Online]
Available at: https://www.movementandplace.nsw.gov.au/sites/default/files/guides/pdf/aligning-movement-and-place.pdf

PAEHolmes, 2013. *Methodology for Valuing The Health Impacts of Changes in Particle Emissions - Final Report.* [Online]
Available at:
https://www.epa.nsw.gov.au/%7E/media/EPA/Corporate%20Site/resources/air/HealthPartEmiss.ashx

Punter, J., 1991. Participation in the design of urban space. *Landscape Design,* pp. 24-27.

SGS Economics & Planning, 2014. *CBD Pedestrian Analysis,* Melbourne: City of Melbourne.

smirt, m., 2004. *book of journey.* melbourne: drfm.

Standen, C., 2018. *The value of slow travel : An econometric method for valuing the user benefits of active transport infrastructure.* [Online]
Available at: https://ses.library.usyd.edu.au/bitstream/handle/2123/17914/standen_cm_thesis_nosignature.pdf;jsessionid=B6F59D18340454A9C5660D19A8459B26?sequence=4

Sydney Metro, 2023. *Measuring amenity benefits of public realm in interchange precincts,* s.l.: s.n.

Transport and Public Works Committee, 2020. *Inquiry into Motor Recreational Activities.* [Online]
Available at: https://documents.parliament.qld.gov.au/tp/2020/5620T1401.pdf

Transport for New South Wales, 2022. *Streets as Shared Spaced Program.* [Online]
Available at: https://www.transport.nsw.gov.au/industry/cities-and-active-transport/cities-revitalisation-and-place/festival-of-place/grant-0#:~:text=The%20Streets%20as%20Shared%20Spaces,night%20activity%2C%20and%20increases%20footfall

Transport for NSW, 2020. *Movement and Place Evaluators Guide.* [Online] Available at: https://www.transport.nsw.gov.au/system/files/media/documents/2020/Movement_and_Place_Evaluators_Guide_20201110.pdf

Transport for NSW, 2020. Walking Space Guide: Towards Pedestrian Comfort and Safety. [Online] Available at: https://www.movementandplace.nsw.gov.au/design-principles/supporting-guides/walking-space-guide-towards-pedestrian-comfort-and-safety

Transport for NSW, 2021. *Safe System Assessment Framework for Movement and Place Practitioners.* [Online] Available at: https://www.transport.nsw.gov.au/system/files/media/documents/2023/Safe%20System%20Assessment%20Framework%20For%20Movement%20and%20Place%20Practitioners.pdf

Transport for NSW, 2022. *Streets as Shared Spaces Program.* [Online] Available at: https://www.transport.nsw.gov.au/industry/cities-and-active-transport/cities-revitalisation-and-place/festival-of-place/grant-0#:~:text=The%20Streets%20as%20Shared%20Spaces,night%20activity%2C%20and%20increases%20footfall [Accessed 01 May 2024].

Transport for NSW, 2023. *Safer Cities Survey Report.* [Online] Available at: https://www.transport.nsw.gov.au/system/files/media/documents/2023/Safer-Cities_Survey-Report_0.pdf?trk=public_post_comment-text

UK Department for Environment, Food and Rural Affairs (DEFRA), 2013. *Local environmental quality: valuing the neighbourhood in which we live.* [Online] Available at: https://assets.publishing.service.gov.uk/media/5a7c277ced915d0b036b55f4/pb14015-valuing-local-environment.pdf

UK Department of Transport, 2022. *Transport Appraisal Guidance (TAG) Unit A4.1 Social Impact Appraisal,* s.l.: s.n.

UN Habitat, 2019. *Global Public Space Toolkit.* [Online] Available at: https://unhabitat.org/sites/default/files/2019/05/global_public_space_toolkit.pdf [Accessed 30 April 2024].

United States Environmental Protection Agency, 2023. *Air Pollution and Cardiovascular Disease Basics.* [Online] Available at: https://www.epa.gov/air-research/air-pollution-and-cardiovascular-disease-basics#:~:text=A%20large%20body%20of%20science,for%20outdoor%20particle%20pollution%20exposure [Accessed 30 April 2024].

Varma, A., 2003. Working Paper 3: Valying Greeness. *Greater London Authority Economics.*

Waka Kotahi, 2020. *Impact on Urban Amenity In Pedestrian Environments,* s.l.: New Zealand Government.

Wijayaranta, et al., 2022. *Evaluation and Implementation of Shared Spaces in NSW,* Sydney: s.n.

Wijayaratna, K. et al., 2022. *Evaluation and Implementation of Shared Spaces in NSW: Framework for road infrastructure design and operations to established placemaking,* Sydney: University of Technology.

WSP, 2023. *New Planner.* [Online] Available at: https://www.planning.org.au/documents/item/12626

INFRASTRUCTURE AND TRANSPORT MINISTERS