

# Developing a business case

Stage 3 of the **Assessment Framework**

The Assessment Framework  
comprises an overview, stages 1 to 4  
and technical guides:



## Overview

- 1 Defining problems and opportunities
- 2 Identifying and analysing options
- 3 Developing a business case**
- 4 Post completion review

Technical guides

The Assessment Framework (including this document) and the Infrastructure Priority List are changing in line with amendments to the Infrastructure Australia Act 2008.

While this transition process is underway, IA will continue to receive and evaluate proposals according to the current process and assessment framework.

For further information  
contact [engagement@infrastructureaustralia.gov.au](mailto:engagement@infrastructureaustralia.gov.au)

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It leads reform on key issues including means of financing, delivering and operating infrastructure and how to better plan and utilise infrastructure networks.

Infrastructure Australia has responsibility to strategically audit Australia's nationally significant infrastructure, and develop 15-year rolling infrastructure plans that specify national and state level priorities.

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Requirements



Additional information



Worked example



Case study

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# 1

## Introduction

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## At a glance

- During **Stage 3** of Infrastructure Australia's assessment process, you will undertake a detailed assessment of options that respond to problems and opportunities identified in Stage 1 and Stage 2, then and document the outcomes in a business case.
- We will assess your Stage 3 submission to determine whether you have:
  - Defined a shortlist of options that could address the problems and opportunities.
  - Applied a **robust and defensible methodology** to analyse the shortlisted options.
  - Identified a **preferred option** based on its relative merit, which is recommended in the business case.
- We assess your **detailed options analysis** process, the **merit of your preferred option** and the **deliverability considerations** of the proposal. This document outlines tools and methodologies that can help you with this process and provides links to supporting **technical guides**.
- The Assessment Framework has been designed to align with other national, state and territory frameworks. We accept submissions that conform to the relevant state or territory guidelines, so long as they include all the required information as set out in this document. Before submitting, check your submission against our Stage 3 **Assessment Criteria** and **Submission Checklist** to ensure you have met these requirements.
- Once we have assessed your Stage 3 submission, we will publish a summary of our evaluation on our website. If we positively assess your proposal, and it is not yet funded, we will update the **Infrastructure Priority List**. We will also provide feedback to you.
- We encourage you to **engage with us as early as you can** when developing a proposal, so that we can provide advice to strengthen your submission and clarify any assessment requirements.

Figure 1: Assessment Framework stages



## 1.1 How to navigate this document

This document is designed for proponents (you) wishing to make a Stage 3 submission to Infrastructure Australia (us), in accordance with the Infrastructure Australia Assessment Framework (the Assessment Framework). Your submission will include the business case for your infrastructure investment proposal. If you are unfamiliar with the Assessment Framework, we recommend that you review our **Overview** volume before reviewing this document.

- **Section 1** explains the purpose of Stage 3, including how it fits within our broader assessment process and the relationship to the *Infrastructure Priority List* (the Priority List). This section also identifies the key infrastructure decision-making principles that apply to Stage 3.
- **Section 2** takes you through the steps you should follow to develop a high-quality business case for a Stage 3 submission. This includes guidance

on methods you can use to determine the value of your proposal and collect evidence for your submission.

- **Section 3** explains the criteria we use to assess a Stage 3 submission. Before submitting, you should check your submission against our Assessment Criteria to ensure you provide all the information required for our consideration.
- **Section 4** provides a submission checklist that clearly lists all of the items that are required or recommended for a Stage 3 submission. Your submission should include a **Stage 3 Submission Checklist**, available on our website, along with all listed supporting information.

Throughout this document, we will direct you to more detailed technical guidelines that may assist you to develop your submission.



### Box 1: Key terms

**Assessment Criteria:** three overarching criteria we use to assess the merit of every proposal, at every stage of the Assessment Framework – Strategic Fit, Societal Impact and Deliverability.

**Business case:** a document that brings together the results of all the assessments of an infrastructure proposal. It is the formal means of presenting information about a proposal to aid decision-making. It includes all information needed to support a decision to proceed, or not, with the proposal and to secure necessary approvals from the relevant government agency. Unless otherwise defined, we are referring to a final or detailed business case, rather than an early (for example, strategic or preliminary) business case, which is developed in accordance with state or territory requirements. A business case is prepared as part of Stage 3 of the Assessment Framework.

**Option:** a possible solution to address identified problems and opportunities. A wide range of options should be considered and analysed to determine the preferred option, which will be recommended in the business case.

**Program:** a proposal involving a package of projects that are clearly interlinked by a common

problem or opportunity. The package presents a robust and holistic approach to prioritise and address the projects, and there is a material opportunity to collaborate and share lessons across states, territories or agencies. The projects can be delivered in a coordinated manner to obtain benefits that may not be achieved by delivering the interventions individually.

**Project:** an infrastructure intervention. A project will move through the stages of project initiation, planning, delivery and completion. A suite of related projects to address a common problem or opportunity will create a program.

**Proponent:** an organisation or individual who prepares and submits infrastructure proposals to us for assessment. To be a proponent of a business case (a Stage 3 submission), the organisation must be capable of delivering that proposal.

**Proposal:** the general term we use for successful submissions to the *Infrastructure Priority List*, across the key stages of project development, specifically – early-stage (Stage 1), potential investment options (Stage 2) and investment-ready proposals (Stage 3). Proposals that have been delivered would be assessed in Stage 4.

## 1.2 Purpose of Stage 3

The Assessment Framework provides a structured and objective approach to making decisions about infrastructure. It also explains how we assess proposals for inclusion on the Priority List.

The Assessment Framework is designed for proponents, to help you develop high-quality infrastructure proposals for submission to us. The purpose of Stage 3 is to:

- develop the shortlisted options (which you identified as an output of **Stage 2: Identifying and analysing options**) in sufficient detail to enable a robust and defensible comparative assessment
- select a preferred option based on a rigorous and unbiased analysis of the shortlisted options
- develop the delivery strategy and operations strategy for the preferred option – this will set out the approach to governance, risk and delivery that will ensure estimated costs and benefits are realised
- prepare a business case to present the findings of the analysis and summarise the case for investment.



### Box 2: When to submit a business case to us

There are two reasons to submit a business case to us:

1. **To have the proposal considered for the *Infrastructure Priority List*.** We will determine if the proposal is nationally significant and suitable for the Priority List.
2. **For review where more than \$250 million in Australian Government funding has been committed.** We are required to evaluate business cases for infrastructure proposals with funding committed above this threshold.

Your proposal could also be referred to us by our responsible Minister.

## Using the Assessment Framework to develop submissions

This document explains how to make a Stage 3 submission to us and our minimum requirements for these submissions. This document provides an overview of specific tools and methodologies you could adopt to analyse options in detail and develop a business case. Where appropriate, we direct you to our relevant technical guides for further advice on these tools and methodologies.

The Assessment Framework, including Stage 3, has been designed to align with other national, state and territory frameworks. We provide a **Stage 3 Submission Checklist** and guidance on tools and methodologies to support your submission to us. To prevent duplication with state, territory and agency processes, we do not provide a business case template.

**Submissions should be provided in your own business case or equivalent template.** We will accept submissions that conform to the relevant state and territory guidelines, so long as they include all the required information as set out in this document.

## Developing the business case

The business case is a document that brings together the results of the analysis of all shortlisted options, building on the work completed in **Stage 1** and **Stage 2**, to recommend a preferred option. It is the formal means of presenting a proposal to aid decision-making, providing all information needed to decide whether to proceed with the proposal and to secure necessary approvals from the relevant government agency.

At the end of Stage 3, you will have prepared a business case in accordance with your own state or territory guidance and suitable for our assessment.

**Where you have not previously provided a submission for the proposal to us, we require you demonstrate how you have met the requirements of Stage 1 and Stage 2 in your submission.**

We recommend that you develop your business case, including its supporting information, to respond to our three Assessment Criteria and associated themes (discussed in detail in **Section 3.2**):

### 1. Strategic Fit

Analyse if there is a clear rationale for the proposal. This should consider whether it aligns with government priorities and addresses underlying problems and opportunities. Strategic Fit is evaluated in detail in Stage 2 and confirmed in Stage 3.

### 2. Societal Impact

Analyse the value of the proposal to society. This should consider:

- social cost–benefit analysis (CBA) to analyse the social, economic and environmental impacts of each shortlisted option to a higher degree of confidence than undertaken in Stage 2
- costs and benefits that cannot be monetised
- how the proposal will affect different user and non-user groups (equity and distributional impacts)

- risk and uncertainty, which is analysed through risk analysis, sensitivity analysis and, where relevant, scenario or real options analysis (see **Glossary**) to evaluate how resilient options are to a range of possible futures
- any other relevant investigations, such as sustainability and resilience analysis, which may include climate risk, community vulnerability, shocks and/or stress reviews and transition risk analysis for the shift to a low carbon economy.

### 3. Deliverability

Analyse if the proposal can be delivered successfully. This should consider:

- risks and requirements for delivery, including for change management, network readiness, procurement and environmental approvals
- financial analysis, to assess the financial implications of the proposal, including considering different funding models
- delivery strategy and operations strategy, including a post completion review (PCR) plan that details how the preferred option will be delivered and will operate over its lifecycle.

We recommend, but do not require, you to include at least two options in addition to a ‘do-minimum’ base case in the business case (see **Box 3**).

We also recommend that project development aligns to our *Infrastructure Decision-making Principles*, outlined in **Box 4** and available on our website [www.infrastructureaustralia.gov.au](http://www.infrastructureaustralia.gov.au).



### Box 3: Number of options in a business case

The Assessment Framework **recommends, but does not require, that a business case** (submitted at Stage 3) **includes at least two options** (that is, two possible responses to the identified problems and opportunities) and a base case (see [Glossary](#)).

This approach is consistent with the majority of national, state and territory guidelines for business case development. Including at least two feasible options enables a rigorous and defensible analysis to determine the most appropriate investment response. Considering more than one option is important because it:

- increases the transparency of analysis
- helps establish the economic merit of the proposal by comparing it to other feasible solutions
- helps to consider additional societal benefits that may be achieved as part of each option
- may increase confidence in the results, by reducing the risk of there being a superior option that was not considered in the business case.

We expect you to demonstrate a rigorous and defensible Stage 2 process to identify and analyse an appropriate range of potential options – particularly if a business case includes only one option.

**Where only one option is considered in the business case, we require a Stage 2 submission or equivalent analysis with an indicative value-for-money analysis** (for example through rapid CBA). **This should demonstrate that the preferred option is clearly better than the alternatives and that those alternatives do not warrant further investigation.**

If a single option has been identified for detailed analysis, there are usually variations to it that can be considered. It may be possible to build the same option more cheaply without any impact on benefits, to progress a more expensive scope of work that derives proportionally higher benefits, or to package options, including with non-build interventions such as policy reform or demand management.

When we assess your options analysis, we will consider the following:

1. Have an appropriate range of options been considered to ensure maximum value to society?
2. Is the preferred option the best response to addressing the problems and opportunities, compared to other options?



## Box 4: Infrastructure Decision-making Principles

Our *Infrastructure Decision-making Principles*<sup>1</sup> provide guidelines to drive greater transparency and accountability in infrastructure decision-making.

This stage of project development and assessment aligns with the following principles:

- **Principle 3:** Proponents should invest in development studies to scope potential responses.
- **Principle 4:** Where an infrastructure need is identified, governments should take steps to ensure potential responses can be delivered efficiently and affordably.
- **Principle 5:** Governments should undertake detailed analysis of a potential project through a full business case and should not announce a preferred option or cost profile before undertaking detailed analysis involving multiple options.
- **Principle 6:** Proponents should assess the viability of alternative funding sources for each potential project.

- **Principle 7:** Project proposals should be independently assessed by an appropriate third party organisation.
- **Principle 8:** Governments and proponents should undertake meaningful stakeholder engagement at each stage, from problem identification and option development to project delivery.
- **Principle 9:** Governments and proponents should publicly release all information supporting their infrastructure decisions.
- **Principle 11:** Where projects are funded as part of a broader program, the corresponding decision-making processes should be robust, transparent and prioritise value for money.

The principles were published in July 2018 and will be subject to review and update in Infrastructure Australia's future work program.

## 1.3 Structure of the Assessment Framework

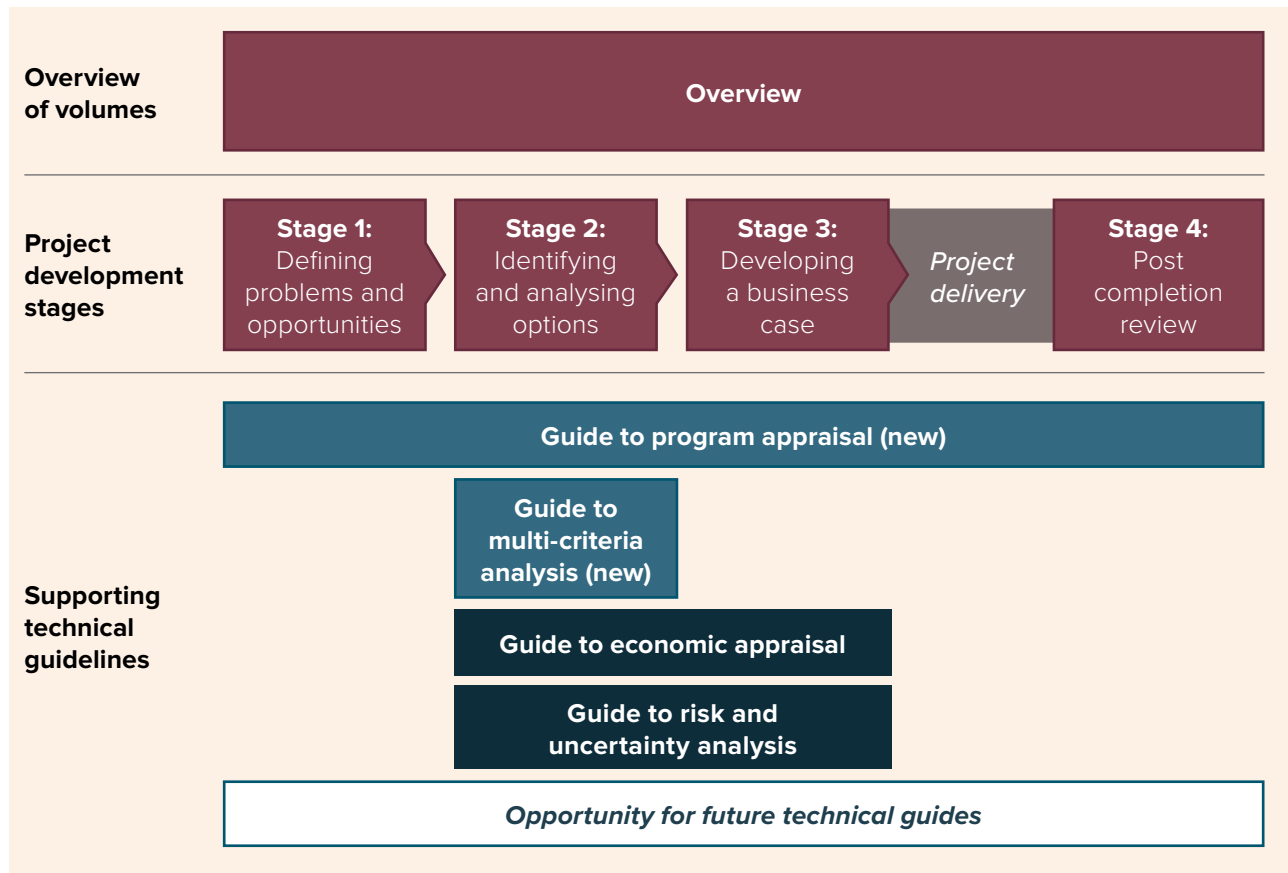
The Assessment Framework consists of a series of volumes and technical guides. Together, they describe the activities in a typical project development and review process, and how we assess proposals that are submitted to us.

For practicality and ease of use, each submission stage is described in a separate document and supported by the technical guides. This allows you to focus on the guidance most relevant to you at the stage you are up to in project development.

The structure of the Assessment Framework is shown in **Figure 2**. The suite of Assessment Framework volumes is available at [www.infrastructureaustralia.gov.au/publications/assessment-framework](http://www.infrastructureaustralia.gov.au/publications/assessment-framework).

1. Infrastructure Australia 2018, *Infrastructure Decision-making Principles*, available at: [www.infrastructureaustralia.gov.au/publications/infrastructure-decision-making-principles](http://www.infrastructureaustralia.gov.au/publications/infrastructure-decision-making-principles)

Figure 2: Structure of the Assessment Framework



## 1.4 Infrastructure Australia can support your submission

We encourage you to engage with us during your Stage 3 development process. Ideally, you should do this **after** reviewing this guidance and the **Stage 3 Submission Checklist**, but **prior** to formally lodging your submission.

We can provide advice and initial review to help you meet our requirements. Early engagement enables us to understand timing and scope of the proposal and benefits you by reducing the possibility of additional work and updates.

By engaging with us during Stage 3, we can support your submission by:

- identifying areas of concern early, before the business case is completed or formally submitted (see **Box 5** for lessons learnt from our previous reviews of business cases)

- advising if the shortlisted options appear appropriate
- advising how to comprehensively identify and measure benefits and costs
- advising if demand modelling and cost estimation methodologies align with our requirements
- advising on how to account for and measure risk and uncertainty
- advising on the scope and level of detail for the deliverability analysis
- preparing for your submission and streamlining our assessment.

When assessing your Stage 3 submission, we will engage directly with you and provide feedback on the submission material to help inform future submissions.





## Box 5: Lessons learnt – common problem areas for business cases

We have evaluated 74 business cases in the period from April 2016 to April 2021. We have seen some high-quality analysis and well-prepared business cases. We have also identified several common areas where business cases could be improved:

- **Defining, quantifying and monetising the problem or opportunity being addressed** in the business case (and determining national significance). This is critical to ensure the options, and impacts measured in the CBA are aligned with and proportionate to the problem or opportunity.
- **Aligning submissions with state and territory guidelines.** In some cases, submissions do not align with relevant state or territory processes and requirements for business case development, such as requirements for options analysis. Business cases prepared in accordance with state or territory guidelines will generally meet our requirements.
- **Defining the project case and base case.** Clearly defining the project and base cases provides greater transparency around what the options are expected to deliver and improves confidence in the economic analysis.
- **Rigorous analysis of shortlisted options.** Providing evidence of detailed and quantified evaluations of options helps make the case that the options progressed to the business case are the best options to address the underlying problems. Many options analysis processes have progressed poor performing options or utilised an overly qualitative methodology or included only pre-conceived decisions without independent justification.
- **Number of options in the business case.** Some business cases have included only one project option, which has been described as the preferred option, before the business case process has been properly concluded. This significantly reduces confidence that the preferred option is the best solution to the problems or opportunities being addressed.
- **Demand forecasting.** In some submissions we have identified issues of inconsistent demand-modelling approaches and assumptions, a lack of transparent model outputs, the consideration of induced demand and biased extrapolation assumptions. Robust and transparent demand forecasting is critical to undertaking high-quality analysis.
- **Using the correct parameters and modelling factors.** Analysis should ensure that the local context of the project is reflected in how modelling results are used to calculate annual economic values.
- **Omitting costs and benefits from the CBA.** All project costs and benefits should be included in the CBA. Where these cannot be monetised, they should be discussed and presented alongside the CBA results.
- **Transparent and full CBA models.** Reviewing transparent and interactive CBA models is essential to appropriately test the approach, assumptions and data used in the analysis. If required, CBA models can be provided on a confidential basis to avoid confidentiality and/or intellectual property issues. Proponents often do not provide full working CBA models to support evaluation, often providing hard-coded workbooks due to confidentiality and/or intellectual property reasons.
- **Sensitivity testing.** Sensitivity tests should be designed to ensure that a project's merit does not rely solely on its key assumptions. Many evaluations include a range of standard tests of the economic performance of the project. More detailed consideration of the key risks of a project should be undertaken through project-specific sensitivity testing.
- **Engagement with stakeholders.** Infrastructure projects have a broad range of stakeholders, and it is important that you consider stakeholders when identifying and analysing options, and selecting a preferred option. Identifying stakeholder views will enable a more informed project evaluation.
- **Failing to incorporate lessons learnt from previous projects into the business case and not undertaking post completion reviews to help inform future projects.** Every project presents a valuable learning opportunity to improve outcomes in the future, but these opportunities are often overlooked.



# 2

## Developing a business case

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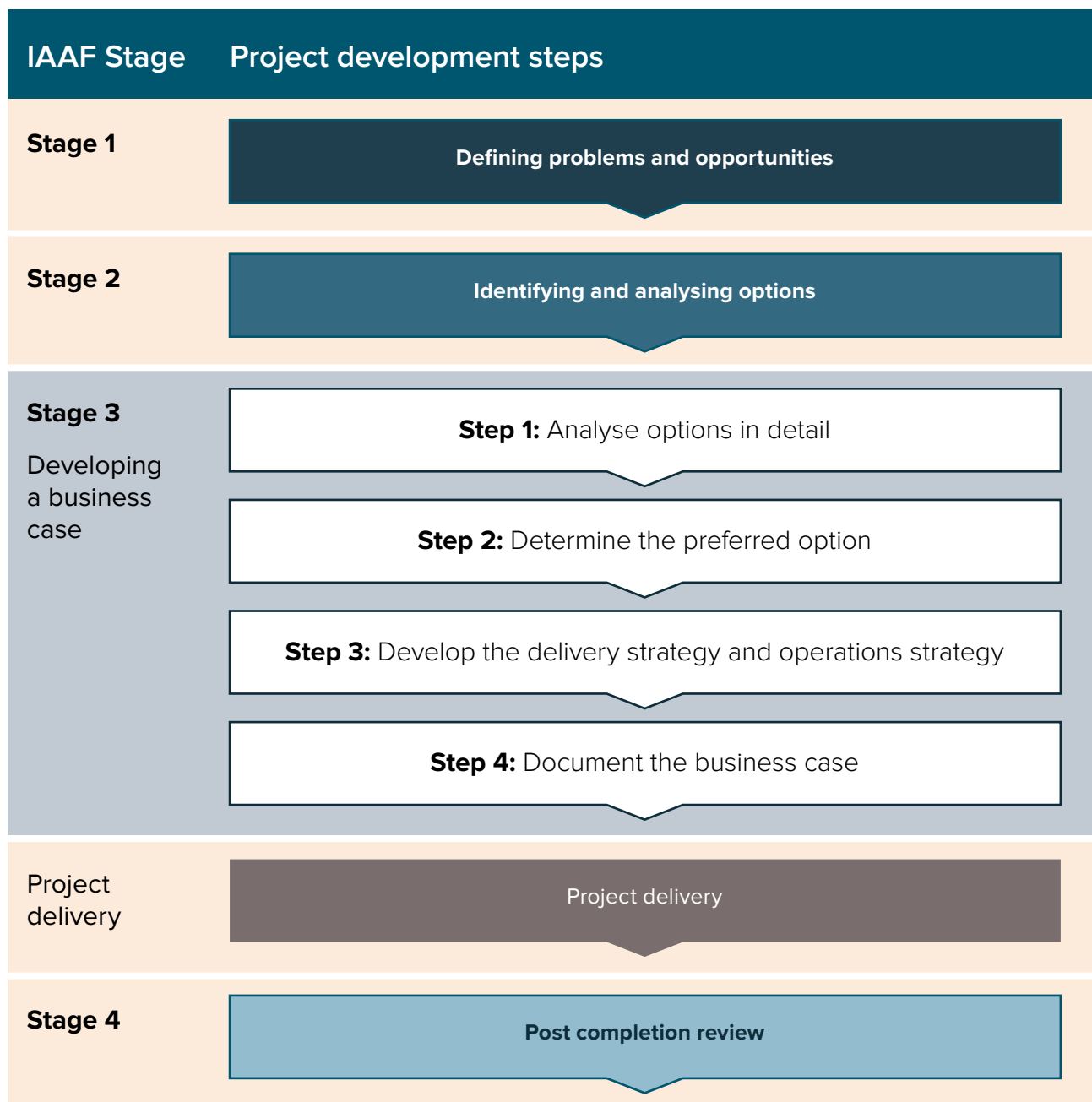


## 2.1 Overview of Stage 3

The Assessment Framework presents our recommended process for project development (see **Figure 3**). By completing Stage 1 and Stage 2 before Stage 3, you will complete the initial requirements for project development and have gathered much of the information required for your business case.

We recommend you follow your state or territory guidelines when developing a business case, while also considering our requirements. **We do not require submissions to duplicate work that has been prepared for state or territory approval processes**, as our evaluation framework has been designed to align with state and territory guidelines. Business cases prepared in accordance with state or territory guidelines will generally meet our requirements.

**Figure 3:** Process for project development and evaluation



By Stage 3 in the project development process, you should have clearly defined problems and opportunities (from [Stage 1](#)), then identified, analysed and filtered a wide range of responses to arrive at a shortlist of feasible options (from [Stage 2](#)).

In Stage 3, you will analyse your shortlist of options in detail to develop a robust business case. The business case will justify the strategic case, capture all relevant costs and benefits (in a CBA and any supporting analysis), consider deliverability for each shortlisted option, and demonstrate how the preferred option would be delivered. To do this, Stage 3 can be summarised in four steps:

1. **Step 1: Analyse options in detail.** Apply a range of relevant analyses, which are used to advise decision-makers of the strengths and weaknesses of the shortlisted options, as well as any other information relevant to option selection:
  - a. **Strategic Fit.** In most cases, the need for change will have been determined in Stage 1 and the strategic alignment of options will have been determined in Stage 2. During Stage 3, you should validate that the options address the identified problems and/or opportunities, and demonstrate in greater detail how they integrate with the broader network.
  - b. **Societal Impact.** This is the focus of Step 1 and will consist primarily of a CBA, supported by analysis of non-monetised benefits and other relevant considerations like sustainability and resilience.
  - c. **Deliverability.** The options analysis must consider whether the options can be delivered, and expected benefits realised. If an option cannot be successfully delivered, there is limited value in evaluating it in detail. Deliverability, which should have been considered at a high level in Stage 2 when identifying and shortlisting options, is analysed in detail for each of the shortlisted options in Step 1. This will be further supplemented in Step 3 with the Delivery Strategy and Operations Strategy for the preferred option.

Guidance on the detailed analysis of options is provided in [Section 2.3](#).

2. **Step 2: Determine the preferred option.** Use the analysis from the previous step to define the recommendations of the business case. Guidance on determining the preferred option is provided in [Section 2.4](#).
3. **Step 3: Develop the delivery strategy and operations strategy.** Analyse how the preferred option will be delivered and will operate over its lifecycle. This should include analysis of the following considerations:
  - a. Implementation
  - b. Capability and capacity
  - c. Project governance – including procurement approach
  - d. Risk
  - e. Lessons learnt – including post completion review plan

Guidance on developing the delivery strategy and operations strategy is provided in [Section 2.5](#).

4. **Step 4: Document the business case.** In this final step, you bring together the analysis undertaken in the previous steps into a business case document and supporting appendices. This should be developed in accordance with state or territory requirements and should provide all the information for a decision-maker to determine whether to proceed with the proposed option or not, and for Infrastructure Australia to undertake a business case assessment. Guidance on documenting the business case is provided in [Section 2.6](#), while information on how we assess business cases is provided in [Section 3.2](#).

The business case should include a post completion review (PCR) plan. PCRs occur after a project has been delivered and is operational. They aim to understand the outcomes from the project, as well as its delivery, against the information described in the business case. PCRs are completed as part of Stage 4 of the Assessment Framework (see [Stage 4: Post completion review](#)).

## 2.2 Business case inputs

Having completed Stage 1 and Stage 2 of the Assessment Framework, you will have gathered much of the information required for your business case and to support a comprehensive CBA.

Importantly for Stage 3, appropriate technical studies and investigations are required to define and understand the shortlisted options in sufficient detail for a detailed comparative analysis. This will include a level of definition, design and cost estimates to underpin the CBA of the shortlisted options, as well as any analysis to determine the risk profile and deliverability.

**Table 1** provides a summary of the types of investigations that are typically inputs to the detailed analysis of options; these will be included as supporting appendices to the business case.

**Box 6** provides further detail on infrastructure definition, design and cost estimate maturity applicable to Stage 3.

Inputs should be included in the business case and the CBA where they are required to justify a rigorous and defensible business case. The list is not exhaustive or sector-specific, so you should refer to relevant national, state, territory and sector-specific guidelines for further detail.

**Table 1: Business case and CBA inputs**

Input area	Description
Technical	<ul style="list-style-type: none"> <li>Demand and/or service level analysis should be completed to provide context to the underlying problem or opportunity.</li> <li>Design (including engineering and/or architecture) builds on other technical investigations and is required to provide context to the level of project definition, cost estimate confidence, risk profile and overall deliverability of the project.</li> <li>System management analysis should be completed to provide context to network / system integration, interfaces and/or operational readiness.</li> </ul>

Table 1: *Continued*

Input area	Description
<b>Planning and environmental</b>	<ul style="list-style-type: none"> <li>Land use, planning and value capture analysis should be completed (where relevant) to provide context to a proposal's role within the local, regional and/or sector context.</li> <li>Approvals permit analysis should be completed to identify any potential 'showstoppers' that may impact the risk profile or deliverability.</li> <li>Property impacts and acquisition legislation and processes should be identified (and costed) with resumption plans in place to inform deliverability.</li> <li>Geotechnical investigations (preliminary) should be completed to inform the design, cost estimate and risk profile.</li> <li>Hydrology analysis (where relevant) should be completed to inform the design, cost estimate and risk profile.</li> <li>Air quality and noise analysis should be completed to identify potential mitigation strategies, design requirements and impacts on the cost estimate.</li> <li>Heritage assessment (including Cultural Heritage and Native Title) should be completed where relevant to identify potential mitigation strategies, design requirements and impacts on the cost estimate.</li> <li>Sustainability assessments, either conducted in-house or those completed by an industry association, such as the Infrastructure Sustainability Council of Australia (ISCA) or Green Building Council of Australia (GBCA).</li> </ul>
<b>Other</b>	<ul style="list-style-type: none"> <li>Safety and security analysis could take a number of forms, depending on the type of proposal, but should be considered where appropriate to inform the design, risk profile and cost estimate.</li> <li>Funding and financing analysis should be undertaken to identify a preferred funding model. We would expect to see consideration of user-pays funding models, revenue generating or PPP options, and the identification of proposed funding splits between proponents and the Australian Government.</li> <li>Market considerations, whether they be formal or informal market sounding or market engagement processes, can be valuable to inform the cost estimate and deliverability of the project. This may include consideration of future market trends using tools such as scenario analysis.</li> <li>Technology analysis, such as Building Information Management (BIM) / Intelligent Transport Systems (ITS) should be considered where relevant, particularly to inform whole-of-life costs.</li> <li>Legal and regulatory analysis should be completed to identify any potential 'showstoppers' that would severely impact deliverability. This may include consideration of new or emerging policies.</li> </ul>





## Box 6: Level of project development, design and cost estimate in a business case

We receive proposals for projects at varying degrees of development, design and cost estimate confidence. While some state and territory guidelines outline the level of design and investigations required to support a business case, the approaches are not consistent.

To assist you in developing a rigorous business case that is supported by an appropriate level of development, design and cost estimate confidence, we have identified the key features we would expect to see at Stage 3. Project development<sup>2</sup> includes undertaking a

comprehensive range of technical investigations to inform the scope and level of confidence in the cost estimate of the proposal. The level of design is traditionally at a preliminary stage, and should be appropriate for the preferred delivery model. In most cases, detailed design occurs after completion and approval of the business case.

For a breakdown across all stages, please see our [Guide to economic appraisal](#). This technical guide also outlines that cost estimates are primarily presented as P50, P90 and Expected Value.

Level of design and cost estimate at Stage 3	
Recommended inputs to design and cost estimate	Business Case
Level of project design	20–40%, or usually a Preliminary / Schematic design
Investigations to inform project definition	See <b>Table 1</b>
Cost estimate bases	Primarily first principles <sup>3</sup>
Cost estimate class/category	Proponent to nominate applicable national, state, territory or sector-specific cost estimate class / category
Quantified risk & contingency	20%–40%
Cost ranging	Low side: -10%/-20% High side: +10%/+20%
Probabilistic cost estimates	P50 / P90 / Expected Value for economic and financial appraisals
Estimate confidence level	Moderate
Usage	For investment and budget allocation

Key considerations and influencing factors informing project definition, design and cost level include:

1. The budget and timeframe made available for planning and business case development
2. The preferred delivery model will have differing definition and design requirements.

We understand the pitfalls of insufficient funding and time for appropriate technical investigations. Where these are identified as constraints or limitations in a business case, we will reflect these as risks in our assessment.

2. There are different terminology, phases, design and cost classes across states, territories, sectors and infrastructure classes. You should adopt an approach that is appropriate for your proposal.

3. Primarily project specific costs, with limited percentage-based allowances.

## 2.3 Step 1: Analyse options in detail

In Step 1 of Stage 3, you will analyse the shortlisted options in detail. Your analysis should respond to our Assessment Criteria:

1. Strategic Fit – analysed in detail in Stages 1 and 2 and validated in Stage 3.
2. Societal Impact:
  - a. Undertake a robust and objective CBA.
  - b. Consider non-monetised impacts.
  - c. If relevant, consider equity and distributional impacts.
3. Deliverability, including financial analysis.

### Overview of Step 1

**All business cases submitted to Infrastructure Australia must provide a thorough appraisal of shortlisted options, including a detailed CBA.**

Considering the inputs outlined previously, this analysis should be of sufficient quality and detail so we can understand and verify the societal and productivity gains anticipated from the options considered in the business case. This information will inform our assessment of the preferred option in the business case.

In Step 1 of Stage 3, you will analyse the shortlist of feasible options, which were identified in Stage 2, in greater detail. As options are developed, concept designs and cost estimates will be refined allowing for a more detailed evaluation of the options. Any additional information prepared since Stage 2 should be included in the business case to help decision-makers and other stakeholders understand the options being considered.



### Box 7: What options are appropriate?

Typically, options describe a proposed 'do something' intervention, such as discrete capital investment. This describes a future in which infrastructure and operational changes have taken place. The options are compared against the base case to determine their incremental impact. In other words, this measures the merit of the option over and above the base case.

**We recommend that a business case includes at least two options, in addition to a 'do-minimum' base case.**

The shortlist of options analysed in detail in the business case should:

- Be aligned to the problems and opportunities – for example, if a transport problem relates to strong growth in a strategic centre then appropriate options may include relevant transport modes and corridors to respond to the long-term growth trends. Conversely, if a transport problem relates to addressing a network pinch point, then options relating to a single mode and corridor may be appropriate.
- Include all options that cannot be reasonably differentiated and discarded – for example, if two or more options perform similarly through Stage 2 analysis, then all of these should be analysed in the business case.





## Box 8: What information is required to analyse options?

A business case should analyse the options that have been shortlisted from the process completed in Stage 2. Considering the potential inputs to a business case outlined in [Section 2.2](#), you should define each option in sufficient detail to include:

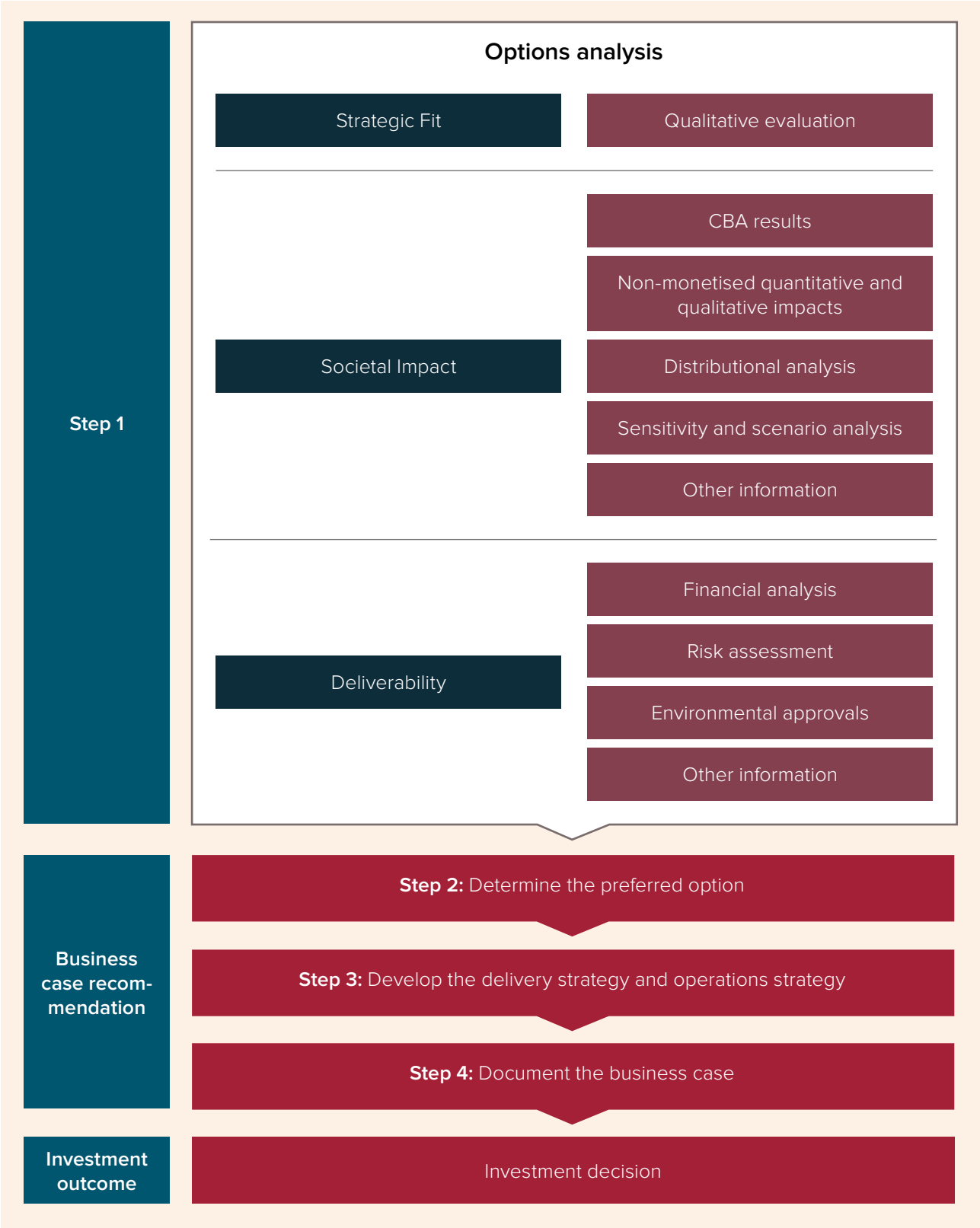
- option description and scope
- infrastructure and non-infrastructure changes or enablers
- estimated whole-of-life costs, including:
  - investment cost
  - annual operating and maintenance costs
  - periodic and life expiring component renewal costs
- expected impacts, including:
  - monetised benefits (and dis-benefits)
  - non-monetised quantitative and qualitative impacts
  - residual value
- consideration of risks and uncertainties
- any relevant information supporting the Assessment Criteria, such as sustainability analysis, environmental impact studies, feasibility studies, economic appraisals
- any relevant assessments, such as distributional effects, sensitivity and real options analysis, if available
- anticipated funding model/s
- interdependencies with other problems and opportunities and/or programs and projects
- indicative Deliverability considerations (risks, schedule, model etc.).

You should analyse the options in detail to build a case for the proposal for each of our Assessment Criteria, which will be captured in the business case:

- Strategic Fit:
  - There is a clear rationale for the proposal and it aligns with government priorities and addresses underlying problems and opportunities
- Societal Impact:
  - The economic analysis typically consists of a CBA to capture the overall social welfare impact. This is complemented by quantitative and qualitative information on impacts that are difficult or costly to monetise in a CBA. Further detail on how to undertake a CBA is set out in the [Guide to economic appraisal](#).
  - Any other information or analyses that may affect the choice of the preferred option, such as sustainability, resilience, distributional impacts, risks and uncertainty.
- Deliverability:
  - Deliverability analysis, includes governance, proponent and market capability, capacity and authority to deliver the options
  - Financial analysis seeks to understand the impacts of investment options on the agencies in terms of their revenues, costs and cash flow changes (as opposed to measuring the social welfare impacts of the whole economy). It should also consider potential funding models, including the cost to government.

**Figure 4** shows a range of recommended inputs for a robust options analysis in a business case and how they align with our Assessment Criteria. Your analysis in Step 1 should inform which option is recommended in the business case. Further information on determining the preferred option (which is the ultimate outcome of the options analysis) is provided in [Section 2.4](#).

Figure 4: Relevant inputs to analysing options in detail



## Strategic Fit of options

Stage 3 of the Assessment Framework builds upon work completed in Stage 1 and Stage 2 and is informed by the relevant inputs identified in [Section 2.2](#). As outlined earlier, Strategic Fit is analysed in detail in Stage 2 and validated in Stage 3.

Stage 3 should provide current and up-to-date information to demonstrate the strategic fit of the proposal.

To enable us to appropriately analyse the strategic fit of options, you should consider [Table 5](#) in [Section 3.2](#).

## Societal Impact of options

To enable us to appropriately assess the societal impact of options, consideration should be given to [Section 3.2](#) to demonstrate your proposal's societal impact.

Generally, societal impact analysis will involve:

### 1. Undertaking a robust and objective CBA:

You should monetise impacts as far as possible and consider impacts on as many stakeholders as practicable to gain an accurate, community-wide perspective on the costs and benefits of each option. This should include detailed analysis of risks, using sensitivity analysis, as well as scenario and/or real options analysis where relevant (see the [Guide to risk and uncertainty analysis](#)). Our assessment requires full transparency of the input data, assumptions and CBA methodology.

- a. Independent peer reviews of the CBA and key inputs (including cost estimates and demand modelling) are strongly recommended to provide confidence that the conclusions of the analysis are robust.

### 2. Considering non-monetised impacts and provide supporting evidence:

Where impacts cannot be robustly expressed in monetary units, or it is difficult to do so, they should be detailed alongside the CBA. This may include information on quality-of-life (that is, social impacts), sustainability, resilience and environmental impacts.

### 3. Considering equity and distributional impacts:

Equity and distributional impacts relate to which community groups (including individuals, businesses and governments) bear the benefits and costs of an investment. To aid decision-making, we recommend you undertake a distributional analysis and present the results alongside the CBA.

When making a Stage 3 business case submission to us, we require you to demonstrate that you have appropriately considered these elements, which are further explained in the subsequent sections.

## Cost–benefit analysis

A central part of a business case is the economic appraisal. **We require use of CBA** as a standard method to evaluate the costs and benefits of the interventions to the community as a whole. A CBA allows decision-makers to measure and compare potential changes in social welfare (see [Box 9](#)).

**We require you to submit a detailed CBA model (including assumptions, data and calculations) in support of your proposal.** The information should be sufficiently detailed to allow us to replicate CBA results, as described in our [Stage 3 Submission Checklist](#) in [Section 4](#).

CBA is widely recognised as the most appropriate tool for considering and comparing the costs and benefits of a wide variety of policies and projects, including infrastructure projects. It allows the social, economic and environmental merits of a proposal to be identified, measured, valued and compared from the perspective of the Australian community.

CBA is adaptable – it can be applied to different levels of scope and different types of interventions, to policy and regulation changes, projects and programs.

CBA is often characterised as ‘monetary evaluation’, where all units are in monetary terms. This contrasts with other methods, such as multi criteria analysis (MCA), which are ‘non-monetary evaluation’ and are not appropriate for analysing options in detail.

For more information, see our [Guide to economic appraisal](#).



## Box 9: The role of CBA in considering societal impacts

CBA is a primary tool to assist infrastructure decision-making and the most robust tool for analysing how your proposal performs against the Societal Impact criterion. It is often referred to as **Social CBA**, because it evaluates the social, economic and environmental value of investment proposals (that is, the increase in overall societal welfare) over the life of those proposals. **CBA considers all relevant social, economic and environmental effects from an investment that can be monetised as benefits and costs.**

The analysis is societal in the sense that it takes into account all impacts on the welfare and wellbeing of the population. CBA allows decision-makers to compare the combined social, economic and environmental welfare implications of different projects to society as a whole.

The CBA process requires the following:<sup>4</sup>

- Systematically cataloguing project impacts as benefits and costs.

- Valuing impacts in dollar terms. This is used to evaluate the relative importance of the identified impacts. A benefit is defined as any gain in human wellbeing, and a cost as any loss in wellbeing. There are a number of methods to value benefits and costs in dollar terms, including using market prices, willingness to pay and willingness to accept as measures of human preference.
- Determining if there are net benefits (that is, benefits *greater than* costs) to the proposed option compared to the base case. If benefits are greater than costs, then the option is potentially worthwhile. There may be other better options, so options may need to be ranked, particularly if there is an overall budget constraint.

Some costs and benefits may be difficult or costly to monetise in a CBA. These impacts are still relevant for decision-makers and should be considered alongside the CBA in non-monetised terms (quantitative where possible, or otherwise in qualitative).

An Appraisal Summary Table may be useful for presenting additional analysis outputs and is described in **Section 2.6**.

4. Boardman, et al 2018, *Cost–benefit analysis: concepts and practice* (5th ed.). Cambridge University Press, NJ, p. 1–2.

## Cost–benefit analysis methodology

For detailed guidance, see the [Guide to economic appraisal](#).

In preparing and presenting results of the detailed economic appraisal, proponents must:

1. **Consider as many monetised economic benefits and costs as possible.** We require you to monetise benefits and costs whenever possible and to consider impacts on as many stakeholders as practicable to gain an accurate community-wide perspective on the benefits and costs. We are particularly interested in understanding the magnitude and longevity of benefits. Examples include:
  - Productivity and economic costs and benefits (for example, reliability and travel-time savings, increased producer surplus, and vehicle operating cost savings).
  - Individual user benefits (for example, accessibility and connectivity benefits, and travel time savings).
  - Service improvement benefits.
  - Quality of life including (but not limited to) health, safety and security benefits.
  - Environmental, also including sustainability and resilience.
  - Land use impacts (for example, higher or lower value of land use, public infrastructure cost changes, and second-round transport benefits and costs) should also be considered, where relevant, noting they only apply in specific settings and may be misapplied in practice.
  - Wider economic benefits (WEBs, see [Glossary](#)) should also be considered, where relevant, noting they only apply in specific settings and may be misapplied in practice.
2. **Consider whether the benefits outweigh the costs, making it an efficient proposal.** Consider the incremental benefits and costs of the proposal to the base case to determine the net benefits and whether it would be an efficient use of resources. This is dealt with directly by the CBA.

3. **Consider risk and uncertainty.** Infrastructure is affected by a range of risks that impact on whether costs and benefits are realised. These risks will vary over time with some level of uncertainty. Risks that may be relevant for infrastructure include economic growth, individuals' behaviour, technological innovation, oil prices, pandemic risks, natural disaster risks, regulatory risks and climate risks. For detailed guidance see the [Guide to risk and uncertainty analysis](#).

## Considering benefits and costs that are difficult to monetise

As far as possible, you should monetise all relevant impacts of options and include these in the CBA model. Stages 1 and 2 should provide appropriate context to the scale of the problems and opportunities to which the proposal is responding.

However, there may be some instances where impacts cannot be monetised due to uncertainty around the magnitude of the impact being measured.

In some instances it may be very costly to monetise an impact using a willingness-to-pay survey or other approaches (see **Approaches for monetising benefits and costs** in the [Guide to economic appraisal](#)). If the impact is expected to be minor and unlikely to affect decision-making, the additional cost of monetising the impact may not be worthwhile.

Examples of impacts that may be difficult or costly to monetise include the protection of biodiversity, cultural or heritage impacts, covered by cultural and heritage values, and indirect mental and physical health impacts. Where impacts have not been monetised, you should clearly explain your reasons in the business case.

It is important to document non-monetised quantitative and qualitative impacts as part of the analysis as they may provide important information to help decision-makers fully understand the impacts of the option being considered. Non-monetised impacts should be presented alongside the monetised impacts to account for the full range of effects of the options.

Quantitative and qualitative measures are not easily comparable, like monetised costs and benefits, as applying monetary values evaluates the relative importance of impacts. Proposals including these measures will rely on the judgement of decision-makers.

**If you cannot monetise the impacts, you should quantify them.**

**If you cannot quantify the impacts, you should qualitatively describe them.**

### Approach 1: Quantify impacts

This approach may be used where there are difficulties in monetising specific costs and benefits, in particular where methods or evidence do not yet exist for the type of cost or benefit.

Quantification provides an indication of the challenges or opportunities faced, but may not capture the overall magnitude of the problem. When the problem is quantified, but not monetised, it is useful to provide benchmarks for comparison, note the number of stakeholders impacted, and to demonstrate the magnitude. Quantified information should be accompanied by qualitative information linking the problem or opportunity to societal welfare.

### Approach 2: Qualitatively describe impacts

This approach provides qualitative information on how the impact affects society. This could include consideration of impacts to cultural standing or heritage, or an analysis of the relative disadvantages currently experienced by the users of the infrastructure.

### Quantifying benefits for place-based proposals

We note that place-based analysis of programs or projects that generate social benefits through coordinated development in a defined area may need to be qualitative given current data constraints.

However, our view is that this should only apply where compatible studies or revealed preferences from past projects are not available. Rather, we encourage you to apply revealed preference, stated preference and avoided cost techniques to quantify non-market costs and benefits specific to the program. Guidance on place-based programs is provided in the [Guide to program appraisal](#) and approaches to quantifying non-market values are described in our [Guide to economic appraisal](#).



## Box 10: Case study – demonstrating the broader benefits of regional public transport

Identifying proposal benefits, both quantitative and qualitative, is necessary to make informed investment decisions. However, some benefits are difficult to quantify. In 2014, the National Center for Transit Research published an analysis of rural and small urban public transport systems in the United States. The study quantified broader benefits traditionally not captured in CBAs.

The key benefits considered in the study can be broadly categorised as:

- **traditional benefits commonly included in CBA**, relating to the direct savings associated with using public transport (for example, vehicle ownership and operational cost savings)
- **broader benefits usually not included in CBA**, relating to the costs of forgoing medical and work trips in the absence of public transport.

These broader benefits recognised that in remote rural areas without public transport, individuals cannot undertake many welfare-increasing trips (that is, it identifies the benefits of trips that are not available to them currently).

This study estimated these traditional and broader economic benefits through survey evidence that linked improved outcomes to the availability of public transport. This was achieved by gathering evidence on:

- how customers would otherwise travel in the base case without the public transport (for example, by car, taxi, bike or by no longer travelling)
- what customers would use public transport for (for example, work, medical, education or discretionary).

By understanding how the public transport service would affect behaviour, the authors were able to quantify the benefits of the transit service by referring to prior research.

One example of the broader benefits quantified in the study is benefits from increased work trips. The study linked the availability of public transport to higher job market participation. In the base case without public transport, individuals in rural areas may be unable to engage in the job market.

Another example quantified in the study is economic cost of forgone medical trips. The study found that investment into public transport encourages some people to undertake trips for medical purpose more frequently. This could be the difference between well-managed and poorly-managed care, which can reduce the need for more expensive medical treatment and improve the overall quality of life.

This study showed that in rural contexts, non-traditional benefits can exceed the value of traditional economic benefits. In this case, providing public transport enabled higher labour market participation, which resulted in welfare cost savings and higher net incomes for individuals.

Further detail on the treatment of secondary economic benefits in remote areas is provided in the [Guide to economic appraisal](#).

Source: National Center for Transit Research, Cost–benefit analysis of rural and small urban transit, July 2014.



## Distributional analysis

Distributional analysis considers the impacts of an option on groups in society. **Options may have different impacts on different groups** due to their characteristics, such as location, income or demographics. Distributional analysis should be considered where these impacts are disproportionate to specific groups or disadvantaged groups are significantly impacted. However, it may not be relevant or applicable to all proposals. Information on how benefits and costs affect specific users **can help decision-makers understand the fairness or equity implications of the specific option**. This may be an important consideration for decision-makers and affect the choice of the preferred option.

Different impacts may be a deliberate objective of an option (for example, regional telecommunication black spots programs specifically seek to provide wireless connectivity benefits for regional populations) or an indirect consequence of an option (for example, people living close to a new train station may receive greater benefits than those living further away). If you are seeking to provide benefits for a specific group, understanding the benefits and cost implications for this group will be critical to the analysis.

The distribution of benefits may also be used to design possible user-pays funding of options, following the user-pays or beneficiary-pays principle. **Groups who receive the greatest benefit should, in principle, pay more to use infrastructure**. User-pays funding is discussed in **Box 11** later in this chapter.

Distributional analysis takes the impacts and disaggregates them by groups. The impacts for each impacted group can then be presented alongside CBA results and non-monetised impacts, which aggregate impacts across all of society.

**We recommend using a distributional analysis as a supplement to CBA**, to describe the impacts of options on different groups within society. The steps in undertaking a distributional analysis are:<sup>5</sup>

1. Identify the key groups of interest for the analysis.
2. Allocate costs and benefits from the CBA to the identified groups.

3. Consider whether any of these costs or benefits may be shifted to another group. For example, reductions in production costs may be passed onto consumers in lower prices depending on the competitive structure of the specific market.
4. Include any transfer payments that have not been included in the CBA, and consider which groups are impacted. Transfers, such as tolls, are not included in CBA as a cost or benefit as they do not affect societal welfare. However, transfers may be included as a resource cost correction (see the [Guide to economic appraisal](#)).
5. Consider whether the impacts not monetised in the CBA are likely to affect groups in different ways.

Another approach, included in some CBA guidelines, is to consider distributional impacts by applying weights to the costs and benefits of different groups in society.<sup>6</sup> The intent is to weight disadvantaged groups more favourably. For instance, one dollar of benefit for a low-income household is worth more than one dollar of benefit for a high-income household. However, **we do not support this approach** (the use of distributional weights in CBA) as the choice of weights is highly subjective and depends on how you define equity. This reduces transparency and comparability of CBA results with other appraisals that do not use weights or use different weights.

**Instead, we recommend you provide quantitative and qualitative information to describe the distributional impacts of options, as a supplement to CBA.**

## Considerations for other economic appraisal tools

In some policy areas, other types of analysis – such as computable general equilibrium (CGE) modelling or other analytical tools based on input–output tables – can provide useful additional information. However, in most cases they will not be relevant to a submission to us.

5. Based on: NSW Treasury 2017, *Guide to Cost–Benefit Analysis (TPP17-03)*, New South Wales Government, p. 53.

6. HM Treasury 2020, *Appendix A3: Distributional Appraisal of The Green Book: Central government guidance on appraisal and evaluation*, United Kingdom Government.



### CGE modelling

CGE models estimate changes in key macroeconomic indicators at the national level, for individual industries and often regions, as a result of external changes or policy changes. Key indicators include impacts on GDP, private consumption, investment, exports, employment and industry outputs.

**There is limited value in this kind of modelling for infrastructure** because CBA directly captures the majority of welfare impacts on the Australian community. Additionally, CGE is unlikely to clearly differentiate comparable options due to the aggregate level of analysis.

We primarily consider CBA for assessing the economic merit of a proposal. We are unlikely to consider CGE outcomes as additive or complementary to CBA outcomes. However, you may use CGE models to provide additional information on the economy-wide and regional effects of large projects.

Proponents should weigh up whether the additional information obtained is valuable to support the investment proposal. CGE modelling should be considered only for very large proposals.

Further information on CGE modelling is provided in the [Guide to economic appraisal](#).

### Input–output analysis

Input–output (I–O) analysis aims to estimate the impact on economic activity of a policy or economic change, including the flow-on effects throughout the economy. Because it considers only the impact of investment costs and ignores the benefits of options as measured by a CBA, it does not provide an indication of the overall merit of a project. Due to the reduced complexity, it may be a less expensive alternative to CGE models to supplement CBA. However, I–O analysis comes with major limitations and the results are likely to be biased upward. **We do not recommend the use of I–O models** for proposals submitted to Infrastructure Australia.

Further information on I–O analysis is provided in the [Guide to economic appraisal](#).

### Deliverability of options

To enable us to appropriately assess the deliverability of the shortlisted options, consideration should be given to **Table 11** in [Section 3.2](#).

#### Deliverability analysis

We recommend your deliverability analysis includes consideration of:

- Ease of implementation
  - Change management or operational readiness requirement for integration of the asset with the organisation, supply chain and network into which the proposal will fit.
  - The schedule to deliver the proposal within the timeframes required.
- Project governance
  - You have the **authority to deliver** the proposal and understand what legislative mechanisms enable delivery of the proposal
  - You should understand **approval requirements** by identifying and understanding them, and evidencing that they are attainable.
  - Governance and management structures in place and where additional expertise may be required
  - Financing options, including user-pays models or alternatives to government funding
  - Proposed funding model, including level of Australian Government funding
  - Delivery (contracting) and procurement models, including key milestones and dependencies
- Proponent and market capability and capacity
  - Market sounding / engagement of the supply chain has informed the ability to deliver
  - Organisational capability, demonstrated track record and lessons learnt

- Risk analysis, including identification of different risk profiles of the options
  - Risks to achieving the project outcomes resulting from planning, forecasting or delivery
  - Approach to unmitigated risks (such as significant, irreversible environmental or social impacts) and pending approvals
  - Please refer to the [Guide to risk and uncertainty analysis](#) for further information.

A detailed delivery strategy and operations strategy should be developed for the preferred option, see **Step 3** for further information.

### Financial analysis

A financial analysis is an important element in option appraisal. It considers the financial implications of the options under consideration, typically from the perspective of the proponent, over the life of the option. The financial analysis does not measure the overall economic merit of a project (which is determined by the CBA), other non-monetised factors, or equity and distributional effects.

The financial analysis focuses on the costs and revenues of a project and not necessarily the funding source. In certain circumstances, for example under a PPP, financing costs would also be included in the financial analysis.

Financial analysis is used to evaluate the financial viability and sustainability of a proposed option. This considers the capital and operating costs, potential revenues from the options (such as access charges, fares and tolls) and what government funding is required to deliver an option.

The financial analysis is typically undertaken from the perspective of the proponent or organisation who would undertake the project.

The financial analysis for a business case typically uses the same information as the economic analysis but is more narrowly **focused on the financial impact of an option on the proponent**, as opposed to considering the welfare impacts across society.

The financial analysis should consider:

- project cashflows, including capital and operating costs and revenues, reported over time and in terms of net present value (NPV)
- sensitivity of project cashflows to project risks
- financial interdependencies with other infrastructure or policies (such as regulation of access charges, fares and tolls)
- funding opportunities in addition to government grants, including user-pays funding of capital and operating costs
- the net financial cost to government, including the funding required from the Australian Government.

Most business cases submitted to us include options that are not commercial and will require funding from government for capital and or operating costs. Because of this, **many options will generate negative cash flows for the proponent, although they may generate positive net societal benefits**. This means that financial analysis results generally will not translate to a transparent decision rule, unlike the NPV and benefit-cost ratio (BCR) results from a CBA.

However, financial analysis should be completed for all options, including revenue-impacting options, as it is important to help decision-makers understand the direct financial impacts of the options on the proponent and ensure options for user-pays funding have been appropriately considered.

Where funding sources are known, these should be included in the financial analysis. Where funding sources are not known, the financial analysis should consider the forecast costs and revenues identified for the options.



## Box 11: What is user-pays funding?

User-pays funding describes **a funding arrangement that recovers costs from those who use or directly benefit from services.**

User-pays fees and charges are used across a range of infrastructure sectors and include public transport fares, water and electricity consumption tariffs, and a variety of social infrastructure sector fees, such as gallery entry fees, court fees and in some cases health care costs.

User-pays funding is usually an efficient, equitable and sustainable funding method because:

- it can provide users with a price signal about the cost of infrastructure, which should incentivise efficient use
- the primary beneficiaries of the infrastructure are the ones who pay for it, avoiding cross subsidies across different groups in society (however, some user charges are regressive, having a bigger impact on those with lower incomes)

- it provides an ongoing stream of revenue over the life of the asset
- reduces the need for government funding.

There is widespread support in the community for this type of funding, with a majority of Australians supporting user-pays models as a means of increasing funding for infrastructure development.<sup>7</sup>

In some sectors, the amount that would be acceptable to charge users does not cover the full cost of delivering, operating and/or maintaining the required level of infrastructure and services.

As a result, government funding is utilised to fill this gap and user-pays arrangements are more commonly used as part of a mixed funding model.<sup>8</sup>

7. Infrastructure Australia 2019, *Australian Infrastructure Audit*, p. 226.

8. Infrastructure Australia 2019, *Australian Infrastructure Audit*, p. 226

## 2.4 Step 2: Determine the preferred option

Step 2 of Stage 3 determines the preferred option through rigorous assessment against the Assessment Criteria and Themes. In this section, we give an overview of Step 2 and explain what is involved to evaluate options against the Assessment Criteria to identify the preferred option.

### Overview of Step 2

In Step 2, you will use the evidence you have collected in Step 1 to determine the preferred option.

The preferred option, recommended to decision-makers in the business case, should be the option deemed to have the greatest positive impact based on our three overarching Assessment Criteria:

1. Strategic Fit
2. Societal Impact
3. Deliverability

These criteria broadly align with national, state and territory guidelines. If you have already prepared a business case in line with other guidance, it is likely you will have already considered these criteria in determining the preferred option.

To help explain how we assess proposals against the Assessment Criteria, we have broken each of the criteria into five specific themes (see **Figure 5**). **The themes are not criteria within themselves and will not all be applicable for each proposal.** However, they highlight the range of considerations we use when assessing a Stage 3 submission. For more information, see [Section 3.2](#).

**Figure 5: Our Assessment Criteria and themes**

<b>Strategic Fit</b> <i>'Is there a clear rationale for the proposal?'</i>	<ul style="list-style-type: none"> <li>• Case for change</li> <li>• Alignment</li> <li>• Network and system integration</li> <li>• Solution justification</li> <li>• Stakeholder endorsement</li> </ul>
<b>Societal Impact</b> <i>'What is the value of the proposal to society and the economy?'</i>	<ul style="list-style-type: none"> <li>• Quality of life</li> <li>• Productivity</li> <li>• Environment</li> <li>• Sustainability</li> <li>• Resilience</li> </ul>
<b>Deliverability</b> <i>'Can it be delivered successfully?'</i>	<ul style="list-style-type: none"> <li>• Ease of implementation</li> <li>• Capability and capacity</li> <li>• Project governance</li> <li>• Risk</li> <li>• Lessons learnt</li> </ul>

In general, you should **select the option with the highest net benefits** (assessed through the CBA and supporting non-monetised impacts), which in turn will be the option likely to maximise societal welfare. **Decision-makers should also consider the Strategic Fit and Deliverability of the options.**

Your CBA will directly address the Societal Impact criterion. The results of the CBA can be used to rank the various project options (see **Box 12**).



## Box 12: Ranking options using economic measures

To rank your options, the outcomes of a CBA should be presented for each option, using relevant economic measures.

Key measures that we consider are:

- Net present value (NPV) of the future benefits and costs. This is the difference between the present value of benefits and the present value of costs.
- Benefit cost ratio (BCR). This is the ratio of the NPV of the project benefits to the NPV of the project costs. Example BCR interpretation:
  - BCR of 0.5 – for every \$1 in costs, society will receive \$0.5 in benefits. That is, the benefit return will not cover the costs
  - BCR of 1 – for every \$1 in costs, society will receive \$1 in benefits
  - BCR of 2 – for every \$1 in costs, society will receive \$2 in benefits.

Additional measures that may be useful for comparing options include:

- Net present value per dollar of capital investment (NPVI). This measures the overall economic return of a project in relation to its requirement for initial capital expenditure. This measure can be used to maximise net present value based on a constrained capital funding allocation.
- First-year rate of return (FYRR). This measures the value delivered by a project in its first year of operation. It can provide insight into whether a proposal's intended date of operation is early, late or appropriate.

For more information on measures of economic worth, see the [Guide to economic appraisal](#).

Your business case should explain the **robust and defensible** process and decision-making to determine the preferred solution, to demonstrate that other potential solutions have not been dismissed unnecessarily. Ultimately, this will help build support for and confidence in the preferred option.

There is no standard approach to undertake this analysis, which comprises monetised and non-monetised impacts, risks and other considerations. How these are valued will depend on the preferences and risk tolerance of different individuals or organisations. **The aim of the business case is to present transparent and unbiased information to enable informed decision-making.**

To make clear how you determined the preferred option, you should **detail the full analysis of the shortlisted options**. This will include:

- analysis of Strategic Fit
- any technical or other relevant investigations
- results of the CBA
- results of sensitivity testing, scenario analysis or real options analysis, as well as any risks to realising estimated costs and benefits
- any quantitative and qualitative impacts not monetised in the CBA
- distributional analysis, if undertaken
- deliverability and risk analysis
- results of the financial analysis
- other information that may be relevant for decision-makers (see [Section 3.2](#)).

It is important to remember that the preferred option could be the base case. This would be the case where none of the options generate a net benefit (benefits greater than costs) as demonstrated through the CBA and other quantitative and qualitative evidence.

## 2.5 Step 3: Develop the delivery strategy and operations strategy

Step 3 of Stage 3 develops the delivery and operations strategy of the preferred option and includes:

- identifying governance arrangements to support effective delivery and transition to operations
- identifying the schedule and key milestones for delivery including procurement and delivery
- developing a post completion review plan.

### Overview of Step 3

Developing the delivery strategy and operations strategy involves **detailed investigation on how the preferred option will be delivered and will operate over its lifecycle**. This should provide enough detail for decision-makers to determine whether you have considered risks, appropriately planned for delivery and operations phases, and have the capability and capacity to deliver the project on time and on budget.

The delivery strategy and operations strategy should conform to the relevant national, state or territory guidelines.

For a Stage 3 submission to us, you should develop the following and demonstrate how they are suitable for the proposed project:

- high-level delivery schedule
- governance framework
- change management or operational readiness framework
- risk management plan and risk register
- procurement strategy, including, where relevant:
  - local industry participation plan
  - indigenous participation plan
- stakeholder engagement plan
- asset management plan
- planning for post completion review, including benefits realisation plan
- sector-specific and asset-specific planning as relevant (for example, crewing plan)
- any other supporting evidence required (see [Section 3.2](#)).

## Estimating jobs supported by infrastructure projects

As outlined in the **Overview**, the infrastructure sector is a significant employer in the Australian economy and decision-makers and governments across Australia are interested in understanding the specific employment impacts of infrastructure investment. To improve consistency around the calculation of jobs supported from infrastructure investment **we provide the following guidance on estimating job numbers as part of business case development.** **Appendix A** provides additional guidance on terminology, as well as worked examples of estimating job numbers and presenting the time profile.

**Please note that we do not consider estimated job numbers as part of our assessment.**

Notwithstanding this, if you provide us with estimated jobs information, we will include it in our evaluation outputs.

### Job types

Investment in infrastructure supports a range of job types, including both direct and indirect jobs:

- **Direct** – jobs supported specifically for the construction and operation of the project.
- **Indirect** – jobs supported by the intermediate products and services used in the construction and operation of the project.

The number of jobs applicable to an investment will depend on the type and scale of the infrastructure proposal.

Due to the costs and resources required to estimate indirect jobs, **we do not request that proponents estimate indirect jobs at the business case stage.**<sup>9</sup> As a result we have focussed on providing guidance with regard to estimating direct jobs attributable to an investment proposal.

## Estimating direct jobs as part of a business case

This section provides a summary of a clear and pragmatic approach to estimating full time equivalent (FTE) direct jobs using our preferred ‘top-down’ approach. While a ‘bottom up’ approach based on project-specific data provides the most robust method to estimate direct jobs at the business case stage, this approach is dependent on a range of information, which may not be available.

The preferred methodology for estimating job numbers using the ‘top-down’ approach includes:

1. identify the time profile of expenditure for the project phases and convert data into real dollars
2. identify relevant direct job to output multipliers and apply the regional adjustment factor
3. convert estimate of direct jobs to direct FTE jobs using conversion factors
4. adjust direct jobs estimates to reflect changes in labour productivity
5. finalise and report direct jobs estimate.

The formula for estimating direct jobs is shown in **Box 13**. See **Appendix A** for worked examples of estimating job numbers and presenting the time profile.

### Other considerations

The following rules apply when estimating and reporting direct jobs at the business case stage:

- Direct jobs need to be converted to FTE to prevent overstatement of job numbers.
- When reporting jobs for different phases of an infrastructure project, the number of jobs must be averaged over the period to prevent double counting.
- The length of time over which a job is supported needs to be clearly identified (for example, 6 months, calendar year, financial year).

9. The estimation of indirect jobs for infrastructure projects involving large capital investments is usually estimated using techniques such as computable general equilibrium modelling – this type of modelling is more realistic for large investment projects as it considers resource constraints in the economy.

10. The word expenditure is used rather than ‘output’ which is a technical economics term for value of production or output by an industry.



### Box 13: Formula to estimate direct FTE jobs ‘top down’

**Direct FTE jobs** = [Project phase expenditure (\$m real)<sup>10</sup> X jobs per \$m of expenditure X regional adjustment X FTE conversion] X (1 – % change in labour productivity)

Where:

- **Project phase expenditure (\$m real)** – identify capital spend for each key phase (e.g. planning, construction, operations and post-operations phases), excluding out of scope items
- **Jobs per \$m of output** – identify and apply the direct job multiplier to calculate the direct jobs per million dollars of real output
- **Regional adjustment** – apply the regional adjustment to the direct job per \$m of output for the relevant state, territory, or region
- **FTE conversion** – identify and apply factors to convert direct jobs to direct FTE based on part-time and full-time hours worked data
- **% change in labour productivity** – apply the adjustment for labour productivity.

### Planning the post completion review

The purpose of Stage 4 of the Assessment Framework is to conduct a post completion review (PCR) of the completed project. The objective of a PCR is to promote better decision-making, learning lessons from each project to improve the robustness of future business cases and the use of public funds. PCRs should focus on understanding and learning from experiences of project delivery and project performance.

We recommend you review the delivered project using our three Assessment Criteria:

- **Strategic Fit** – whether the project achieved its intended strategic objectives.
- **Societal Impact** – the performance of the project against its stated Societal Impact outcomes, including an ex-post review of the CBA.
- **Deliverability** – whether delivery objectives were achieved, how efficiently the project was delivered against forecast capital costs, how any risks were managed and any other lessons learned.

**During Stage 3, you should develop a PCR plan, focusing on:**

- the timing of review(s)
- which benefits and costs will be reviewed
- how benefits and costs will be measured, monitored and reviewed
- requirements for data capture and analysis
- identifying accountability for the PCR and reviewers.

Most state and territory guidelines include a **benefits realisation plan** as part of their standard business case templates. Our PCR process extends the benefits realisation plan to review costs, benefits and project delivery to understand whether the community is better off as a result of the project. **Where a benefits realisation plan has been developed, we will accept this as capturing the benefits component of the PCR plan.**

Detailed guidance on PCRs is provided in **Stage 4: Post completion review**.



## 2.6 Step 4: Document the business case

Step 4 of Stage 3 presents the findings of the analysis in a business case.

### Overview of Step 4

You should develop a business case in accordance with your state or territory requirements and ensure it **captures all the information detailed in Steps 1–3**. Our information requirements for Stage 3 assessment are summarised in the **Submission Checklist** in **Section 4** of this document, which you should review before submitting your business case to us.

The business case brings together all the analysis undertaken as part of project development into a single document (or suite of documents). This provides a transparent account for decision-makers of the value of each option, how you selected the preferred option and your delivery and operations strategy. It should include all the information for a decision-maker to determine whether to proceed with the proposed option.

The business case will include, but is not limited to:

1. Definition of the problem or opportunity (from **Stage 1** of the Assessment Framework).
2. Options identification and shortlisting methodology (from **Stage 2** of the Assessment Framework).
3. Detailed analysis of shortlisted options against the Assessment Criteria and themes, including Strategic Fit, Societal Impact and Deliverability, in accordance with guidance in **Section 2.3** of this document.
4. Recommendation of the preferred option.
5. Delivery strategy and operations strategy for the preferred option, including PCR plan.

Highly technical content is generally not included in the business case document where it is not relevant for decision-makers.

To ensure transparency, the business case document should be supplemented with detailed reports (as appendices) that have been prepared to inform parts of the business case, including further technical information on the analysis. This detailed information is important for business case review and assurance processes.

Where using a state or territory template (or other relevant template), you should identify in our **Stage 3 Submission Checklist** where our requirements have been addressed.

### Summarising your options analysis in the business case

In documenting your business case we recommend completion of an Appraisal Summary Table (AST) to succinctly capture both the qualitative and quantitative elements of the proposal.

ASTs are used by numerous government bodies in Australia, New Zealand and the United Kingdom. An AST will enable decision-makers to quickly understand the broader strategic, societal and deliverability aspects of the proposal.

To demonstrate the alignment of your proposal with the Assessment Criteria and themes, we recommend you develop an AST that summarises:

- project and its location
- funding status and level of funding sought
- Strategic Fit: summarising the objectives of the project
- Societal Impact: addressing all themes or as required by your proposal
- Deliverability: outlining the delivery model, key risks and total outturn cost.

An **example AST structure** is shown in **Table 2**.

Table 2: Example Appraisal Summary Table structure

Proposal name:	[TBA]	Proposal location:	[TBA]	
Funding Status:	[TBA]	Aust. Govt. Funding Sought:	[TBA]	
Total outturn cost	[P50]	[Most Likely]	[P90]	
Strategic Fit [summarise Section 2.4 Step 2: Determine the preferred option – add rows as required]				
Objectives	[insert objectives]			
Stakeholder	[insert level of stakeholder endorsement]			
Societal Impact [summarise section 2.4 Step 2: Determine the preferred option]				
CBA outputs	Discount rate:	4%	7% (Central)	10%
CBA results	BCR:	[insert BCR]	[insert BCR]	[insert BCR]
	NPV (\$m):	[insert NPV\$]	[insert NPV\$]	[insert NPV\$]
Results with land use impacts, if applicable	BCR:	[insert BCR]	[insert BCR]	[insert BCR]
	NPV (\$m):	[insert NPV\$]	[insert NPV\$]	[insert NPV\$]
Results with land use impacts and/or WEBs, if applicable	BCR:	[insert BCR]	[insert BCR]	[insert BCR]
	NPV (\$m):	[insert NPV\$]	[insert NPV\$]	[insert NPV\$]
Description of qualitative, quantitative and monetised impacts				
Theme	Impact Summary	Qualitative impacts	Quantitative impacts	Monetised impacts
Quality of life	[distributional effects, digital connectivity, access, amenity]	[TBA]	[TBA]	[TBA]
Productivity	[competition impacts, innovation, jobs]	[TBA]	[TBA]	[TBA]
Environment	[impacts to natural resources, ecosystems, carbon emissions]	[TBA]	[TBA]	[TBA]
Sustainability	[sustainability assessment information, sustainable design or materials]	[TBA]	[TBA]	[TBA]
Resilience	[impacts of extreme climate scenarios, improves resilience]	[TBA]	[TBA]	[TBA]
Deliverability [summarise section 2.4 Step 2: Determine the preferred option – add rows as required]				
	Description	Values		
Governance	[insert delivery model]	[insert package values if applicable]		
Risks	[insert key risks and proposed mitigations]	[insert P50 / Most Likely / P90]		

## 2.7 Worked examples of analysing sustainability and resilience using cost–benefit analysis

This section provides worked examples of analysing sustainability and resilience using CBA to demonstrate how your proposal responds to our themes.

**Box 14** provides overarching principles for a sustainable approach to CBA development.

**Box 15** provides a worked example of how to analyse sustainability in CBA and **Box 17** provides a worked example of how to analyse resilience in CBA.



### Box 14: Sustainability in cost–benefit analysis

For CBA to be a high-quality and useful decision-making tool for considering sustainability, it should:

- **Consider long-term drivers of change**, including population projections and climate change. Such drivers of change should be based on the best available evidence. We recommend consulting with the relevant state or territory treasury to ensure appropriate population projections are being applied.
- **Include all material social, economic and environmental impacts** within the CBA framework. This should include both positive and negative externalities, such as changes in air pollution and noise. The analysis should focus on real impacts to society as a whole rather than counting the transfer of impacts from one group to another.
- **Develop robust, whole-of-life costing** of infrastructure interventions. This should include all aspects of the construction, operation, maintenance, renewal and disposal/decommissioning of an asset. This allows you to evaluate the impacts of sustainable options compared to other options.
- **Consider risk and uncertainty** both in the central CBA scenario and through sensitivity analysis, as well as scenario or real options analysis as relevant (see [Guide to risk and uncertainty analysis](#)). This should include appropriate levels of contingency in the cost estimates, valuing impacts related to risk where appropriate (for example, network resilience) and focussing sensitivity analysis on context-specific risks and uncertainties.

You should also refer to our Sustainability Principles outlined in the [Overview](#) volume.

We expect that the approach to sustainability in the CBA will differ depending on the context of the proposal. Where sustainability is the primary driver of the case for change, addressing this sustainability-related problem or opportunity should be central to the CBA, with a clear emphasis on the key elements outlined above. Where sustainability is an overlay to the primary problem or opportunity, evidence should be provided that the key elements outlined above were at least considered as part of the CBA process.

In some instances, where sustainability is the primary driver of the case for change, the key outcome of sustainability may be to meet a government policy or target. We will take this into account when reviewing the Strategic Fit of submissions.

A worked example of incorporating sustainability is included in **Box 15**. More detail on how we assess sustainability considerations in business cases is given in our Assessment Criteria in [Section 3.2](#).



## Box 15: Example CBA where sustainability is the primary driver of the case for change

This worked example builds on **Box 14** to provide a practical example of how to embed sustainability in CBA.

### Scenario for best practice example

A CBA is being completed as part of a business case to address a wastewater capacity issue for an urban growth area. The base case of the CBA is to upgrade an existing wastewater treatment plant with treated effluent discharged to a part of the existing broader wastewater network which is already near capacity.

### How to incorporate sustainability into CBA

Sustainability is incorporated into the CBA by considering the identified urban growth problem, while also being conscious of relevant long-term drivers of change, such as climate impacts to water availability and water usage.

The appraisal period should be appropriate to take into account these long-term drivers of change across the lifetime of the infrastructure asset. For this example, the appraisal period is assumed to be 30 years.

Identified options are designed to respond to the problem and long-term drivers of change. These comprise:

- **Option 1** – Build a new additional wastewater treatment plant, which discharges into a less constrained part of the broader wastewater network.
- **Option 2** – Build a new additional wastewater treatment plant which produces Class A recycled water for non-potable reuse<sup>11</sup> to be used for agriculture and irrigation of green space. These recycled water users are in close proximity to this additional plant.
- **Option 3** – Build a new additional wastewater treatment plant which produces Class A recycled water for non-potable reuse to be used for agriculture and irrigation of green space. A reticulation network is built to distribute this recycled water across a wider area than in Option 2.

As all options provide wastewater services to support urban growth, there is no incremental benefit compared to the base case for wastewater provision.

The identified benefits vary by option. For Option 1, the only benefit is an avoided downstream wastewater network upgrade which would be needed in the base case. Options 2 and 3 provide additional benefit streams relating to the productive use of the Class A recycled water.

These comprise agricultural benefits (increased agriculture output) and recreation benefits from improved quality of green space (resulting in improved recreation health). All options reduce odour compared to the base case which positively impacts adjacent communities – a positive externality.

The analysis considers whole-of-life costs. This includes capital costs and a bottom-up approach to operating and maintenance costs, which included consideration of renewals.

A breakdown of incremental costs and benefits compared to the base case is presented in **Table 3**.

11. Class A is the highest quality of recycled water which is permitted for uses including direct human contact such as clothes washing, watering gardens and irrigated food crops.

## Box 15: Example CBA where sustainability is the primary driver of the case for change *continued*

**Table 3:** Incremental costs and benefits of a best practice approach to incorporating sustainability in a CBA.

	Option 1	Option 2	Option 3
<b>Costs</b>			
Capital cost	\$100m	\$150m	\$250m
Operating and maintenance cost	\$20m	\$30m	\$40m
<b>Total cost</b>	<b>\$120m</b>	<b>\$180m</b>	<b>\$290m</b>
<b>Benefits</b>			
Avoided cost in downstream wastewater network	\$100m	\$150m	\$150m
Increased agricultural output	\$0m	\$20m	\$40m
Improved recreation health	\$0m	\$20m	\$40m
Reduced odour	\$4m	\$4m	\$4m
<b>Total benefits</b>	<b>\$104m</b>	<b>\$194m</b>	<b>\$234m</b>
<b>Cost benefit analysis summary results</b>			
<b>Net Present Value (NPV)</b>	<b>-\$16m</b>	<b>\$14m</b>	<b>-\$56m</b>
<b>Benefit-cost Ratio (BCR)</b>	<b>0.87</b>	<b>1.08</b>	<b>0.81</b>

**Table 3** shows that Option 2 is net beneficial, with a NPV of \$14m and a BCR of 1.08, whereas Options 1 and 3 have negative NPVs and BCRs of less than 1. Based on this CBA, Option 2 is the preferred option while the base case would be preferred to Options 1 and 3. There would need to be a clear reason to choose another preferred option. This could include the relative risk of Option 2 compared to the other options.

This example demonstrates that you should consider the value for money proposition of sustainability elements in their own right, as there is a balance between incorporating sustainability into a proposal and the costs and benefits of doing so.



## Box 16: Resilience in cost–benefit analysis

As for sustainability, for CBA to be a high-quality and useful decision-making tool, it should also adequately consider resilience. A high-quality, comprehensive CBA will consider the following elements of resilience:

- **Identification of shocks and stresses** that present a material risk to each shortlisted option. These risks should be described accordingly and evaluated, with measures to mitigate and/or adapt to shocks and stresses identified.
- **Scenario analysis**, using multiple plausible future scenarios, to account for future uncertainties and consider what shocks and stresses may arise or be exacerbated under alternative futures that differ from ‘business as usual’.
- **Estimate avoided disaster and disruption costs:** Resilience benefits can be estimated in terms of direct and indirect avoided disaster or disruption costs. This is achieved by estimating the disaster costs (e.g. costs associated with disruption, repair and/or replacement) of the base case compared with the estimated disaster costs of the shortlisted options. For example, electricity infrastructure damaged during a storm will incur direct costs for repair and/or replacement, and additional maintenance, as well as indirect costs associated with the disruption of electricity supply to customers. Shortlisted options with greater resilience will have lower disaster costs due to:
  - Reduced exposure to shocks and stresses
  - Improved robustness and redundancy to withstand shocks and stresses
  - The ability to recover, respond and adapt to the consequences of shocks and stresses
  - Integrated and inclusive decision-making processes that support and enhance the resilience of the proposal, as well as any interdependent systems and infrastructure, and the broader community.

- **Assess resilience of interconnected systems and interdependent infrastructure:** Costs and benefits associated with resilience conferred on interconnected systems and interdependent infrastructure may be difficult or costly to monetise in a CBA. These impacts are still relevant for decision-makers and, where monetisation is difficult, these should be considered alongside the CBA in non-monetised terms (quantitative where possible, or otherwise in qualitative terms). For example, electricity infrastructure damaged during a storm may have downstream impacts on transport infrastructure such as rail and light rail, resulting in a disruption to transport services and costs associated with the provision of bus alternatives.
- **Assess community vulnerability and resilience:** Community vulnerability to shocks and stresses should be assessed to estimate the costs and benefits of resilience conferred on communities by the proposal. Where difficult to monetise, these costs and benefits should be assessed in non-monetised terms (quantitative where possible, or otherwise in qualitative terms).

We expect that the approach to resilience in the CBA will differ depending on the context of the business case. Where resilience is the primary driver of the case for change in the business case, addressing this resilience-related problem or opportunity should be central to the CBA, with a clear emphasis on the key elements outlined above. Where resilience is an overlay to the primary problem or opportunity, evidence should be provided that the key elements outlined above were at least considered as part of the CBA process.

In some instances where resilience is the primary driver of the case for change, the key outcome of resilience may be to meet a government policy or target. We will take this into account when reviewing the Strategic Fit of submissions.

More detail on how we assess resilience considerations in business cases is given in our Assessment Criteria in [Section 3.2](#). The Australian Business Roundtable report *Building Resilient Infrastructure* also provides useful resources for considering resilience.<sup>12</sup>

12. Australian Business Roundtable 2019, *Building Resilient Infrastructure*, Appendix G: Estimating Resilience Benefits, available at <http://australianbusinessroundtable.com.au/our-research/resilient-infrastructure-report>



## Box 17: Example CBA where resilience is the primary driver of the case for change

Flooding can lead to major economic and social consequences, including:

- loss of property, such as building damage and damage to contents
- disruption of business activities
- loss of life, injury and mental health consequences.

These impacts generally occur sporadically depending on particular weather conditions.

Options to reduce the likelihood of flooding or the consequences of flooding are about increasing the resilience of assets and communities to flood events. These options can be undertaken alongside addressing other problems, or individually. For example, a proposal might be examining a dam upgrade to increase water supply, but at the same time can consider options to upgrade the dam for a higher safety standard or to allow the dam to provide resilience to flooding.

To measure the benefits of different resilience options, you need to assess the likelihood of different events occurring and the consequences if an event occurs. You then need to consider how these change with particular options. To take a simplified example, suppose that a large flood event occurs once every 100 years in a particular valley. If this flood event occurs, then it is expected that it will lead to \$10 billion in damage to buildings and infrastructure. It may also lead to loss of life and social impacts such as mental health issues and disruption to people's lives and businesses. Based on the best available evidence, the total costs of this flood event are estimated at \$15 billion. This means that the expected cost in any given year is \$150 million (1/100 multiplied by \$15 billion).<sup>13</sup>

There could be a range of options to improve resilience to flooding, including reducing loss of life and damage to property resulting from flooding. For example:

- options to reduce the extent of flooding, such as upstream flood mitigation dams, diversion channels and dredging, and
- options to reduce the consequences of flooding, such as changing where buildings can be built, building infrastructure to a higher standard, raising building standards, improving flood evacuation routes or increasing community awareness of what to do when there is a flood.

For each of these options, the benefits will reflect how they change the likelihood and consequences of flooding. For example, one option may reduce the likelihood that the large flood event that causes \$15 billion worth of damage occurring to only once every 300 years. In this case, the expected cost with the option is \$50 million per year, so the benefit is \$100 million per year.

Another option may reduce the costs that occur for the 1 in 100 year flood event, by reducing loss of life. In this case, the expected cost of the event may fall to \$13 billion, or \$130 million expected cost per year. This means a benefit of \$20 million per year.

These benefits are then weighed up against the costs of the different options as part of the cost–benefit analysis.

13. In practice there will be a range of events of different levels of severity that would be accounted for in the cost benefit analysis. The example is shown for a single event for simplification purposes only. This also assumes that there is no level of risk aversion in the community, so the cost can be multiplied by the probability of the event.





# 3

## How we assess Stage 3 submissions

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### 3.1 How we assess Stage 3 proposals

We assess Stage 3 submissions using the Assessment Framework to determine whether a proposal is suitable for inclusion on the *Infrastructure Priority List* and/or when the Australian Government has provided funding of more than \$250 million.

As noted in [Section 2.6](#), your Stage 3 submission should demonstrate the strategic case for the proposal, all the appropriate costs and benefits for each shortlisted option, how each option would be delivered, and plans for delivering and operating the preferred option. This ensures that there is clear and robust evidence for moving forward with the preferred solution.

**Infrastructure Australia accepts Stage 3 submissions at any time.**

**Our information requirements for Stage 3 assessment are set out in the Submission Checklist in Section 4.** We encourage you to submit the business case and supporting material in their entirety, where they have already been prepared.

We follow a two-step pathway (as illustrated in **Figure 6**), to assess each unfunded proposal seeking to be added to the Priority List.

**Figure 6:** *Infrastructure Priority List* assessment pathway



#### Evaluation of funded proposals

Our Statement of Expectations requires us to review business cases for proposals seeking more than \$250 million in Australian Government funding. Where proposals have already received Australian Government funding, we will continue to assess them using the Assessment Framework.

However, funded proposals will not be considered for inclusion on the Priority List. Our assessment of these proposals will focus on identifying risks for delivery and realising benefits, and highlighting opportunities for improving overall project outcomes.



## Box 18: When is a Stage 3 proposal added to the Priority List?

To include a proposal on the Priority List, we must be confident that the proposal presents merit against our Assessment Criteria. Ideally, the proposal will have progressed through Stage 1, 2 and 3 submissions, although all of this information can be packaged in a single Stage 3 submission.

At a high level, to be added to the Priority List, a Stage 3 proposal must:

- Address a problem or opportunity of national significance.
  - This is normally assessed as part of a Stage 1 submission (see the [Stage 1](#) volume). If you have not made a Stage 1 submission, this will be assessed as part of the business case in Stage 3.
- Demonstrate strategic fit, including alignment with stated goals, the existing and future infrastructure network and response to the needs of stakeholders. This should be demonstrated in Stage 2 and validated in Stage 3.
- Be the most compelling response following comparison with a wide range of options using a robust and defensible analysis process.
  - A longlist of options should be identified, analysed and narrowed down to a shortlist in Stage 2 (see the [Stage 2](#) volume). If you have not made a Stage 2 submission, this will be assessed as part of Stage 3.

- The shortlisted options are analysed in detail in Stage 3, as described in this document. This should include any supporting analysis, such as sustainability, resilience, sensitivity testing and deliverability of options.
- Demonstrate that the preferred option will have a significant positive impact on societal wellbeing.
  - This will be demonstrated by considering the full range of project impacts, including those that are difficult or costly to monetise. Ideally, the net benefits outweigh the costs as measured in present value real terms.
  - This will be underpinned by a CBA that is evidence-based and robust, with the benefit and cost estimates based on a methodology that is consistent with the respective state or territory guidance.
- Plan for successful delivery and operation over its lifecycle, supported by appropriate governance, funding and finance model and risk identification and management.

**We review proposals against all three of our Assessment Criteria, even when the economic case is strong.**

We strongly encourage you to engage with us during Stage 3. This will facilitate a robust and transparent business case development process.

## 3.2 Assessment Criteria

To assess whether the preferred option, based on its relative merit, is likely to maximise net societal benefits, we will consider it against our Assessment Criteria and associated themes. You should consider every theme, and make reference to them in your submission as relevant, noting that **the level of significance will differ and not all themes may be applicable to all proposals**.

Our assessment of submissions is based on the quality of evidence across all three criteria (and associated themes) and our experience in reviewing business cases for nationally significant infrastructure proposals. We assess the merit of submissions against each of the Assessment Criteria to build an overall picture of each proposal.


**The following sections outline how our Assessment Criteria apply to a Stage 3 submission.**

Note that we consider additional guiding outcomes when assessing program submissions. See the [Guide to program appraisal](#) for our requirements for program submissions.

### Strategic Fit

For a Stage 3 submission, our assessment of Strategic Fit focuses on how the proposal addresses a problem or opportunity of national significance, how the preferred option compares to the shortlist of options and the involvement of stakeholders in arriving at the preferred option.

**Table 4: Stage 3 Strategic Fit considerations**



Theme	Guiding outcomes
<b>Case for change</b>	<ul style="list-style-type: none"> <li>The proposal will demonstrably respond (in full or materially) to the identified problem or opportunity.</li> <li>There is clear explanation why solving that particular problem or realising that opportunity is being prioritised over addressing other (potential) problems or opportunities.</li> <li>The proposal is being undertaken at the right time in response to the scale of the problems and opportunities.</li> </ul>
<b>Alignment</b>	<ul style="list-style-type: none"> <li>The proposal should be identified in and contribute to the achievement of relevant national, state or territory policies and plans. This may include new or emerging policies.</li> </ul>
<b>Network and system integration</b>	<ul style="list-style-type: none"> <li>There is clear alignment and integration of the proposal with a broader program of work or with other projects being planned or delivered (i.e. not competing). If the proposal is part of a program, there is understanding of the extent to which the program outcomes are compromised if the proposal does not proceed.</li> <li>The proposal will enhance the supply chain by improving service efficiency for the immediate and broader network.</li> <li>Interdependencies of the proposal with other infrastructure within the network and potential vulnerabilities are identified. There are clear actions/next steps on responding to residual concerns about network integration.</li> <li>Enabling infrastructure that is required to support the proposal is identified and included in the proposal.</li> <li>The proposal will improve resilience and stability of the existing/future network.</li> </ul>



Table 4: Continued

Theme	Guiding outcomes
<b>Solution justification</b>	<ul style="list-style-type: none"> <li>• There is compelling evidence that the proposal is the most appropriate response to addressing the problem or opportunity in comparison to other options.</li> <li>• The proposal can be reshaped, re-scoped, altered or redesigned in response to risks or uncertainties eventuating (for example, through a real option approach).</li> <li>• The scale of the proposal aligns to the scale of the problems and/or opportunities. That is, it solves all or a significant extent of the problems and/or opportunities, but does not exceed what is needed.</li> <li>• Proceeding with the proposal now will avoid or minimise social, economic and/or environmental impacts in the future, either on the network, or on another part of the network (e.g. construction in a greenfield location now will be materially cheaper than building in the future).</li> </ul>
<b>Stakeholder endorsement</b>	<ul style="list-style-type: none"> <li>• There is relevant government (national, state, territory and local) support for the proposal.</li> <li>• There has been quality engagement in relation to the preferred solution and the opinions of stakeholders are accurately represented.</li> <li>• The full range of beneficiaries and stakeholders impacted by the proposal have been considered.</li> <li>• Where proposals impact more than one state or territory, inputs from and impacts to those states and territories have been considered.</li> </ul>

## Societal Impact

For a Stage 3 submission, we require evidence demonstrating the value of the shortlisted options to support the selection of the preferred option.

This is summarised in **Table 5**, with additional considerations for each theme provided in the subsequent sections.

**Table 5: Stage 3 Societal Impact considerations**



Theme	Guiding outcomes
<b>Quality of life</b>	<ul style="list-style-type: none"> <li>• Social impacts have been identified, measured and considered as far as possible in the CBA.</li> <li>• The proposal will demonstrably improve cultural outcomes (e.g. by improving the access, quality or attractiveness of meeting places, entertainment and cultural facilities).</li> <li>• The proposal will demonstrably improve living standards (e.g. by addressing poverty or entrenched disadvantage, improving access to affordable housing or essential services, including utilities).</li> <li>• The proposal will demonstrably improve learning and earning outcomes (e.g. by improving access to employment centres, access to education and skills centres – to access a wider job market and higher paid jobs – creating or retaining skills or improving local workforce participation).</li> <li>• The proposal will demonstrably improve health and safety (e.g. by improving access to health services, amenities and recreation, or by reducing risks).</li> <li>• The proposal will demonstrably improve economic and social participation (e.g. improving the access, quality and reliability of transport options or digital connectivity).</li> <li>• The proposal produces a significant improvement to a disadvantaged place (in regional or urban areas) of Australia.</li> </ul>
<b>Productivity</b>	<ul style="list-style-type: none"> <li>• The proposal will improve efficiency and productivity within the economy, such as faster movements of freight and business trips, which can be measured in dollar terms.</li> <li>• Economic impacts have been identified, measured and considered in the CBA.</li> <li>• The investment will modernise the economy and enhance sustainable productivity growth into the future, rather than replicating current economic arrangements (i.e. pioneering development, research and innovative or new industries).</li> <li>• The proposal will increase access through capacity enhancements to infrastructure networks (e.g. transport, energy, telecommunications).</li> <li>• The proposal will increase the overall efficiency and improve the reliability of an infrastructure network.</li> <li>• The proposal will improve reliability and enhance the network's resilience to disruption.</li> <li>• The proposal has considered whole-of-life costs (including operating, maintenance and end of life costs).</li> </ul>

Table 5: *Continued*

Theme	Guiding outcomes
<b>Environment</b>	<ul style="list-style-type: none"> <li>Environmental impacts (including to natural resources, habitat and broader ecosystems) during development/construction and operation are understood.</li> <li>Environmental impacts have been identified, measured and considered as far as possible in the CBA.</li> <li>The proposal does not have known significant, irreversible environmental impacts.</li> </ul>
<b>Sustainability</b>	<ul style="list-style-type: none"> <li>The proposal responds to and/or supports identified long-term drivers of change (e.g. population growth, urbanisation, globalisation, digitisation and climate change).</li> <li>Externalities have been identified, measured and considered in the CBA.</li> <li>The proposal will avoid or minimise social, economic and/or environmental costs in the future, in both the immediate and broader network.</li> <li>The proposal will improve sustainability through decreased material, energy, social or economic costs (e.g. during construction, operations and maintenance).</li> <li>Sustainability is explicitly considered in the design, delivery strategy and operations strategy.</li> </ul>
<b>Resilience</b>	<ul style="list-style-type: none"> <li>The proposal accounts for the impacts of changing future circumstances (and multiple plausible future scenarios), improving resilience to short-term and long-term shocks (such as natural hazards, war, cyber attack, pandemic and extreme weather events) and stresses (such as ageing infrastructure, rising social inequity, lack of transport accessibility and availability, rising demand for health services and political uncertainty or instability).</li> <li>The proposal assesses and responds to the specific risks and opportunities that may arise from shocks and stresses.</li> <li>The proposal addresses the resilience of the asset itself, as well as how the proposal supports the resilience of the community.</li> </ul>



## Assessing quality-of-life impacts

Quality of life relates to our standards of health, wealth, happiness and choice in how we live. Infrastructure can have positive and negative impacts on quality of life. Considering these impacts during project development helps achieve positive quality-

of-life outcomes for Australians. We have identified key characteristics of quality of life that relate to infrastructure, as outlined in **Table 6**, which you should consider as part of options analysis.

**Table 6: The key characteristics of quality of life**

Characteristic	How infrastructure can support this characteristic
<b>Culture</b>	Supporting the continuation and sharing of beliefs, arts, culture, customs and places that define individual and community identity, including through vibrant and socially inclusive meeting places, such as community, entertainment, recreational, arts and cultural facilities.
<b>Living standards</b>	Meeting the basic needs of all users and improving the standard of living of the community. This may include addressing equity issues (including cost-of-living, poverty or entrenched disadvantage), improving liveability and access (whether to employment, social and affordable housing, essential services or utilities), and accommodating all users, including people with disability.
<b>Learning and development</b>	Improving educational outcomes and fostering skills development to build social capital and productivity at all stages of life, including through access to tertiary and technical education facilities.
<b>Health and safety</b>	Improving the health of the community through access to health services, recreation choices and environmental factors (for example, connectivity for virtual health, active transport, potable water quality and air quality). Improving the safety of the community by reducing risks and improving access to justice services.
<b>Economic and social participation</b>	Providing appropriate access to desired goods and services, including where access is facilitated digitally.

### You should monetise quality-of-life impacts, where possible, and include them in the economic appraisal.

However, we recognise that monetising broader quality-of-life benefits can be difficult. Where the methods or information to monetise these impacts are not available, we suggest you provide other evidence that helps validate the impacts. To demonstrate this, you should:

- Link to the quality-of-life characteristics of the problems and opportunities identified in Stage 1.
- Describe the impact on the community of the services and infrastructure, to understand how the impacts are attributable to the social outcomes. This should be supported by relevant studies to evidence the links, such as surveys, known demand elasticities or relevant academic literature.
- Identify quantitative indicators that capture the impact of addressing the problem or opportunity by utilising relevant benchmarks (for example, relevant regional or national comparisons) and government objectives for comparison.
- Indicate the target changes in quality-of-life indicators that should be expected from the proposal.

### Providing supporting evidence

For a Stage 3 submission, we expect that the potential quality-of-life impacts will be considered when analysing the shortlisted options and be supported by evidence in line with our information requirements.

There are a number of publicly available sources that provide metrics on social outcomes by region that may be relevant. Useful sources, for which you should determine appropriateness of use specific to your proposal, are provided in **Table 7**.

**Table 7: Data sources for quality-of-life indicators**

Data source	Update frequency	Available at
ABS labour statistics (e.g. average weekly earnings, employment)	Updated every 6 months	<a href="http://www.abs.gov.au/statistics/labour">www.abs.gov.au/statistics/labour</a>
ABS Census	Updated every 5 years	<a href="http://www.abs.gov.au/census">www.abs.gov.au/census</a>
Bureau of Meteorology Urban National Performance Report (Water)	Updated annually	<a href="http://www.bom.gov.au/water/npr/">www.bom.gov.au/water/npr/</a>
Digital Inclusion Index	Updated annually	<a href="http://digitalinclusionindex.org.au/">digitalinclusionindex.org.au/</a>
Household, Income and Labour Dynamics in Australia (HILDA) Survey	Updated annually	<a href="http://melbourneinstitute.unimelb.edu.au/hilda/for-data-users">melbourneinstitute.unimelb.edu.au/hilda/for-data-users</a>
National Assessment Program – Literacy and Numeracy (NAPLAN)	Updated annually	<a href="http://www.nap.edu.au/results-and-reports">www.nap.edu.au/results-and-reports</a>
Centre for Social Impact Social Progress Index	Updated annually	<a href="http://amplify.csi.edu.au/social-progress-index/">amplify.csi.edu.au/social-progress-index/</a>

Where impacts may be less directly linked to the infrastructure (for example, where place-based development is expected to improve health and education outcomes and reduce the rate of incarceration in an area), you should support your analysis with evidence that the outcomes will be achieved, such as through relevant surveys and academic literature.

As an example, for the telecommunications sector, different options will deliver various improvements related to access, quality and reliability of digital connectivity. It is our expectation that the CBA will include monetised benefits where possible, and support this with quantitative and qualitative information where relevant.

Other impacts, such as reductions in poverty and entrenched disadvantage, are more difficult to monetise. If the purpose of the proposal is to address distributional issues, we recommend you present information as **quantitative and qualitative information on impacts, as well as distributional analysis** to show how different groups in society are affected.

## Assessing productivity impacts

Due to the economic nature of productivity impacts, they should be monetised wherever possible. See **Box 19** for examples of productivity impacts. **We will assess monetised impacts as part of our evaluation of the CBA.** Where impacts cannot be monetised, we

recommend presenting quantitative and qualitative information as well as distributional analysis to show how production is affected by the proposed options. Information on monetising economic impacts is provided in the [Guide to economic appraisal](#).



### Box 19: How to measure productivity impacts

Productivity impacts are generally measured in CBA by measuring the impacts on business activity. Some examples of investments that may result in productivity gains, and how these gains can be measured, include:

- **Investment to reduce congestion on the road network** may increase productivity for the transport and logistics sector by requiring fewer capital and labour inputs to complete the same freight task. This could be measured from travel time and vehicle operating cost saving for business users.
- **Investment in the transport network** may increase accessibility of firms to one another and their input and labour markets, generating positive productivity externalities or agglomeration effects. Methods for quantifying agglomeration effects and other wider economic benefits (WEBs) are still in development in Australia and CBA results should be presented both with and without WEBs. Further information on agglomeration effects and other WEBs is provided in the [Guide to economic appraisal](#).
- **Investment in water infrastructure** to reduce leakage and evaporation losses may improve the productivity of irrigators, resulting in increased water available for irrigation. This could be measured from the marginal value of the water saved.
- **Investment to reduce telecommunications black spots** in rural areas may increase the productivity of the agricultural sector by supporting the implementation of agricultural technology. This could be measured from the net value of the additional production.
- **Investment in social infrastructure** to reduce social disadvantage may also increase productivity in key areas of the economy, such as healthcare and education. This could be measured by societal indicators such as number of presentations.

The Australian Transport Assessment and Planning (ATAP) *T3 Wider Economic Benefits* provides the latest guidance for transport appraisals.<sup>14</sup>

- **Investment in electricity infrastructure** may increase the productivity of electricity generators and distributors, improve the electricity network's productivity and viability in the transition to a low carbon economy and reduce the costs of supplying a given level of electricity. This could be measured through the costs associated with generation, considering carbon emissions and the potential costs of offsets, and/or a change in prices paid by consumers.

14. Transport and Infrastructure Senior Officials' Committee 2021, *Australian Transport Assessment and Planning (ATAP) Guidelines T3 Wider Economic Benefits*, available at: [www.atap.gov.au/tools-techniques/wider-economic-benefits](http://www.atap.gov.au/tools-techniques/wider-economic-benefits).

## Assessing environmental impacts

Infrastructure projects may have both positive and negative impacts on the environment. For example, investments in public transport may reduce air pollution and greenhouse gas emissions by inducing mode shifting from private car to public transport.

In contrast, the construction and use of infrastructure consumes physical resources and may have negative environmental impacts, such as the clearing of native vegetation.

A project resulting in negative environmental impacts may still be justified depending on the other benefits and costs of the project. It is important that environmental impacts are incorporated into the analysis of each proposal, so that an informed decision can be made.

**Environmental impacts should be measured as part of a CBA** where possible. Monetising environmental impacts can be very difficult and involve significant uncertainty, as often there are no market prices for environmental services that would normally be used to measure changes in social welfare. Instead, environmental impacts can be monetised using non-market valuation techniques – further information on non-market valuation techniques is provided in the [Guide to economic appraisal](#).

In addition to measuring the environmental impacts of the project, the CBA should include project costs related to **environmental offsets, mitigation and remediation**. These actions and associated project costs are often required to obtain planning and environmental approvals and help offset the environmental impact of the project.

We will assess monetised environmental impacts as part of our assessment of the CBA. We recommend you present the following information alongside the CBA results:

- Quantitative and qualitative information to describe how the project will impact the environment.
- Proposed environmental offsets or mitigation strategies for the project and their effectiveness to preserve and enhance environmental outcomes.
- Information prepared to seek Commonwealth and state or territory environmental approvals, where relevant.
- The outcome of national and state or territory environmental approvals, where relevant.

## Assessing sustainability

**Sustainability is a broad topic that crosses a number of themes within our Assessment Criteria.**

It is also a defined theme within our Societal Impact criterion to recognise specific sustainability outcomes and trade-offs. You should consider sustainability throughout your options analysis and delivery and operations planning.

This section draws out how sustainability is captured throughout the themes in **Table 5**.

**Table 8** demonstrates how we consider sustainability outcomes against applicable themes to inform our assessments. Our approach is also guided by our sustainability principles (see **Section 2.6** in the [Overview](#) volume).

Table 8: Stage 3 sustainability considerations

Criteria	Theme	Sustainability considerations
Strategic Fit	<b>Case for change</b>	The proposal responds to longer-term drivers such as climate change.
	<b>Alignment</b>	The proposal directly contributes to relevant national, state and local government goals, objectives, policies and strategic plans relating to sustainability issues, such as emissions reduction and circular economy <sup>15</sup> practices.
	<b>Network and system integration</b>	The proposal improves an infrastructure network or system's long-term sustainability, for example, in the transition to a low carbon economy.
	<b>Solution justification</b>	The proposal is planned to be delivered at the right time to avoid or minimise any negative social, economic and/or environmental costs in the future.
	<b>Stakeholder endorsement</b>	The proposal has been developed based on transparent engagement, which is inclusive of all relevant communities and cultures.
Societal Impact	<b>Quality of life</b>	The proposal promotes sustainable communities by improving or maintaining quality of life, well-being, heritage and culture.
	<b>Productivity</b>	The proposal will provide value-for-money returns over the long-term by increasing productivity and providing ongoing employment opportunities.
	<b>Environment</b>	Possible impacts on the environment of the proposal are understood, and there is a plan to protect natural assets as much as possible
	<b>Sustainability</b>	The proposal has been planned and designed to optimise social, economic, environmental and governance outcomes efficiently and responsibly throughout the asset's life.
Deliverability	<b>Implementation</b>	The proposal can be implemented without compromising other sustainability considerations, such as adversely impacting the environment during the construction phase.
	<b>Capability &amp; capacity</b>	The proposal has considered short-term and long-term employment needs, while also seeking to improve market capacity.

15. 'A circular economy aims to use resources for as long as possible, draw the maximum value from them while in use, and then recover and regenerate their components for reuse at the end stage of their service life.' Otter, C, 2018. *The circular economy: an explainer*. Department of Parliamentary Services, Parliament of Victoria, Melbourne, p. 2.

Sustainability considerations should be embedded as part of preparing your business case. This should be **demonstrated both qualitatively and quantitatively, in addition to being monetised where relevant or possible**. The key activities here are including externalities and whole-of-life costing into CBA (see **Box 13**).

The assessment of shortlisted options should also **consider the trade-offs between current and future generations in determining a preferred option**. Sustainability considerations should then be applied to the design of the preferred option and the development of the delivery strategy and operations strategy.

#### Reaffirm sustainability in the underlying drivers of change

In your Stage 3 submission, you should reaffirm how the underlying longer-term drivers of change have been considered in your analysis of options and your presentation of the base case. This should include justification of the projections applied, for example, how you have factored in changes in population growth, urbanisation, globalisation, digitisation and climate change over time. We suggest consulting with the relevant state or territory treasury to ensure appropriate projections are being applied.

#### Analyse externalities as part of a CBA

Your Stage 3 submission should include all material social, economic and environmental impacts as part of a CBA.<sup>16</sup> This should include both positive and negative externalities such as changes in air pollution, noise, biodiversity and social impacts.

#### Whole-of-life costing as part of CBA

Your analysis should be based on robust, whole-of-life costing for both the base case and options. This should include all aspects of the construction, operation, maintenance, renewal and disposal/decommissioning of an asset across the appraisal period.<sup>17</sup> Stage 3 submissions should justify the scope of the costing used for your CBA and to determine a preferred option.

#### Designing for sustainability

Designing for sustainability in your preferred option should also be considered. Examples of this include reducing material and energy usage, using recycled materials and recycling existing assets. The CBA may need to be reassessed for the preferred option in order to understand the incremental costs and benefits of a higher level of sustainability in design.

#### Consider sustainability in the delivery strategy and operations strategy

We expect that sustainability is considered in the delivery strategy and operations strategy for the preferred option. This should document sustainability considerations for risk management, procurement, delivery/construction and benefit realisation.

Sustainability considerations will be specific to the proposal context, but should be considered consistently across these outputs. You should demonstrate a robust approach to mitigating negative impacts and/or enhancing positive impacts.

16. A useful rule of thumb to determine whether an impact is material is to consider whether the impact is expected to be 10% or greater of the infrastructure cost. There may be some impacts of less than 10% which should be calculated if they are of strategic importance.

17. For further information on whole-of-life costing see New Zealand Treasury 2015, *Whole of Life Costs Guidance*. Available at: [www.treasury.govt.nz/publications/guide/whole-life-costs-guidance](http://www.treasury.govt.nz/publications/guide/whole-life-costs-guidance), AS/NZS 4536: 1999 *Life cycle costing – An application guide*, and Transport for NSW, 2018, *Life Cycle Costing*, T MU AM 01001 ST.



## Box 20: Case study – demonstrating sustainability in your business case

An Australian city is considering a nationally significant recycled water proposal. It comprises constructing a water recycling facility and associated infrastructure network. In the short term, the recycled water is intended for irrigation of agriculture and green space with the flexibility to provide for residential users following augmentation in the future. This project will help address a water security problem while also responding to the drivers of population growth, urbanisation and climate change.

The project demonstrates the following sustainability considerations:

- **Strategic Fit:** the project aligns with stated policy objectives to increase agricultural production while promoting the efficient and sustainable use of water, and has considered the community to identify their specific needs over the long term. The project has also considered workforce diversity and inclusion, including through an Aboriginal Participation Strategy.
- **Societal Impact:**
  - Quality-of-life benefits include improved quality of green space through irrigation and the option to improve residential water security in the future. Material impacts – such as liveability, water resilience, avoided cost of drought – are included in the CBA.
  - Productivity benefits include increased yield of agriculture resulting from improved water security and water efficiency. Material impacts are included in the CBA.
  - Environmental benefits may arise if demand for water from other sources is reduced and if more water is available for release to maintain downstream river health. Impacts are identified by quantifying the frequency and volume of release and an environmental investigation of impacted species. Negative environmental impacts were minimised by reducing clearing of native vegetation for construction.
- Sustainability may be specifically addressed through planning and design by measuring and responding to the long-term drivers of the proposal, in addition to adopting sustainable design practices that reduce the impacts of construction and the ongoing operating costs.
- Resilience for the broader community is achieved through the improved water availability from the project, and may be complemented by providing blue and green space for cooling, thereby reducing the impacts of extreme heat events.
- **Deliverability:** the facility can be located on a brownfield site and may be able to leverage the existing water network, reducing environmental impacts in the construction phase. Opportunities can be identified to embed sustainable practices through the sourcing and reduction of materials, such as prioritising local material, using resources efficiently and maximising the use of recycled and reclaimed materials.

## Assessing resilience

Like sustainability, resilience is a broad topic that crosses a number of themes within our Assessment Criteria. It is also a defined theme within our Societal Impact criterion to recognise specific resilience outcomes and trade-offs. You should consider resilience throughout your options development and analysis.

Table 9 demonstrates how we consider resilience outcomes against applicable themes to inform our assessments. Our approach is also guided by our seven characteristics of resilient infrastructure (see Section 2.6 in the [Overview](#) volume).

**Table 9: Stage 3 resilience considerations**

Criteria	Theme	Resilience considerations
Strategic Fit	Case for change	The proposal responds to a clear problem or opportunity relating to the management of shocks and stresses, including under scenarios of future uncertainty.
	Alignment	The proposal directly contributes to relevant national, state and local government goals, objectives, policies and strategic plans relating to resilience, including shocks and stresses, such as bush fires, coastal inundation and cyber-attack. This includes consideration of new or emerging policies.
	Network and system integration	The proposal considers resilience and redundancy within the network and broader interconnected systems and interdependent infrastructure, such as its role in emergency response or how it improves network redundancy.
	Stakeholder endorsement	A diverse set of stakeholders have been consulted to understand potential community vulnerabilities and the broad range of current and potential future challenges that these communities may face.
Societal Impact	Quality of life	The proposal considers the protection and enhancement of quality of life, wellbeing, heritage and culture both during and after shocks and stresses. Improved quality-of-life outcomes contribute to community resilience.
	Productivity	The proposal will improve the ability to absorb and recover from shocks and stresses to minimise disruption to productivity.
	Environment	The proposal demonstrates how to absorb and resist shocks and stresses to minimise impacts on the broader physical environment.
	Resilience	The proposal will improve the community's ability to anticipate, resist, absorb, recover, transform and thrive in response to shocks and stresses.
Deliverability	Implementation	The proposal can be delivered without compromising the ability of communities to respond to shocks or stresses, such as disrupting a transport corridor that would be a primary route for access during extreme weather events.



In a Stage 3 submission, we expect that resilience considerations, like sustainability, will be demonstrated **both qualitatively and quantitatively in addition to being monetised where relevant or possible**. We also expect submissions to include monetised evidence, as well as qualitative information, such as demonstrating alignment to extreme weather event mitigation strategies and adaptation strategies across various government levels.

### Identify and respond to risk exposure

For a Stage 3 submission, we ask you to focus on risk exposure to define how shortlisted options could potentially be impacted by broader shocks and stresses (including from climate change). You should have already analysed and quantified this during Stage 2 when determining the performance of options against broader community resilience factors.

A Stage 3 submission can demonstrate this understanding by analysing options performance against the below considerations:

- **Criticality and prioritisation** – determine the criticality of the shortlisted options (dependencies from other assets and the community) during normal and emergency operations.
- **Systems-based approach** – when evaluating impacts of the shortlisted options, consider an expanded spatial boundary that includes the broader system and community to which the asset is connected.
- **Multi-hazard approach** – consider the risks and opportunities of the shortlisted options through a multi-hazard lens to understand compounding risk effect compared to single hazard occurrence. For example, this may include multiple shock events and/or shock events that magnify stresses, such as an extreme temperature event (the shock) that places additional strain on health infrastructure that is already at capacity (the stress).
- **Life-cycle approach** – consider the entire life cycle of the shortlisted options, recognising that shocks and stresses may change over time and that resilience efforts may be adopted in planning, design or operation, as needed.
- **Transboundary analysis** – develop a consistent analysis approach that addresses the transboundary nature of options and potential hazards.

### Identify potential shocks and stresses

If you have already completed a Stage 2 submission, you should have identified specific potential shocks and stresses that could impact both the delivery and operation of potential options (see the [Stage 2](#) volume). You should determine the likelihood and consequence of potential shocks and stresses to build results into planning and development. Refer to [Table 7](#) in the [Overview](#) volume for examples of shocks and stresses.

### Review option performance under shocks and stresses

Once relevant potential impacts have been identified, you should analyse the performance of each shortlisted option against the different shocks and stresses. This can be demonstrated through sensitivity analysis for risks, and scenario analysis for uncertainty. The purpose of sensitivity analysis is to assess the possible impact of risks, the magnitude of the impact and uncertainty on option outcomes. These impacts should be described accordingly and evaluated, with measures to mitigate and/or adapt to shocks and stresses identified.

You should always start with sensitivity analysis and then undertake scenario analysis where uncertainty exists. Our [Guide to risk and uncertainty analysis](#) provides further information on how to distinguish between risks and uncertainties and how to undertake both sensitivity and scenario analysis.

The detail you provide for each option should appropriately respect to our guiding outcomes for detailed options analysis in Stage 3 – provided in [Table 5](#). You should also refer to our [Guide to risk and uncertainty analysis](#) for guidance on how to apply sensitivity and scenario analysis to Stage 3 of the project development process.

### Develop flexible investment strategies to respond to uncertainty

Long-term changes, path dependencies and irreversibility can create uncertainty for decision-makers. Where significant uncertainty has been identified for the proposal, such as key shocks and stresses, the performance of the options and the value of a flexible investment strategy should be demonstrated using **real options analysis**.

Practical steps for considering resilience and accounting for uncertainty are to:

- Develop coherent future scenarios relevant for the proposal.
- Consider or measure the value of a range of options in these different scenarios.
- Attach likelihoods and measure costs/benefits for these different future scenarios (for quantitative real options analysis).

- If outcomes are significantly affected under the different scenarios, then develop investment strategies that provide future flexibility.

Undertaking this work will help identify options and investment strategies whose outcomes are robust to a range of different futures. Please refer to our [Guide to risk and uncertainty analysis](#) for further information on real options analysis.



## Box 21: Considering sustainability and resilience in design

Infrastructure designs should be optimised where possible to minimise or avoid the consequences of shocks and stresses or improve sustainability. For example, there may be opportunities for:

- Improved drainage, or changes to an asset's vertical or horizontal alignment, may reduce the consequences of flooding or avoid floodplains altogether.
- Complementary investment in solar or green energy (for example, solar panels on roofs of railway stations, electric vehicle charging stations or purchase of carbon credits).
- Capture and re-use of excess energy (e.g. regenerative braking on trains).
- Use of lower-emission materials in construction.
- Re-use of materials for construction (also known as circular economy).
- Use of recycled materials in construction.

The value of these improvements can be quantified, for example:

- Avoided costs of disruption from flooding or other extreme weather events (see **Box 17** for an example of analysing the net benefits of resilience) based on:
  - Probability of the event (for example, is it a 1 in 10 year or 1 in 100 year flood?)
  - Duration of disruption.
  - Foregone benefits during disruption.
  - Externality costs imposed on the rest of the network from higher demand (for example, slower network speeds).

- Avoided emissions from changes in demand for different types of fuel/energy based on applying emission intensity factors and the cost of carbon.
- Avoided landfill costs.
- Producer surplus based on net revenue from recycling.
- Consumer surplus based on willingness to pay for increased recycling.

There may be some conceptual issues associated with including benefits from design optimisation in an economic appraisal. This is because these are calculated incrementally to a base case where there is no project.

Even if the design improvements cannot be included in the economic appraisal, there is still value in quantifying their impacts on the options to demonstrate the magnitude of disruption or rectification costs that would otherwise be experienced if this optimisation exercise had not taken place.

There is also an exception where design improvements benefit other existing infrastructure, for example, where adjacent locations are no longer negatively impacted by flooding because of drainage designed to benefit a new asset (that is, there is a positive externality). In this circumstance, there is a change in consequences between the base case and project case that can be included in the economic appraisal.

## Deliverability

For a Stage 3 submission, we require evidence that Deliverability has been considered in options analysis, and the delivery risks of the proposal are considered acceptable or can be sufficiently mitigated.

**Table 10: Stage 3 Deliverability considerations**



Theme	Guiding outcomes
<b>Ease of implementation</b>	<ul style="list-style-type: none"> <li>The proposal can be delivered to the time, cost and scope required to address the problems and/or opportunities.</li> <li>Supporting activities for successful implementation of the proposal are complete or a plan is in place for them, including any residual risks (e.g. land use change, land acquisition, regulatory changes or stakeholder endorsement).</li> <li>The supply chain/network in which the proposal will fit into is ready (e.g. the update of rail service plans to accommodate new infrastructure).</li> <li>If part of a program, opportunities for the proposal to be delivered more efficiently than it could independently have been investigated (e.g. through efficient procurement, skills retention, less disruption effects).</li> </ul>
<b>Capability and capacity</b>	<ul style="list-style-type: none"> <li>The delivery agency has the track record, level of skills and experience required to deliver the proposal.</li> <li>The market has sufficient capability (tools, technology, experience) to deliver the proposal successfully and efficiently.</li> <li>The market has sufficient capacity (labour and materials) to support the delivery of the proposal.</li> <li>The market has sufficient capacity and capability to operate and maintain the asset after delivery.</li> </ul>
<b>Project governance</b>	<ul style="list-style-type: none"> <li>There is government support for the proposal.</li> <li>Appropriate governance structures, including management, quality assurance and inter-agency agreements are in place.</li> <li>Procurement approaches have been fully explored and the preferred approach has been identified with consideration of value for money and delivery risk.</li> <li>The procurement model for the proposal is the most suitable for successful delivery and a plan is in place.</li> <li>The proponent has considered and identified the most appropriate funding and financing model and, if possible, elements of this model are in place.</li> <li>Necessary planning and environmental approvals are in place, or there is clarity on the tasks needed to achieve them and the extent to which management of stakeholders is required (e.g. approval agencies, industry, unions and the community).</li> </ul>

Table 10: *Continued*

Theme	Guiding outcomes
<b>Risk</b>	<ul style="list-style-type: none"> <li>• There are processes in place to own and manage risks throughout the project lifecycle.</li> <li>• There is a well-defined schedule and cost estimate supported by project definition and design maturity that enables risks to be understood.</li> <li>• There is an appropriate level of operating cost estimate maturity to inform and/or mitigate risks transitioning into operations.</li> <li>• There is a clear understanding of the risks of delivery, such as complexity, relying on new or untested technologies, access to resources, and complex terrain or geography, and interdependency with other projects (whether in the same program or not).</li> <li>• There is clarity on the extent to which successful delivery may be impacted by environmental or social issues, such as flora/fauna, heritage and culture, climate change and/or natural hazards.</li> <li>• If there is a time gap before construction is due to start (from completion of the business case), any potential risks (e.g. change of government or legislation) have been identified with mitigations in place.</li> <li>• The impacts of delivery delays (e.g. on the supply chain or the public) have been considered.</li> </ul>
<b>Lessons learnt</b>	<ul style="list-style-type: none"> <li>• The Post Completion Review plan sets out measurement of performance against key indicators in the business case.</li> <li>• Benefits realisation has been considered, and a Benefits Realisation Plan defines a strategy for benefits measurement and management.</li> <li>• If part of a program, there is a plan in place to learn lessons from delivery of one project to the next.</li> </ul>

### 3.3 Outputs of our assessments

There are two reasons to submit a business case to us for review:

1. **To have an unfunded proposal considered for the *Infrastructure Priority List*.** Infrastructure Australia will determine if the preferred option is to be included on the Priority List.
2. **For review when a proposal has received more than \$250 million in funding from the Australian Government.** Infrastructure Australia is required to assess business cases for any proposal that has received a funding commitment above this threshold.

Each assessment is undertaken against the criteria and themes within the Assessment Framework. However, for already funded and committed proposals, our assessment will focus on identifying delivery risks and opportunities to realise proposal benefits. **Table 12** outlines the outputs of each assessment.

Stage 3 evaluation summaries are published on our website [www.infrastructureaustralia.gov.au/project-evaluations](http://www.infrastructureaustralia.gov.au/project-evaluations).

It is important you understand the following about our evaluations:

- We will assess all submissions. However, we will not review earlier stages again unless there is new information that has a bearing on the previously assessed stages.
- Where submissions are not successful, this does not mean they are not worth pursuing or revising in more detail for a future submission.
- Where submissions are not listed on the Priority List, this does not preclude them from seeking Australian Government funding.

**Table 11: Outputs of assessment**

We will:	Priority List submission	Funded proposal submission
Inform you once we have accepted your proposal for evaluation	✓	✓
Inform you of the outcome of our evaluation	✓	✓
Add successful proposals to the Priority List	✓	
Publish a summary of our evaluation	✓	✓
Provide you with feedback on our decision	✓	✓

### 3.4 Removing proposals from the Infrastructure Priority List

Proposals may be removed from the Priority List for a number of reasons:

1. The proposal receives a commitment of funding for delivery from the Australian Government.
2. The proposal proceeds to construction (major contracts are awarded).
3. The proposal is withdrawn because the problem or opportunity is no longer nationally significant. (Evidence of the change, such as change in forecast demand, is required to support this action).
4. The proposal is withdrawn because it no longer meets our Strategic Fit or Deliverability criteria.

# 4

## Submission Checklist

If you are making a Stage 3 submission to us, you will need to provide documentation supporting the selection of the preferred option and the rationale for proceeding with it.









## Stage 3 Submission Checklist

**Table 13** provides our submission checklist, which clearly lists all of the items that are required or recommended in a Stage 3 submission. The editable **Stage 3 Submission Checklist** that we require to accompany your submission is available at [www.infrastructureaustralia.gov.au/submit-a-proposal](http://www.infrastructureaustralia.gov.au/submit-a-proposal). The business case and relevant supporting information should be provided in a relevant state, territory or agency template.

We classify submission items as **required**, **recommended** or **good practice**, as described in **Table 12**.

We encourage you to engage with us when developing your Stage 3 submission, ideally after reviewing this guidance and the Stage 3 Submission Checklist, but prior to formally lodging your submission. We can provide advice and initial review to ensure you are meeting our requirements, which may avoid us seeking clarification or requesting additional work be completed after submission.

Contact us to discuss your proposal before submission and to arrange a secure file transfer facility for your submission. You can contact us via email at [proposals@infrastructureaustralia.gov.au](mailto:proposals@infrastructureaustralia.gov.au) or call us on **02 8114 1900**.

**Table 12:** Classification of submission checklist requirements

<b>Required</b>	Proponents must provide this information, including evidence justifying the analysis or outputs that have been determined.
<b>Recommended</b>	Proponents must consider recommended items and provide supporting evidence justifying if they have not been assessed.
<b>Good practice</b>	Proponents should consider these discretionary items as part of good practice, but they may not apply to all proposals.

**Table 13: Stage 3 Submission Checklist**

Item	Requirement	Name relevant docs you have attached	Where can we find that info in the docs (if relevant)
<b>Proposal information</b>			
Project description	Required	<i>Included in editable Submission Checklist. Identify any additional information attached</i>	
Information is finalised (i.e. not draft or identified as subject to change)	Required		
Information is not out of date (we recommend information is current or less than 3 years old)	Required		
Confidentiality requirements	Required		
Please identify if Australian Government funding is sought for the proposal and, if so, the status and amount of funding	Required		
State or territory (gateway) review (infrastructure advisory body or equivalent), where relevant	Recommended		
On Infrastructure Priority List as Early-stage Proposal (Stage 1) or Potential Investment Options (Stage 2)	Good practice		
Stage 2 assessment complete (or documented robust and defensible options analysis) and included in Stage 3 submission	Required		
Post completion reviews of similar projects	Good practice		
<b>Step 1: Assess options in detail</b>			
Evidence of stakeholder engagement and endorsement	Required	<i>e.g. Business Case</i>	<i>e.g. Appendix D, Section 3</i>
Options analysis provided, including: <ul style="list-style-type: none"> <li>Base case definition and scope. Where planning reference case is used, justification is provided.</li> <li>Shortlisted options' definition and scope</li> </ul>	Required	<i>e.g. CBA report</i>	<i>e.g. Section 2.3</i>

Table 13: *Continued*

Item	Requirement	Name relevant docs you have attached	Where can we find that info in the docs (if relevant)
<p>At least two options (in addition to the base case) assessed in the business case.</p> <p><i>Where only one option is considered, we require a Stage 2 assessment or equivalent be completed as part of the business case to demonstrate that the one option is clearly justified and better than the alternatives</i></p>	Recommended	<i>e.g. Excel CBA model</i>	<i>e.g. n/a</i>
<p>Inputs/assumptions for costs and benefits for each option and the base case, including:</p> <ul style="list-style-type: none"> <li>List of assumptions</li> <li>Project concept or scheme design provided to appropriate level of definition</li> <li>Project cost report provided defining estimate class</li> <li>Capital cost estimate, including probabilistic P50, expected value and P90 estimates</li> <li>Operational cost estimate, including operation and routine and periodic maintenance</li> <li>Underlying demand forecasts with assumptions</li> <li>Land use, population and employment forecasts</li> <li>Integrated planning (e.g. land use and transport)</li> <li>Demand modelling report</li> <li>Demand model</li> </ul>	Required		
<p>Peer reviews:</p> <ul style="list-style-type: none"> <li>Project cost report</li> <li>Demand modelling</li> <li>Cost–benefit analysis (CBA)</li> </ul>	Recommended		
<b>Step 2: Determine the preferred option</b>			
<b>Strategic Fit</b>			
State/territory support or approval provided	Recommended		
Alignment with relevant national, state and local government goals, objectives, policies and/or strategic plans	Required		
Provide relevant documents responding to our assessment themes	Required		

Table 13: *Continued*

Item	Requirement	Name relevant docs you have attached	Where can we find that info in the docs (if relevant)
<b>Societal Impact</b>			
Detailed social, economic and environmental assessment (i.e. cost–benefit analysis report)	Required		
CBA model, including: <ul style="list-style-type: none"> <li>• spreadsheet breakdown of cost–benefit analysis</li> <li>• calculations (i.e. model is not ‘hard-coded’)</li> <li>• time stream for each benefit and cost component (\$m, real, undiscounted)</li> <li>• discounted cash flows (\$m, real, discounted)</li> </ul>	Required		
Non-monetised costs and benefits clearly articulated, including quantification where possible	Required		
Sensitivity testing	Required		
Real options and/or scenario analysis	Good practice		
Sustainability is explicitly considered, e.g. sustainability report	Good practice		
Resilience is explicitly considered	Good practice		
<b>Deliverability</b>			
Financial analysis	Required		
Risk assessment	Required		
Environmental approvals	Required		
Other relevant information	Required		
<b>Step 3: Develop the delivery strategy and operations strategy</b>			
Project schedule	Required		
Governance structures	Required		
Risk register and risk management plan	Required		
Change management plan	Recommended		

Table 13: *Continued*

Item	Requirement	Name relevant docs you have attached	Where can we find that info in the docs (if relevant)
Delivery and procurement strategy, including market assessment of capability and capacity	Required		
Funding and financing models	Required		
<p>Environmental and planning approvals, in accordance with state or territory requirements, including:</p> <ul style="list-style-type: none"> <li>• Status of environmental approvals</li> <li>• Review of Environmental Factors (REF), Environmental Impact Statement (EIS) or equivalent</li> </ul> <p><i>If this is not available, provide the plan for gaining approvals including, at a minimum, identification of major environmental risks and the strategy for mitigating risks (may be included in risk register).</i></p>	Required		
<p>Post Completion Review plan, including:</p> <ul style="list-style-type: none"> <li>• timing for the initial and subsequent reviews</li> <li>• metrics to review project outcomes</li> <li>• data organisation, capture and storage requirements</li> <li>• responsibility for: <ul style="list-style-type: none"> <li>— capturing and storing the information</li> <li>— completing the review(s)</li> </ul> </li> <li>• approach to measure actual project benefits and costs</li> </ul>	Required		
Direct FTE employment numbers	Recommended		
<b>Step 4: Document the business case</b>			
Project options rankings	Required		
Appraisal summary table (for each shortlisted option)	Good practice		
Any other information attached in support of proposal			

Program-specific requirements

Where your proposal is part of a program, we require additional information to be included in Stage 3 (business case) submissions for:

- Pathway 1 – **project business cases** for projects that are part of a program
- Pathway 2 – **program business cases** for an overall program.

**Table 14** sets out the requirements you need to consider for proposals that are part of a program. Further information on programs is available in the [Guide to program appraisal](#).

Table 14: Program-specific submission requirements

Item	Requirement	Name relevant docs you have attached	Where can we find that info in the docs (if relevant)
<b>For Pathway 1 only</b> Project business cases for projects that are part of a program			
Demonstrate alignment with strategic objectives of the program business case	Required		
Program-level analysis to justify the preferred program option (particularly if the program is not already listed on the Priority List at Stage 1 or Stage 2)	Required		
Establish economic benefits and outcomes metrics for monitoring how projects contribute to the program	Required		
Deliverability assessment, including demonstration of value for money in project delivery through benchmarking and continuous improvement by reviewing projects that have been delivered and identifying learnings to reduce costs for future work packages	Required		
Program governance arrangements	Required		
Demonstrate relationships to other projects or programs (where they exist)	Required		
Program outcomes management plan, including post completion reviews for each project as they are delivered to inform future projects within the program	Required		

Table 14: *Continued*

Item	Requirement	Name relevant docs you have attached	Where can we find that info in the docs (if relevant)
<b>For Pathway 2 only</b> Program business cases for an overall program			
Clear justification for delivery as a program – that is, by meeting our criteria	Required		
Options assessment defining the program options and project makeup in detail <ul style="list-style-type: none"> <li>• <i>Where relevant (for inter-related or ongoing programs), the prioritisation framework that will be used on an ongoing basis to select projects</i></li> </ul>	Required		
Design maturity sufficient to inform investment decision with regard to the program	Required		
Cost maturity sufficient to inform investment decision – sufficient to provide an estimate of program cost	Required		
Detailed value-for-money assessment (CBA) and financial assessment	Required		
Report economic benefits and outcomes metrics for monitoring the program	Required		
Proposed delivery sequence and implementation plan, including deliverability assessment	Required		
Details of program governance arrangements	Required		
Program-level risks and mitigations, and a plan for how project-level risks will be assessed, monitored and mitigated as the program proceeds	Required		
Demonstrate relationships between projects and with other programs (where they exist)	Required		
Program outcomes management plan, including post completion reviews for each project as they are delivered to inform future projects	Required		





# Glossary

Term	Definition
<b>Appraisal</b>	The process of determining the impacts and overall merit of a proposal, including gathering and presenting relevant information for consideration by the decision-maker.
<b>Appraisal period</b>	The number of years over which the benefits and costs of an infrastructure proposal are assessed in a <b>cost–benefit analysis</b> . A default value of 30 operational years plus construction time is generally used for infrastructure proposals. Refer to the <b>Guide to economic appraisal</b> for more information.
<b>Appraisal summary table (AST)</b>	This table succinctly captures both the qualitative and quantitative elements of a proposal. It will assist decision-makers to quickly understand the broader strategic, societal and deliverability aspects of the proposal.
<b>Assessment</b>	For the purposes of the <b>Assessment Framework</b> , this refers to Infrastructure Australia's evaluation of proposals submitted to us for inclusion on the <b>Infrastructure Priority List</b> or for a funded proposal review.
<b>Assessment Criteria</b>	The three criteria Infrastructure Australia assesses proposals against: <b>Strategic Fit, Societal Impact and Deliverability</b> .
<b>Assessment Framework</b>	A publicly available document that details how Infrastructure Australia assesses infrastructure proposals. It provides structure to the identification, analysis, appraisal, and selection of proposals and advises proponents how to progress through the following four stages: <ul style="list-style-type: none"> <li>• Stage 1: Defining problems and opportunities</li> <li>• Stage 2: Identifying and analysing options</li> <li>• Stage 3: Developing a business case</li> <li>• Stage 4: Post completion review</li> </ul>
<b>Australian Infrastructure Audit</b>	Published in August 2019, the Audit was developed by Infrastructure Australia to provide a strategic assessment of Australia's infrastructure needs over the next 15 years. It examined the drivers of future infrastructure demand, particularly population and economic growth. Data from the Audit is used as an evidence base for assessments of proposals for inclusion on the <b>Infrastructure Priority List</b> .
<b>Australian Infrastructure Plan</b>	The 2021 Plan was developed by Infrastructure Australia as a positive reform roadmap for Australia. Building off the evidence base of the Audit (see <b>Australian Infrastructure Audit</b> ), the Plan sets out solutions to the infrastructure challenges and opportunities Australia faces over the next 15 years, to drive productivity growth, maintain and enhance our standard of living, and ensure our cities remain world class. The 2021 Plan supersedes the February 2016 Plan.
<b>Base case</b>	A project <b>appraisal</b> compares the costs and benefits of doing something (a 'project case') with not doing it (the 'base case'). The base case should identify the expected outcomes of a ' <b>do-minimum</b> ' situation, assuming the continued operation of the network or service under good management practices. We recommend the committed and funded expenditure approach to defining the base case, but recognise that some states and territories use the planning reference case approach.
<b>Base year</b>	The year to which all values are discounted when determining a present value. (See <b>discounting</b> and <b>discount rate</b> ).
<b>Benefit–cost ratio (BCR)</b>	This is the ratio of the present value of economic benefits to the present value of economic costs. It is an indicator of the economic merit of a proposal presented at the completion of a cost–benefit analysis. (See <b>cost–benefit analysis</b> ).

Term	Definition
<b>Business case</b>	A document that brings together the results of all the assessments of an infrastructure proposal. It is the formal means of presenting information about a proposal to aid decision-making. It includes all information needed to support a decision to proceed, or not, with the proposal and to secure necessary approvals from the relevant government agency. Unless otherwise defined, we are referring to a final or detailed business case, rather than an early (for example, strategic or preliminary) business case, which is developed in accordance with state or territory requirements. A business case is prepared as part of Stage 3 of the Assessment Framework.
<b>Capital cost</b>	The initial fixed costs required to create or upgrade an economic asset and bring it into operation. This includes expenses such as the procurement of land, buildings, construction, labour and equipment.
<b>Computable general equilibrium (CGE) modelling</b>	CGE modelling traces the flow-on impacts of a policy change in a systematic way, such as indirect impacts on sectors of the economy. The outputs of CGE models do not usually play a role in CBA. CGE models focus on 'economic activity impacts', which are not a measure of efficiency effects. (See <b>economic impact analysis</b> ).
<b>Cost–benefit analysis (CBA)</b>	An economic analysis technique for assessing the economic merit of an infrastructure proposal. It involves assessing the benefits, costs, and net benefits to society the proposal would deliver. It aims to attach a monetary value to the benefits and costs wherever possible and provide a summary indication of the net benefit. (See <b>benefit–cost ratio</b> ).
<b>Cost-effectiveness analysis (CEA)</b>	Cost-effectiveness analysis is used when the benefits of project options are identical. Its aim is to identify the option that will cost the least. The technique for valuing costs is the same as for <b>cost–benefit analysis</b> .
<b>Cost distribution</b>	<b>Probabilistic project cost estimates</b> identify cost components, determine the probability distribution for each cost component and then undertake a simulation (often a 'Monte Carlo' simulation) to generate a probabilistic distribution of project costs.
<b>Delivered proposal (Stage 4)</b>	Once we've assessed the post completion review of a delivered project we will list it on the <b>Infrastructure Priority List</b> as a delivered proposal.
<b>Deliverability</b>	One of three overarching <b>Assessment Criteria</b> we use to assess the merit of every proposal, at every stage. This criterion asks: can the proposal be delivered successfully? We assess whether the proposal is capable of being delivered successfully, whether risks have been identified and sufficiently mitigated, and whether there is a plan in place to realise the benefits.  This criterion is divided into five themes: ease of implementation, capability and capacity, project governance, risk and lessons learnt.
<b>Demand forecasting</b>	The activity of estimating future demand (such as public transport patronage, vehicle volumes or water usage) in a particular year or over a particular period.
<b>Discount rate</b>	The interest rate at which future dollar values are adjusted to represent their present value (that is, in today's dollars). This adjustment is made to account for the fact that money today is more valuable than money in the future. <b>Cost–benefit analysis</b> should use real social discount rates.
<b>Discounted cash flow (DCF)</b>	An analytical technique for converting a monetary impact at one point in time to a monetary impact at another. Project performance measures (such as internal rate of return and <b>net present value</b> ) are based on this technique.
<b>Discounting</b>	The process of converting money values that occur in different years to a common (base) year. This is done to convert the dollars in each year to present value dollars. (See <b>discount rate</b> ).
<b>Distributional effect</b>	A change (positive or negative) in the economic welfare of a group of individuals or firms caused by a proposal.
<b>Do-minimum</b>	A base case reflecting the continued operation of the network or service under good management practices. It should assume that general operating, routine and periodic maintenance costs will continue to occur, plus a minimum level of capital expenditure to maintain services at their current level (e.g. maintaining access or reliability) without significant deterioration. This may include asset renewals and replacement of life-ending components on a like-for-like basis, as well as committed and funded projects and smaller scale changes required to sustain viable operations under the base case. (See <b>base case</b> ).

Term	Definition
<b>Early-stage proposal (Stage 1)</b>	Stage 1 submissions that are positively assessed by us are listed on the <i><b>Infrastructure Priority List</b></i> as an early-stage proposal.
<b>Economic efficiency</b>	A measure of the extent to which economic gains (also referred to as increases in societal welfare) have been or could be achieved. Economic efficiency is improved whenever those who gain from a change could compensate the losers out of their gains and still have some gain left over. Maximum economic efficiency is said to be obtained when no further changes of this type are possible (i.e. there are no unexploited opportunities to improve everybody's welfare).
<b>Economic impact analysis</b>	A form of economic analysis aimed at establishing the effect that a proposal will have on the structure of the economy, or on the economic welfare of groups of people or firms. Economic impacts are usually expressed in terms of employment and income effects, broken down by economic sector and/or region. <b>Computable general equilibrium</b> and input–output analyses are types of economic impact analysis.
<b>External cost</b>	A cost imposed on third parties, including time lost from delays, accident risks and environmental impacts (valued at <b>resource costs</b> where applicable).
<b>Expected Value</b>	The mean value of the <b>cost distribution</b> . If the cost distribution is symmetrical, the Expected Value will be equal to the P50 value. Where the cost distribution is positively skewed, the mean will be above the P50 value and may lie closer to the P90 value. (See <b>P50 cost</b> and <b>P90 cost</b> )
<b>Externality</b>	An effect that one party has on another that is not transmitted through market transactions. An example is noise pollution from vehicles: those operating the vehicles disturb other parties such as nearby residents, but a market transaction between these parties is absent.
<b>Financial analysis</b>	The evaluation of the benefits and costs, measured in financial cash-flow terms, to a single entity (that is, not the community or the economy).
<b>First-year rate of return (FYRR)</b>	Benefits minus operating costs in the first full year of operation of a proposal discounted to the start of the evaluation period, divided by the present value of the investment costs, expressed as a percentage. The first-year rate of return is used to determine the optimum timing of proposals.
<b>Impact</b>	A generic term to describe any specific effect of a proposal. Impacts can be positive (a benefit) or negative (a cost).
<b>Indicative delivery timeframe</b>	For investment-ready proposals (Stage 3), this provides the proponent's indication of when the proposal is likely to be delivered and operational.
<b>Infrastructure</b>	Physical assets and facilities that enables organisations to provide goods and services to the community and improves quality of life, efficiency, accessibility and liveability of our cities and regions. This includes, but is not necessarily limited to, transport, energy, telecommunications, water and social (such as health, education, social housing and community facilities) infrastructure.
<b>Infrastructure Australia Act</b>	The <i>Infrastructure Australia Act 2008</i> (Cth) is the legislative framework by which we operate and report through our responsible Minister (the Minister for Infrastructure, Transport and Regional Development).
<b>Infrastructure Priority List</b>	The Priority List is a credible pipeline of nationally significant infrastructure proposals that are seeking investment. Every proposal on the Priority List is expected to contribute to national productivity or to be otherwise socially beneficial. It is a statement of where governments, the community and the private sector can best focus their infrastructure efforts.
<b>Internal rate of return (IRR)</b>	The discount rate that makes the net present value equal to zero. The IRR must be greater than or equal to the discount rate for a proposal to be economically justified. The discount rate is therefore also known as the hurdle rate. (See <b>discount rate</b> ).

Term	Definition
<b>Investment costs</b>	<p>The costs of providing the infrastructure before operations commence (e.g. costs for planning and design, site surveying, site preparation, investigation, data collection and analysis, legal costs, administrative costs, land acquisition, construction costs, consequential works, construction externalities).</p> <p>In some cases, investment costs can recur throughout the <b>appraisal period</b> (e.g. asset replacement or renewal costs). For <b>cost–benefit analysis</b>, these should all be expressed in economic cost terms (also known as resource costs).</p>
<b>Investment-ready proposal (Stage 3)</b>	Stage 3 submissions that are positively assessed by us are listed on the <b>Infrastructure Priority List</b> as investment-ready proposals.
<b>Land use impacts</b>	A change in the types of activities that occur in a section of land, or the intensity of those activities. Changes in activity may be caused by a change in use of the existing built form or a change in the built form itself. For example, an increase in the amount of high-density housing in the area around a train station.
<b>Longlist of options</b>	A comprehensive list of potential options to address the problems and realise the opportunities identified in Stage 1. The longlist includes all options that are identified for a proposal and should represent a range of reasonable alternatives, including capital and non-capital options, as well as demand-side and supply-side options.
<b>Maintenance</b>	Incremental work to repair or restore infrastructure to an earlier condition or to slow the rate of deterioration. This is distinct from construction and upgrading, which seeks to extend infrastructure beyond its original condition.
<b>Monetised</b>	Where a quantified impact has a corresponding dollar value attached to it. (See <b>impact</b> ).
<b>Nationally significant problem or opportunity</b>	<p>The <i>Infrastructure Australia Act 2008</i> (Cth) defines nationally significant infrastructure as including transport, energy, communications, and water infrastructure ‘in which investment or further investment will materially improve national productivity’. We also consider social infrastructure, such as health, education, social housing and community facilities.</p> <p>As a guide, for a proposal to be considered nationally significant, it should concern a problem or opportunity that will have more than \$30 million per annum impact on the economy (nominal, undiscounted). We also take unquantified social benefit considerations into account.</p>
<b>Net present value (NPV)</b>	The monetary value of benefits minus the monetary value of costs over the appraisal period, with discount rates applied (See <b>discount rate</b> and <b>appraisal period</b> ).
<b>Network</b>	Infrastructure networks are the physical assets that enable the provision of services such as transport connectivity, power, water and internet.
<b>Non-infrastructure options/solutions</b>	Proposals that avoid the need for significant expenditure on new or upgraded infrastructure. For example, changes to pricing or reforms to regulations.
<b>Operating costs</b>	The costs of providing the infrastructure after it has commenced operation (e.g. maintenance and administration costs of a facility).
<b>Opportunity</b>	An evidence-based reason for action that results from a gap between an actual and a desired outcome. In the context of the Assessment Framework, an opportunity is informed by the <b>Australian Infrastructure Audit</b> and by our collaboration with proponents to identify jurisdictional and national opportunities.
<b>Option</b>	A possible solution to a problem, including base case options such as ‘do nothing’ or ‘do minimum’. (See <b>base case</b> ).
<b>Options analysis</b>	The analysis of alternative options for solving an identified problem or realising an identified opportunity. (See <b>option</b> ).
<b>Pathway</b>	In the context of the Assessment Framework, this refers to the steps we move through in the assessment of an infrastructure proposal.

Term	Definition
<b>Place</b>	A geographical area within a clearly defined boundary. A 'place' can be scaled at different levels, for example, a precinct, strategic centre or sub-region.
<b>Place-based</b>	A 'place-based' approach to infrastructure applies a wide lens to consider the total impact and needs of a particular community or place over the longer term. It adopts an integrated approach to land use and infrastructure planning. It takes a cross-sectoral view of the interrelated infrastructure and amenity needs of a place, and identifies how and when these should be delivered. (See <b>place</b> ).
<b>Post completion review</b>	A review of a completed project to determine whether the desired objectives and/or forecast benefits and costs have been realised, and to explain the reasons for any differences between the expected and actual outcomes. The aim is to draw appropriate lessons for future project identification and assessment. A post completion review is sometimes referred to as an 'ex-post evaluation'.
<b>Potential investment options (Stage 2)</b>	Stage 2 submissions that are positively assessed by us are listed on the <i><b>Infrastructure Priority List</b></i> as potential investment options.
<b>Price elasticity</b>	An economic measure to describe the sensitivity of a relationship between price variables. (See <b>elasticity</b> ).
<b>Price year</b>	The year in which the prevailing prices are used in the analysis for the valuation of impacts.
<b>Private cost</b>	Cost incurred by an individual user or service provider. Private costs are valued at market prices, where applicable, and may include user costs but exclude external costs imposed on others.
<b>Probabilistic project cost estimates</b>	These estimates identify cost components, determine the probability distribution for each cost component and then undertake a simulation (often a 'Monte Carlo' simulation) to generate a probabilistic distribution of project costs. (See <b>cost distribution, expected value, P50 cost</b> and <b>P90 cost</b> ).
<b>Problem</b>	An evidence-based reason for action that results from a gap between an actual and a desired outcome. In the context of the Assessment Framework, problems are informed by the <i><b>Australian Infrastructure Audit</b></i> and by our collaboration with proponents to identify jurisdictional problems and national problems.
<b>Producer surplus</b>	The difference between the price at which a producer is willing to supply a particular good or service and the price the producer actually receives.
<b>Productivity</b>	The efficiency with which the economy as a whole convert inputs (labour, capital and raw materials) into outputs. Productivity grows when outputs grow faster than inputs, which makes the existing inputs more productively efficient.
<b>Project</b>	An infrastructure intervention. A project will move through the stages of project initiation, planning, delivery and completion. A suite of related projects to address a common problem or opportunity will create a <b>program</b> .
<b>Program</b>	A proposal involving a package of projects that are clearly interlinked by a common <b>problem</b> or <b>opportunity</b> . The package presents a robust and holistic approach to prioritise and address the projects, and there is a material opportunity to collaborate and share lessons across states, territories or agencies. The projects can be delivered in a coordinated manner to obtain benefits that may not be achieved by delivering the interventions individually. (See <b>project</b> ).
<b>Proponent</b>	An organisation or individual who prepares and submits infrastructure proposals to us for assessment. To be a proponent of a business case (a Stage 3 submission), the organisation must be capable of delivering that proposal. (See <b>business case</b> ).
<b>Proposal</b>	The general term we use for successful submissions to the <i><b>Infrastructure Priority List</b></i> , across the key stages of project development, specifically – early-stage (Stage 1), potential investment options (Stage 2) and investment-ready proposals (Stage 3). Proposals that have been delivered would be assessed in Stage 4.

Term	Definition
<b>P50 cost</b>	An estimate of project costs based on a 50% probability that the cost estimate will not be exceeded.
<b>P90 cost</b>	An estimate of project costs based on a 90% probability that the cost estimate will not be exceeded.
<b>Qualitative</b>	A description of an impact that does not rely on quantitative or monetised information.
<b>Quantitative/quantified</b>	A description of an impact that utilises, presents or references values, numbers or statistics.
<b>Rapid cost–benefit analysis (rapid CBA)</b>	A rapid CBA incorporates standard CBA principles and techniques but at a lower level of accuracy. (See <b>appraisal</b> and <b>cost–benefit analysis</b> ).
<b>Real prices</b>	Prices that have been adjusted to remove the effects of inflation. They must be stated for a specific base year, for example ‘2016 prices’. (See <b>base year</b> ).
<b>Real options analysis</b>	An investment evaluation and decision-making framework used to embed flexibility into an investment strategy to better structure and manage projects impacted by uncertainty. Real options analysis can be used as a way of thinking or as a quantitative technique to place values on options and different investment strategies. In both cases, it represents a process of understanding the value of investments under different future states of the world and developing more nuanced investment strategies to reflect this.
<b>Resilience</b>	The ability of the community to anticipate, resist, absorb, recover, transform and thrive in response to shocks and stresses to realise positive social, economic and environmental outcomes.
<b>Risk</b>	Events that have probabilities of occurrence that are predictable and outcomes that can be estimated with some confidence.
<b>Root cause</b>	The underlying causes and drivers of a proposal and how they are likely to change over time. (See <b>proposal</b> ).
<b>Scenario analysis</b>	Scenario analysis provides a framework for exploring the uncertainty about future consequences of a decision, by establishing a small set of internally consistent future scenarios and assessing options against each of them. This form of analysis is especially useful for decision-makers faced with forms of uncertainty that are uncontrollable or irreducible (e.g. future technology change or increased climate variability).
<b>Sensitivity analysis</b>	Changing a variable, or a number of variables, in a model or analysis to test how the changes affect the output or results.
<b>Shortlist of options</b>	The set of options determined as most likely to benefit the Australian community using a structured, quantitative and unbiased analysis (in Stage 2). The shortlist of options is taken to Stage 3 for detailed analysis. We recommend the shortlist includes at least two viable options.
<b>Social cost</b>	See <b>opportunity cost</b> .
<b>Social discount rate</b>	Discount rates translate future costs and benefits to a common time unit, comparing costs and benefits that accrue at different times by expressing them as an equivalent amount in today's dollars. In the economic appraisal, a real discount rate should be used that considers societal resources. (See <b>appraisal</b> and <b>real discount rate</b> ).
<b>Social, economic and environmental impact</b>	The positive and negative effects of a proposal, with regards to: <ul style="list-style-type: none"> <li>• social: quality-of-life effects, such as social exclusion and access to services, employment and safety</li> <li>• economic: productivity effects, such as productive capacity, economic capability, global competitiveness</li> <li>• environmental: effects such as greenhouse gas emissions, waste treatment, noise pollution, visual intrusion, heritage impacts.</li> </ul>

Term	Definition
<b>Socially beneficial</b>	Something is socially beneficial if you can demonstrate an evidence-based improvement that will change the quality of life of Australians. For example, through improved health outcomes, access to services/employment, and improved environmental outcomes.
<b>Societal wellbeing</b>	The welfare of Australian society as a whole. Effects on societal wellbeing, often referred to as impacts, can be positive (a benefit) or negative (a cost), and form the basis for <b>cost–benefit analysis</b> .
<b>Societal Impact</b>	One of three overarching <b>Assessment Criteria</b> we use to assess the merit of every proposal, at every stage. This criterion asks: what is the value of the proposal to society and the economy? We assess whether the social, economic and environmental value of the proposal, and its contribution to community sustainability and resilience is clearly demonstrated by evidence-based analysis.  This criterion is divided into five themes: quality of life, productivity, environment, sustainability and resilience.
<b>Strategic Fit</b>	One of three overarching <b>Assessment Criteria</b> we use to assess the merit of every proposal, at every stage. This criterion asks: is there a clear rationale for the proposal? We assess whether there is a strong case for action, the proposal aligns to the achievement of stated goals and there is a clear fit with the community.  This criterion is divided into five themes: case for change, alignment, network and system integration, solution justification and stakeholder endorsement.
<b>Sunk cost</b>	A cost that cannot be retrieved by resale in the market. More specifically, a sunk asset is one which, once constructed, has no value in any alternative use. Bridges and railway tunnels are typically sunk assets. Sunk costs incurred in the past should be excluded from a <b>cost–benefit analysis</b> .
<b>Themes</b>	Themes are outcome areas within our Assessment Criteria. Each criterion comprises five themes. (See <b>Assessment Criteria</b> , <b>Strategic Fit</b> , <b>Societal Impact</b> and <b>Deliverability</b> ).
<b>Sustainability</b>	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
<b>Travel time savings</b>	The benefit of less time spent travelling as a result of a project. The number of hours saved is typically modelled for both personal and business travel across a network, then converted to a monetary value for use in <b>cost–benefit analysis</b> .
<b>Uncertainty</b>	Events where probabilities of occurrence are difficult to predict and outcomes are challenging to quantify.
<b>User costs</b>	Costs incurred by a transport user in addition to the money price. For example, waiting time, time in transit, unreliability, damage to freight, passenger discomfort, additional costs to complete the door-to-door journey. In <b>cost–benefit analysis</b> , quality attributes such as time and reliability need to be expressed in dollar terms based on user valuations.
<b>Vehicle operating costs</b>	The costs associated with owning, driving and maintaining a vehicle. This includes the costs of fuel consumption, oil and lubrication, tire wear, repair and maintenance, depreciation, and license and insurance.
<b>Wider economic benefits (WEBs)</b>	Improvements in economic welfare from agglomeration, imperfect competition and labour supply effects that are acknowledged, but have not been typically captured in traditional cost–benefit analysis. (See <b>cost–benefit analysis</b> ).
<b>Willingness-to-pay (WTP)</b>	The maximum amount a consumer is willing to pay for a given quantity of a particular good or service (rather than go without it). It is measured as the total area under the demand curve up to the given quantity.



# Appendix A

## Estimating employment impacts

### A-1 Terminology

#### A-1-1 Jobs supported versus new jobs

The use of 'direct FTE jobs supported' terminology is preferred when reporting direct jobs, including for jobs estimated using the 'top down' approach. This is preferred as jobs are 'supported' over a specific time period rather than permanently (for example, the construction or operational phases of a project).

A large proportion of these jobs will also not be 'new jobs' as they are sourced from the existing pool of employed workers in the economy (for example, construction workers often work as crews and move from one site to the next site after the work is completed and architects/designers/engineers provide specialised services over a limited period of time).

#### A-1-2 Phases of infrastructure project to report direct jobs

Direct FTE jobs should be estimated over the following infrastructure project phases:

- **Planning phase** – these activities include, but are not limited to, planning and design before construction begins and obtaining approvals
- **Construction phase** – these are the activities required to complete the construction of the infrastructure prior to operations
- **Operations phase** – this involves opening of the infrastructure and the duration of operations based on the infrastructure asset's life as per published guidelines and other relevant information
- **Post operations** – the time taken to fully shutdown operations or rehabilitate the site (this may not be relevant in all cases).

#### A-1-3 Defining jobs status, full-time, part-time, and FTE

When reporting jobs they should be split into full-time jobs and part-time jobs and then converted to FTE for consistency purposes and comparison with other projects. This is consistent with the Labour Force

Survey (LFS) methodology used by the Australian Bureau of Statistics (ABS).

The ABS methodology has also been developed in line with international standards, though counting employment by full-time and part time can lead to overstatement of jobs (as based on the definition below a worker would be a part-time worker even if they worked only 5 hours a week). Expressing direct jobs as FTE allows for consistency as full-time and part time jobs are expressed in terms of the FTE and overcomes these limitations.

- **Full-time employment** – Full-time employed persons are defined as full time in the labour force if they usually work 35 hours or more per week. For this methodology we assume a standard working week of 37.5 hours.
- **Part-time employment** – People are defined as employed part-time in the labour force if they usually work less than 35 hours per week. Part-time employment is defined solely on the basis of hours worked.

### A-2 Methodology

#### A-2-1 Worked example of 'top down' estimation of jobs

To assist in estimating direct jobs numbers consistently, benchmark ratios are developed with reference to ABS data. This shows industry averages for direct jobs per million dollars of expenditure (determined by sales and services income) in 2018–19 across a broad range of industry sectors for the Australian economy.

These benchmarks should be used to ensure consistent estimation of direct FTE jobs over the different phases of an infrastructure project including the planning, construction, operations, and post operations (where applicable) for different infrastructure project types. When estimating direct jobs using benchmarks, the correct data to use for the economic analysis is the P50 risk-adjusted estimates for capital and operating expenditure.<sup>18</sup>

18. Capital expenditure and operating expenditure used to estimate direct jobs should exclude any expenditure in the base case, as relevant.



## Box 22: Worked example of a ‘top down’ FTE direct jobs estimate

In this example, direct jobs FTE are estimated over the construction phase at the Australian level. The construction phase runs for over three years and the construction expenditure is \$500 million.

### Step 1: Identify time profile of expenditure for project phases and convert data into real dollars

Expenditure over the construction phase is 25% building construction, 50% heavy and civil engineering construction and 25% construction services.

- **Year 1 – 2019–20:** \$150 million [\$37.5 million building construction, \$75 million heavy and civil engineering construction and \$37.5 million construction services]
- **Year 2 – 2020–21:** \$200 million [\$50 million building construction, \$100 million heavy and civil engineering construction and \$50 million construction services]
- **Year 3 – 2021–22:** \$150 million \$37.5 million building construction, \$75 million heavy and civil engineering construction and \$37.5 million construction services]

These expenditures are converted to \$2018–19 prices (which is the reference year of the Australian industry data used for this example). In this case, price deflators have been derived from *ABS Construction Work Done Australia, ABS 8755.0*. The change in the price of construction trade services is determined by the average of the price change in building and engineering construction. Price indexes to rebase data can also be sourced from the *ABS Producer Price Indexes, Australia, ABS 6247.0*.

### Step 2: Identify relevant direct job to output multipliers and apply the regional adjustment factor

Direct job multipliers relevant to the construction sector are then identified. The data to calculate direct job multipliers is available at *ABS Australian Industry, 2018–19, ABS 8155.0, Table 1, Key data by industry sub-division*. National-level data is used to estimate direct job multipliers as more granular industry data is not available. This contains industry data (that is, at the Australian New Zealand Standard Industry Classification (ANZSIC 2006) sub-division level), which is used in this example and includes building construction, heavy and civil engineering construction, and construction services.

The direct job multiplier for the construction sector is shown in **Table 15**.

**Table 15: Direct job multipliers – Construction sector sub-divisions**

Industry sub-division	\$million of expenditure 2018–19
Building construction	1.1
Heavy and civil engineering construction	1.5
Construction services	3.6

Source: Deloitte calculations using *ABS Australian Industry, 8155, Table 1 – key data by industry subdivision*

Note: The same approach can be used to calculate the jobs multiplier for other sub-divisions as relevant, it is total employment per million dollars of expenditure (i.e. sales and services income).

## Box 22: Worked example of a 'top down' FTE direct jobs estimate *continued*

The direct job multiplier is based on jobs per million dollars of sales and services income (which is used as a proxy for expenditure).

A regional adjustment factor is applied to the national direct jobs multiplier, where relevant (in this case the factor is 1 as this example is for Australia) to adjust the Australian direct jobs multiplier to the state/territory level. The data is sourced from *ABS Australian Industry, 2018–19, ABS 8155.0, Table 6 – states and territories by industry division level*.<sup>19</sup>

The regional adjustment factor for Australian states and territories is shown in **Table 16**.

**Table 16: Regional adjustment to direct job multiplier (2018–19)**

Industry division	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Agriculture, forestry and fishing	1.12	0.97	1.03	0.94	0.80	1.09	1.19	1.38
Mining	1.12	1.75	0.93	1.91	0.91	3.03	0.79	0.00
Manufacturing	1.08	1.06	0.98	1.31	0.65	1.12	0.37	1.81
Electricity, gas, water and waste services	1.11	0.79	1.09	0.81	1.29	1.64	0.96	0.74
Construction	0.96	0.95	1.07	1.09	1.10	1.43	0.98	0.80
Wholesale trade	1.05	1.03	0.95	0.85	0.90	1.12	0.86	1.08
Retail trade	0.99	1.02	0.99	1.04	0.99	1.00	1.16	0.93
Accommodation and food services	0.93	1.08	0.99	1.01	1.07	1.19	0.85	1.07
Transport, postal and warehousing	0.99	1.05	0.91	1.11	1.01	1.23	1.00	1.13
Information media and telecommunications	1.04	0.96	1.06	0.85	0.98	0.69	1.65	0.94
Rental, hiring and real estate services	0.83	1.14	1.19	1.10	1.04	1.40	1.02	0.78
Professional, scientific and technical services	0.98	0.98	1.08	1.09	0.98	1.29	0.65	1.04
Administrative and support services	0.94	1.03	1.03	1.12	1.02	1.36	1.34	1.00
Public administration and safety (private)	0.82	1.09	1.21	1.09	1.02	0.54	0.63	1.48
Education and training (private)	0.99	0.91	1.09	1.04	1.08	1.32	1.13	1.27
Health care and social assistance (private)	0.96	1.02	1.02	1.03	0.95	1.25	1.41	1.01
Arts and recreation services	0.97	0.90	1.18	1.30	1.04	1.09	0.90	1.62
Other services	1.04	0.98	1.00	1.02	0.88	1.28	1.08	1.18

Source: Deloitte calculations based on *ABS Australian Industry, ABS 8155, Table 6, states and territories by industry division*.

Note: The regional adjustment factor is the ratio of the direct jobs to \$million of output in industry, compared to the same ratio for Australia in Industry.

19. The region adjustment is based on division level data as a lower level of granularity is not available. For example, regional adjustment factor for construction is estimated at the industry division level.

## Box 22: Worked example of a ‘top down’ FTE direct jobs estimate *continued*

### Step 3: Convert estimate of direct jobs to direct FTE jobs using conversion factors

A factor is used to convert the direct job estimate to FTE. The FTE conversion factors are sourced from *ABS Detailed Labour Force*, ABS 6291.0.55.001 and these are based on the

(ANZSIC 2006) division level using full-time and part-time hours worked for Australia.

This is shown for the construction division in **Table 17**.

**Table 17: FTE conversion factors (February 2021)**

Industry division	Jobs (000's)	FTE (000's)	Conversion factor
Construction	1164	1006	0.86

Source: Deloitte calculations and *ABS Detailed Labour Force*, ABS 6291.0.55.001, Table:RQ1 - Employed persons by Industry division of main job (ANZSIC), Labour market region (ASGS) and Sex, Annual averages of the preceding four quarters, Year to August 1999 onwards, March 2021.

Note: While only the construction is shown in Table 3, this approach can be applied for other industry divisions, as relevant.

### Step 4: Adjust direct jobs estimates to reflect changes in labour productivity

Where possible, adjustments for labour productivity should be based on project specific data. However, we realise that this is not always possible due to the availability of data. In this case, data on real gross value added per hour worked for the construction sector has been used to adjust for labour productivity.

Data to adjust for labour productivity change is sourced at the Australian level using *ABS Estimates of Industry Multifactor Productivity, Australia*, ABS 5260.0.55.002, Table 6, *hours worked basis*. This highlights that the compound annual growth rate in value added per hours worked index for construction is 1.3% over the long term.<sup>20</sup> The lowest level of granularity available is the industry division level index.<sup>21,22</sup>

20. Labour productivity can fluctuate from year to year so the compound average growth in the hours worked index over the period 1994–95 and 2018–19 is used.

21. The lowest level of granularity available for the labour productivity index published by the ABS is the industry division level.

22. The national change in labour productivity is used as this is a national example. While the ABS calculate these indexes for the State level, they are highly aggregated. However, real gross value per hour worked could be estimated where relevant using *ABS Australian National Accounts State Accounts*, ABS 5220.0 and *ABS Detailed Labour Force data* ABS 6291.0.55.001 to estimate the change in labour productivity over time.

## Box 22: Worked example of a 'top down' FTE direct jobs estimate *continued*

### Step 5: Finalise and report direct jobs estimate

Calculate the final **direct jobs estimate** using the below formula:

**Direct FTE jobs** = [Project phase expenditure (\$m real) X jobs per \$m of real expenditure X regional adjustment X conversion jobs to FTE] X (1-% change in labour productivity)

An example of deriving direct jobs 'top down' for the construction phase of a project at the national level is shown in **Table 18**.

**Box 23** provides guidance on the reporting of these jobs alongside other phases of the project.

**Table 18:** Estimation of jobs using 'top down' approach for the construction phase

Sector	2019–20	2020–21	2021–22
<b>Current prices, \$million</b>			
Building Construction	\$37.5	\$50	\$37.5
Civil Engineering	\$75.0	\$100	\$75.0
Construction trade services	\$37.5	\$50	\$37.5
<b>Real, \$million</b>	<b>2018–19</b>	<b>2018–19</b>	<b>2018–19</b>
Building Construction	\$36.3	\$46.9	\$34.0
Civil Engineering	\$72.6	\$93.4	\$67.7
Construction trade services	\$36.3	\$46.8	\$33.9
<b>Direct FTE jobs</b>			
Building Construction	38.9	50.2	36.5
Civil Engineering	108.9	140.0	101.5
Construction trade services	130.2	168.0	121.9
<b>FTE Jobs adjusted for labour productivity</b>			
Building Construction	38.4	49.0	35.2
Civil Engineering	107.6	136.7	97.8
Construction trade services	128.7	163.9	117.5
<b>Total</b>	<b>274.7</b>	<b>349.6</b>	<b>250.5</b>

Source: Deloitte Access Economics, calculations

## A-2-2 How to validate and report employment numbers

Estimates of direct FTE jobs provided in submissions for infrastructure projects should be validated to ensure they are reasonable. There are a number of strategies to validate that the estimate of direct FTE is within a reasonable range:

- Calculate the ratio of direct jobs to expenditure based on data from each project phase and activities over that phase. The jobs ratio implied from the project data should be broadly consistent with industry average benchmarks as a test of reasonableness. Where there are differences are significant (e.g. excess of 20%) the reasons should be documented and further justified.
- Direct FTE job numbers across each of the project phases should be averaged, but reporting peak jobs for a specific time period is reasonable. The example in **Box 23** uses the direct FTE construction jobs, as calculated in **Table 18 (Box 22)** plus jobs calculated for the planning and operations phases.
- Proponents should check that jobs are reported correctly and avoid the use of terminology such as the 'jobs years' or other terminology
- The estimate of direct FTE jobs should be incremental to a base case, and for business cases capital expenditure and operating expenditure (P50 risk adjusted) should be expressed incremental to any expenditure that would have occurred in the base case, using CBA discounted cash flow model, where available.
- If other economic modelling techniques have been used to estimate indirect jobs it is important the direct FTE jobs are reported separately.

To support validating and reporting employment numbers, it is useful to present the time profile of job numbers over the life of a project. **Box 23** presents an example of direct FTE job numbers over the life of a project and describes how these would be interpreted.



## Box 23: Presenting the time profile of direct FTE job numbers over the life of a project

**Table 19** presents an example of direct FTE job numbers over the life of a project to demonstrate how these would be presented and interpreted.

**Table 19:** Interpretation of direct FTE job numbers

Duration	Planning	Construction	Operations	Post Operations
2018	10			
2019	10			
2020				
2021		274.7	60	
2022		349.6	60	
2023		250.5	60	
2024			60	
2025			60	
2026			60	
2027			60	
2028			60	
2029			60	
2030			60	
2031			60	
2032			60	
2033			60	
2034			60	
2035			60	
2036			60	5
<b>Direct FTE jobs (averaged)</b>	<b>10</b>	<b>292</b>	<b>60</b>	<b>5</b>

The interpretation of **Table 19** is as follows:

- The planning phase of the project supports 10 direct FTE jobs per annum over two years (2018 and 2019)
- The construction phase of the project directly supports an average of 292 direct FTE jobs per annum over three years (2021 to 2023)
- The operations phase of the project directly supports an average of 60 direct FTE jobs per annum over the period 2021 to 2036.
- The post operations phase of the project supports five direct FTE jobs in 2036

**The infrastructure project supports 66.4 direct FTE jobs on average per annum over the period 2018 to 2036.**



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The bottom of the page features a decorative design consisting of two overlapping geometric shapes. On the left is a large, dark teal triangle pointing towards the bottom right. On the right is a smaller, dark blue-grey triangle pointing towards the bottom left. These shapes overlap in the center, creating a darker, almost black triangular area at the bottom.